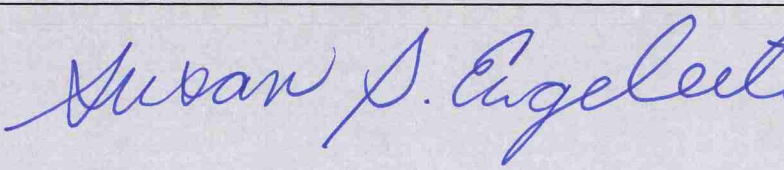


**APPENDIX A - PROPOSAL COVER SHEET
COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF GENERAL SERVICES
RFP 6100032526**

Enclosed in three separately sealed submittals is the proposal of the Offeror identified below for the above-referenced RFP:

| Offeror Information: | |
|-----------------------------------|--------------------------------------------|
| Offeror Name | Data Recognition Corporation |
| Offeror Mailing Address | 13490 Bass Lake Road Maple Grove, MN 55311 |
| Offeror Website | www.datarecognitioncorp.com |
| Offeror Contact Person | Susan Engeleiter |
| Contact Person's Phone Number | 763-268-2102 |
| Contact Person's Facsimile Number | 763-268-3054 |
| Contact Person's E-Mail Address | sengeleiter@datarecognitioncorp.com |
| Offeror Federal ID Number | 41-1810970 |
| Offeror SAP/SRM Vendor Number | 164344 |

| Submittals Enclosed and Separately Sealed: | |
|---------------------------------------------------|------------------------------------------------|
| X | Technical Submittal |
| | Small Diverse Business Participation Submittal |
| | Cost Submittal |

| <i>Signature</i> | |
|----------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|
| Signature of an official authorized to bind the Offeror to the provisions contained in the Offeror's proposal: |  |
| Printed Name | Susan S. Engeleiter |
| Title | Chief Executive Officer and President |

FAILURE TO COMPLETE, SIGN AND RETURN THIS FORM WITH THE OFFEROR'S PROPOSAL MAY RESULT IN THE REJECTION OF THE OFFEROR'S PROPOSAL



May 28, 2015

Ms. Jennifer Habowski
Department of General Services
Bureau of Procurement
Forum Place, 6th Floor
555 Walnut Street
Harrisburg, PA 17101

Dear Ms. Habowski:

Data Recognition Corporation (DRC) and our assessment partners are pleased to submit this proposal in response to the Commonwealth of Pennsylvania's *Request for Proposals (RFP) for Pennsylvania Department of Education System of Assessments (RFP#6100032526)*. Our proposal has been prepared to meet or exceed the requirements of the contract described in the RFP.

DRC has the history, knowledge, expertise, and dedication to support the Pennsylvania Department of Education (PDE) in the continued successful development, administration, and reporting of the Pennsylvania System of School Assessment (PSSA), Keystone Exams, and Classroom Diagnostic Tools (CDT). Under the direction of PDE, our proposed team of experts will provide the highest quality program management; item and test development; psychometric services; materials production, distribution, collection, and processing; test security; data management; reporting; online test administration; and customer service available in the industry. As an example of our commitment, we are proposing a team of professionals who are highly experienced with the Pennsylvania assessments. The team will be led by Ms. Shaundra Sand, the current Pennsylvania Project Director. Ms. Sand will work with PDE to ensure continuity between the current and future programs.

DRC and our partners are committed to continuing to meet the needs of Pennsylvania students, parents, and teachers. The blended talents of our organizations uniquely position us to assist PDE in successfully delivering the Pennsylvania assessment program. We are pleased to propose a team almost entirely composed of certified Small Diverse Businesses (SDBs) including Victory Productions for item development, Spanish translations, online tutorials, and video sign language, and eMetric for online reporting and data warehouse services, website development and hosting services, and psychometric services and support. Our collective SDB commitments will exceed the 5% minimum.

We look forward to your analysis and review of our proposal and trust that it will demonstrate not only our desire to be of continued service to the Commonwealth of Pennsylvania, but also our capacity to meet PDE's needs. This proposal will remain in effect for a period of 120 days

13490 Bass Lake Road Maple Grove, Minnesota 55311
800-826-2368 763-268-2000 Fax 763-268-3000


Ms. Jennifer Habowski

May 28, 2015

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from the due date of June 2, 2015, or until a contract is fully executed. I would be most happy to receive any requests you might have for additional clarification or information supporting this proposal. We would also welcome the opportunity to participate in oral presentations, and would further like to extend an invitation to proposal reviewers to visit any of our locations at any time. It would be our pleasure to demonstrate in person our capabilities and commitment to supporting Pennsylvania's superior assessment system.

Sincerely,

A handwritten signature in blue ink that reads "Susan S. Engeleiter". The signature is written in a cursive style with a large, sweeping initial "S".

Susan S. Engeleiter

Chief Executive Officer and President

Trade Secret/Confidential Proprietary Information Notice

Instructions:

The Commonwealth may not assert on behalf of a third party an exception to the public release of materials that contain trade secrets or confidential proprietary information unless the materials are accompanied, at the time they are submitted, by this form or a document containing similar information.

It is the responsibility of the party submitting this form to ensure that all statements and assertions made below are legally defensible and accurate. The Commonwealth will not provide a submitting party any advice with regard to trade secret law.

Name of submitting party:

Contact information for submitting party:

Data Recognition Corporation
13490 Bass Lake Road
Maple Grove, MN 55311

Please provide a brief overview of the materials that you are submitting (e.g. bid proposal, grant application, technical schematics):

Bid proposal

Please provide a brief explanation of why the materials are being submitted to the Commonwealth (e.g. response to bid #12345, application for grant XYZ being offered by the Department of Health, documents required to be submitted under law ABC)

Response to bid #6100032526

Acknowledgment

The undersigned party hereby agrees that it has read and completed this form, and has marked the material being submitted in accordance with the instructions above. The undersigned party acknowledges that the Commonwealth is not liable for the use or disclosure of trade secret data or confidential proprietary information that has not been clearly marked as such, and which was not accompanied by a specific explanation included with this form.

The undersigned agrees to defend any action seeking release of the materials it believes to be trade secret or confidential, and indemnify and hold harmless the Commonwealth, its agents and employees, from any judgments awarded against the Commonwealth in favor of the party requesting the materials, and any and all costs connected with that defense. This indemnification survives so long as the Commonwealth has possession of the submitted material, and will apply to all costs unless and until the undersigned provides a written statement or similar notice to the Commonwealth stating that it no longer wishes to exempt the submitted material from public disclosure.

The undersigned acknowledges that the Commonwealth is required to keep all records for at least as long as specified in its published records retention schedule.

The undersigned acknowledges that the Commonwealth reserves the right to reject the undersigned's claim of trade secret/confidential proprietary information if the Commonwealth determines that the undersigned has not met the burden of establishing that the information constitutes a trade secret or is confidential. The undersigned also acknowledges that if only a certain part of the submitted material is found to constitute a trade secret or is confidential, the remainder of the submitted material will become public; only the protected information will be removed and remain nonpublic.

If being submitted electronically, the undersigned agrees that the mark below is a valid electronic signature.



Chief Executive Officer and President

05/29/2015

Signature

Title

Date



May 20, 2015

Susan Engeleiter
Chief Executive Officer and President
Data Recognition Corporation
13490 Bass Lake Road
Maple Grove, MN 55311

Dear Ms. Engeleiter:

On behalf of The National Center for the Improvement of Educational Assessment, Inc. (Center for Assessment), I am writing to express our enthusiasm and willingness to subcontract with the Data Recognition Corporation (DRC) in supporting the Pennsylvania Department of Education (PDE) regarding the following requirement in the recently released RFP from PDE.

Third-party to organize and facilitate the Assessment and Educator Effectiveness TAC meetings, and provide additional analyses and technical assistance to the Pennsylvania Department of Education (PDE) on an as-needed basis.

The Center for Assessment will be pleased to continue to lead and organize the PDE assessment and educator evaluation technical advisory committees. Dr. Erika Hall will continue to lead this work and will be assisted by myself and other Center for Assessment professionals as necessary. The Center for Assessment will give this effort our highest priority and fully commit the assets and resources necessary to complete all tasks provided under any independently budgeted agreement entered into as a result of this solicitation.

The Center for Assessment is an independent non-profit corporation that provides technical advice and related services directly to states and other entities. In spite of a subcontracting arrangement, the Center for Assessment will maintain its independence from DRC in order to assure PDE that they are receiving high quality, independent advice.

NCIEA is available to initiate work on this contract immediately upon award. Please direct any technical or fulfillment related questions to Dr. Erika Hall at (319)530-7881. Questions of a contractual or financial nature should be directed to Ms. Erin Joyce at (603) 516-7900.

Sincerely,

A handwritten signature in blue ink, appearing to read "Scott Marion", is written over a horizontal line.

Scott Marion
Associate Director

May 15, 2015

Susan Engeleiter
Chief Executive Officer and President
Data Recognition Corporation
13490 Bass Lake Road
Maple Grove, MN 55311

Dear Ms. Engeleiter:

eMetric, LLC (eMetric) is pleased to offer its commitment to support DRC in its bid to work as the contractor for the Pennsylvania Department of Education System of Assessments, RFP #6100032526. eMetric has been a service provider for the Pennsylvania Department of Education since 2005 and is a certified Small Diverse Business. We have read and understood the RFP and will comply with the requirements of this RFP.

Should DRC be selected as the contractor for this opportunity, eMetric will fulfill its obligations of the contract as described in the proposal. As a leading technology service provider for K-12 assessment, eMetric welcomes the opportunity to work on this important program. We will devote ourselves to providing the support, expertise, and added value that can help make the Pennsylvania Department of Education System of Assessments program even more successful.

Regards,



Dixie Knight
Vice President, Operations
eMetric, LLC



55 Linden Street
Worcester, MA 01609
v: 508.755.0051
f: 508.755.0025
w: victoryprd.com

May 27, 2015

Susan Engeleiter
Chief Executive Officer and President
Data Recognition Corporation
13490 Bass Lake Road
Maple Grove, MN 55311

Re: Pennsylvania Department of Education System of Assessments, RFP 6100032526

LETTER OF COMMITMENT

Victory Productions, headquartered at 55 Linden Street, Worcester, Massachusetts 01609, hereby declares its commitment to serve as a subcontractor in Data Recognition Corporation's (DRC's) response to the Pennsylvania Department of Education's Request for Proposals (RFP) indicated above. We look forward to working with DRC on the following aspects of the project: assessment item development, online tutorials, video sign language, and translation services.

Victory Productions is a state-of-the-art development organization, with innovative solutions, deep content knowledge, focused communications, effective project management, and the pedagogical and technological expertise to fulfill the changing requirements of the world of education. We are also a certified woman-owned Small Diverse Business (SDB) for the Commonwealth of Pennsylvania.

Victory Productions agrees to complete the project in accordance with the conditions enumerated in the RFP, should DRC be awarded the contract. We are delighted to be joining DRC in competing for this work. Should you have any questions, feel free to contact me.

Sincerely,

A handwritten signature in blue ink, appearing to read "Raul Porras", is written over a horizontal line.

Raul Porras, CFO
Victory Productions



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CENTER FOR ASSESSMENT

EMETRIC

VICTORY PRODUCTIONS

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COST SUBMITTAL



SECTION 1. STATEMENT OF THE PROBLEM (REDACTED)

Data Recognition Corporation (DRC) is pleased to provide a response to the Request for Proposals (RFP) for the Pennsylvania Department of Education System of Assessments. DRC has the expertise and experience necessary to meet the goals and requirements of the Pennsylvania assessments. For more than 30 years, DRC has provided superior, forward-thinking services to our clients in large-scale assessment.

DRC has been honored to collaboratively work with the Commonwealth of Pennsylvania in support of their assessment and instructional goals. The following accomplishments have resulted from the Pennsylvania and DRC partnership:

- The establishment of a customized and balanced system of assessment focused on the use of assessment data to improve instruction for all Pennsylvania learners.
- The development of “next generation” assessments including new, innovative item types, the Classroom Diagnostic Tools (with computer adaptive testing), the use of diagnostic data for improving instruction, and new reporting tools.
- The gathering of feedback from Pennsylvania stakeholders, including department and school personnel, teachers, community members, parents, and policymakers, and the use of that feedback in the development of the assessment system tools.

DRC has carefully reviewed the RFP and believes that our in-depth knowledge, technical expertise, and experience will be invaluable to Pennsylvania in order to continue to meet the goals of the program, as shown on the following page. DRC is excited about the opportunity to continue to partner with Pennsylvania. Together, collaboratively, we can grow, enhance, and extend the accomplishments of the Commonwealth.

Goals of the Pennsylvania System of Assessments

- Provide for a criterion-referenced assessment system that is aligned to the Pennsylvania Core Standards (PCS) and the Pennsylvania Academic Standards (PAS), and that is secure, accurate, universally applicable, and publicly accessible.
- Assess students through the following components: the PSSA in English Language Arts and Mathematics at grades 3–8 and Science at grades 4 and 8; the Keystone Exams in Algebra I, Biology, and Literature; and the CDT in Mathematics, Reading, Writing, and Science for students in grades 3–5, and in Mathematics, Algebra I and II, Geometry, Reading/Literature, Science, Biology, Chemistry, and Writing/English Composition for students in grades 6 through high school.
- Assess schools to determine the degree to which school programs enable students to attain proficiency of academic standards.
- Provide information to parents and Commonwealth policymakers, including the General Assembly and the State Board of Education (SBE), on how effective schools are in promoting and demonstrating student proficiency of academic standards.
- Develop and produce assessments that can be administered via both paper/pencil and computer-based testing, including computer adaptive testing.
- Support instruction and accountability through clear communications with students, educators, and the greater public regarding assessment results.
- Ensure validity and reliability through technically sound test development and psychometric practices; detailed statistical analyses; qualitative and quantitative research studies; data forensic analysis; and well-documented processes and quality procedures.
- Maintain and implement best practice test security procedures at all phases of development, administration, and reporting, including monitoring the fidelity with which the test administration and security procedures are being applied by schools throughout the Commonwealth.
- Report student results according to PDE’s timeline, including delivery of data files, individual student reports, parent letters, summary reports, the Accountability Report, and a dynamic data query and reporting tool.
- Expand the assessment system with options for Keystone Exams in English Composition and Civics & Government, performance-based assessments for the PSSA, and the CDT in Mathematics and English language arts for students in grades K–2.

To meet these needs, DRC has assembled a highly qualified team of assessment partners who will contribute to the success of the Pennsylvania assessments. Many of these organizations have direct Pennsylvania experience, having been involved with DRC on the current program in some capacity for the past several years. In addition, **all of our partners are Small Diverse Businesses**, emphasizing our significant commitment to diverse contracting. We have summarized the roles and responsibilities of these exceptional assessment service providers in the graphic on the following page.



DATA RECOGNITION CORPORATION (DRC)

As the prime contractor, DRC will support PDE in managing all aspects of the Pennsylvania assessments. We will provide project management; item, passage, prompt, and test form development; printing; packaging, distribution, and collection; customer service; computer-based test administration using DRC INSIGHT, our online testing engine, along with training and support; processing and scanning; handscoring; psychometric services; and reporting.

OUR SMALL DIVERSE BUSINESS PARTNERS

eMETRIC, LLC
will provide their Data Interaction™ system and online reporting. In addition, eMetric will host PDE-provided online training and will conduct third-party equating verification.

VICTORY PRODUCTIONS
will provide item development, Spanish translations, online tutorial production, and video sign language production.

TECHNI-FORMS
will provide printing of scannable test materials.

BRENNEMAN PRINTING
will print manuals, handbooks, and other ancillary materials.

LIGHTNING PRINTING
will print manuals, handbooks, and other ancillary materials.

JEMNI TECHNOLOGIES
will provide the paper for printing of student reports.

HOLIDAY TRAVEL
will assist with meeting planning and provide all travel services.

ADVANCED SHIPPING TECHNOLOGIES
will manage the delivery and return of test materials to and from schools and districts.

LANGUAGE SERVICES CONSULTANTS
will verify all Spanish translations.

We believe the experience and skills of our combined organizations offer a unique and superior solution for the Pennsylvania assessments—a synthesis of talents and capabilities that cannot be found with any other testing contractor. Our program services will not only meet, but exceed, the contract requirements, as we work in close collaboration with the Pennsylvania Department of Education (PDE) to deliver an innovative, high-quality, technically sound assessment program. The partnerships described throughout our proposal offer PDE the exceptional strengths and advantages of each of our organizations, ensuring the success of the Pennsylvania assessments.

Our proposal is organized according to the direction given by the RFP. We have included the following sections/submissions in our proposal:

- Section 1. Statement of the Problem (presented here)
- Section 2. Management Summary
- Section 3. Work Plan (using the requirements and task descriptions in Part IV of the RFP)
- Section 4. Prior Experience
- Section 5. Personnel (including Appendix C—Personnel Experience by Key Position)
- Section 6. Training
- Section 7. Financial Capability
- Section 8. Objections and Additions to Standard Contract Terms and Conditions
- Section 9. Small Diverse Business Participation Submittal (presented as a separate submission as directed by the RFP)
- Section 10. Cost Submittal (presented as a separate submission as directed by the RFP)
- Section 11. Domestic Workforce Utilization Certification
- Section 12. Lobbying Certification and Disclosure
- Appendices (containing work samples and supporting material)

DRC and our assessment partners have crafted the best solution for the continued development, administration, scoring, analysis, and reporting of the Pennsylvania assessments. Our understanding of the needs of PDE and the students, families, and educators of Pennsylvania cannot be matched by any other testing vendor, as we will demonstrate throughout our proposal. We have built upon a foundation based on our extensive experience in successfully delivering large-scale assessment services to Pennsylvania, and have supplemented it with new ideas and creative solutions for the future.



SECTION 2. MANAGEMENT SUMMARY (REDACTED)

Data Recognition Corporation (DRC) supports the goals of the Pennsylvania Department of Education (PDE) and its constituents throughout the Commonwealth of Pennsylvania. We have worked side-by-side with educators, schools, districts, and PDE for years to deliver the Pennsylvania System of School Assessment (PSSA). In 2009, we began working with PDE on the design and development of the Keystone Exams and Classroom Diagnostic Tools (CDT), including the Voluntary Model Curriculum (VMC). In supporting PDE, our role has evolved from providing test distribution, collection, and scoring services to collaborating on item and test design and research topics to ensure the validity and reliability of the tests. The result has been PDE's state-of-the-art, high-quality assessment system that is well designed and effectively implemented.

To maintain our strong record of success and raise the bar of quality even higher over the next five and a half years, DRC has assembled an exceptional team of organizations for the Pennsylvania assessment program. We have described our team and their roles in *Section 1. Statement of the Problem*, and provided more detailed information in *Section 4. Prior Experience* and *Section 5. Personnel*.

DRC and our partners offer PDE unparalleled expertise:

- A strong understanding of the current and historical complexities of the program.
- A client-centered approach to the deployment of our innovative technology, ensuring the right technology solution for every Pennsylvania school, teacher, and student.
- Operational reliability and excellence.
- Proven project management, test development, psychometric, and performance assessment services.
- Assessment experts who can anticipate the needs of PDE and school/district personnel and meet or exceed their expectations.

No other potential contractors can present the all-encompassing Pennsylvania assessment experience of the DRC team. Our experience allows us to offer products and services that will be unequalled in their quality and ease of implementation.

Transforming Assessment in Pennsylvania

Over the past few years, PDE has crafted the Pennsylvania assessments to become the first-class testing program that it is today. Throughout this transition, DRC has been a steadfast partner for PDE, demonstrating our flexibility in customizing our processes to meet program needs and our creativity in finding innovative solutions to meet the needs of the program.

PDE has thoughtfully laid out new expectations; DRC has expertly shouldered the execution of the myriad tasks of the Pennsylvania assessments, allowing PDE to maintain focus on the high-level policy, design, and accountability side of assessment.

On the following page, we have included a visual display of the milestones associated with the transformation of the Pennsylvania assessment program over the past several years. What PDE has accomplished is impressive, and DRC is honored to have provided our support along the way. Our goal is to be PDE's partner as the next phase of assessment in Pennsylvania begins.

Project Deliverables and Services

DRC is keenly aware of the comprehensive and complex nature of the Pennsylvania assessments. We have assisted PDE with planning the overall vision of the program and managing all of the intricate details. We also understand the key areas of focus for PDE over the next contract term and have crafted our proposal to help devise creative and innovative solutions to these challenges.

In the following table, we have compiled a list of project deliverables and services to be performed under the contract. For each, we have identified the organization responsible for completing the work and provided a section reference for proposal reviewers, where they may find our detailed proposed plan.

| Project Deliverable or Service to be Performed | Responsible Organization(s) | Work Plan Sections |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|----------------------------|
| Provide test designs and blueprints for all PSSA tests, Keystone Exams, and the CDT. | DRC | 4.B.1., 4.B.2., and 4.B.3. |
| Provide items, including passages, graphics, and scenarios, for the PSSA, Keystone Exams, and CDT. This includes conducting content review, data review, and bias/sensitivity review meetings. | DRC and Victory Productions | 4.C.1. through 4.C.7. |
| Construct multiple test forms for the PSSA and Keystone Exams. | DRC | 4.C.8. |
| Produce all non-accommodated test booklets and answer documents for the PSSA and Keystone Exams. | DRC and Techni-Forms | 4.D.2. |
| Produce English/Spanish test booklets and answer documents for the PSSA and Keystone Exams. | DRC, Victory Productions, and Language Services Consultants (LSC) | 4.D.2. |
| Produce all Braille and large-print test booklets and answer documents for the PSSA and Keystone Exams, as well as refreshable Braille for online tests | DRC and American Printing House for the Blind (APH) | 4.D.2. |
| Provide student precode labels using information supplied from the Pennsylvania Information Management System (PIMS). | DRC | 4.D.3. |
| Produce all ancillary materials, including Directions for Administration Manuals, Handbook for Assessment Coordinators, Assessment Updates, and Item and Scoring Samplers. | DRC | 4.D.4. |

| Project Deliverable or Service to be Performed | Responsible Organization(s) | Work Plan Sections |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|-----------------------------|
| Distribute all non-secure test materials four weeks prior to the testing window. Distribute all secure test materials two weeks prior to the testing window. | DRC and Advanced Shipping Technologies (AST) | 4.D.5 |
| Gather enrollment, contact data, testing mode, and administration window information from local education agencies (LEAs). | DRC | 4.E.1 |
| Collect and account for all secure testing materials at the end of each testing window. Provide Missing Materials Report to PDE within 45 days of the end of the testing window. | DRC | 4.D.5.d |
| Provide a system for LEAs to order additional testing materials. | DRC | 4.E.1 |
| Provide retest opportunities for the Keystone Exams. | DRC | 4.E.5 |
| Provide online test administrator training modules for test administrators and district and school personnel. | DRC and eMetric | 4.E.6 and 4.K |
| Ensure the security of all Pennsylvania assessment materials, online/computer-based systems, and student responses and data. | DRC | 4.E.7 and 4.E.8 |
| Provide the DRC INSIGHT Online Learning System for the online delivery of the PSSA, Keystone Exams, and the CDT. | DRC | 4.F.1.a, 4.F.1.b, and 4.F.2 |
| Provide computer-based readiness assessment and diagnostic tools and resources to assist district technology staff in preparing for testing. | DRC | 4.F.1.c |
| Provide tools and accommodations for computer-based testing with DRC INSIGHT. | DRC | 4.F.3 and 4.F.4 |
| Provide online tutorials to prepare students and district personnel for computer-based testing. | DRC and Victory Productions | 4.F.5 |
| Scan all answer documents, including editing and resolution of error data. | DRC | 4.G.1 |
| Score all open-ended items, including conducting rangefinding sessions with Pennsylvania educators. | DRC | 4.G.2 |
| Perform all statistical analyses of assessment data, as well as all calibrating, scaling, and equating procedures. | DRC | 4.H.1 |
| Conduct and document third-party equating verification. | eMetric | 4.H.1.b |
| Conduct Bias, Reliability, and Validity Studies. | DRC | 4.H.1.b and 4.H.1.c |

| Project Deliverable or Service to be Performed | Responsible Organization(s) | Work Plan Sections |
|--------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------|---------------------|
| Develop and produce all technical documentation, including Technical Reports. | DRC | 4.H.1.e |
| Provide data forensics analysis and assist PDE with use of the data and reports. | DRC | 4.H.2 |
| Produce and deliver all necessary data files to accurately fulfill all required reporting. | DRC | 4.I.1 through 4.I.6 |
| Produce and deliver the Accountability Student Data and Summary Files. | DRC | 4.I.7.a and 4.I.7.b |
| Produce and deliver the Twelfth Grade Keystone Exams Graduation File. | DRC | 4.I.7.c |
| Develop and provide Individual Student Reports (ISRs) for the PSSA and Keystone Exams. | DRC | 4.I.8.c |
| Develop and provide Parent Letters for the PSSA and Keystone Exams. | DRC and eMetric | 4.I.8.d |
| Develop and provide Summary Reports for the PSSA and Keystone Exams. | DRC and eMetric | 4.I.8.e |
| Provide the Accountability Report (formerly the State Report Card) via the Required Federal Reporting Measures (RFRM) website. | DRC and eMetric | 4.I.8.f |
| Develop and deliver the web-based PSSA and Keystone Exams Data Query and Reporting Tool via the online reporting tool, Data InteractionTM. | eMetric | 4.I.8.g |
| Deliver tools, systems, and files associated with performance and participation reporting. | DRC | 4.I.8.h |
| Deliver Graduation Attribution system and online corrections system | DRC | 4.I.8.i |
| Develop and deliver the CDT interactive reporting suite. | DRC | 4.I.8.j |
| Provide a Quality Management Plan for the Pennsylvania assessments and perform quality assurance tasks for all data and deliverables. | DRC | 4.J.1.a |
| Provide program plans and schedules of key activities and deliverables. | DRC | 4.J.1.c |
| Plan and participate in project management meetings with PDE and other entities. | DRC | 4.J.1.e and 4.J.1.f |
| Provide overall technical assistance to PDE as needed, and provide meeting arrangements for TAC meetings. | DRC | 4.J.1.g |
| Provide customer service and technical support via telephone, email, and fax. | DRC | 4.M |
| Perform activities and provide deliverables related to contract transition and turnover tasks. | DRC | 4.N |
| Provide plans and activities for contract options 1–4. | DRC | 6.1 through 6.4 |

As prime contractor, DRC is completely responsible for the quality of work under the contract. Should PDE be dissatisfied with the services performed by DRC or any of our assessment partners, we request that we be given notification and a mutually agreed-upon time period to take corrective action. We take our role as the assessment provider for the Pennsylvania assessments seriously and will do everything in our power to ensure that PDE and the schools and districts of the Commonwealth are completely satisfied with our performance.

Summary of Our Proposed Plan

Throughout our proposed Work Plan, DRC and our partners have provided our experience and expertise in responding to the needs of the assessment program, as outlined in the Request for Proposals (RFP). Under the subheadings below, we highlight our proposed approach to managing all aspects of the Pennsylvania assessments and comprehensively meeting all of the deliverables identified in the table above.

ITEM AND TEST DEVELOPMENT

DRC's expertise in item and test development, along with our in-depth knowledge of the Pennsylvania Core Standards (PCS) and the Pennsylvania Academic Standards (PAS), will ensure the ongoing development of high-quality, universally accessible Pennsylvania assessment items and tests for all grades and content areas. We are pleased to include Victory Productions, a certified Small Diverse Business (SDB), to assist with our item writing efforts. Over the years, DRC has established effective procedures for working with PDE staff and Pennsylvania educators to review and select the best passages, scenarios, prompts, and items for the Pennsylvania assessments. We will be able to continue this collaborative process as we seamlessly transition to the new contract.

We propose that construction of test forms for the Pennsylvania assessments will be a cooperative effort between PDE and DRC's integrated development team of specialists in test development, item bank technology, editing, psychometrics, and performance assessment. Our goal is to provide the expertise and tools necessary to ensure the construction of valid and reliable tests for the Pennsylvania assessments.

ONLINE TESTING

DRC has a proven track record in shepherding states through the important progression to online assessments, including the successful implementation of online testing in Pennsylvania for the past five years. The **DRC INSIGHT™ Online Learning System** is a fast, powerful, and highly reliable online testing engine with the proven capacity to meet the needs of large student testing populations. We have significantly increased our online testing capacity year-over-year. In the 2013–2014 school year, DRC delivered 2.6 million online assessments. In 2014–2015, we more than tripled our performance to 8.5 million online assessments, including 1.5 million tests in Pennsylvania. PDE can be confident in

DRC's capacity to administer the online PSSA, Keystone Exams, and CDT assessments to all participating students.

A truly comprehensive system, DRC INSIGHT incorporates computerized testing and related resources with dynamic reporting and a powerful suite of educator tools. Our secure system has been developed and maintained in-house, offering maximum control and flexibility for Pennsylvania—and ensuring just the right technology solution for every school, student, and teacher. DRC's successful partnership with PAIUnet has provided many advantages to technology coordinators in Pennsylvania schools and districts.

The intuitive, easy-to-use interface means minimal training time for administrators and teachers, and minimal practice time for students to acclimate to the online testing environment. Online scoring and reporting provide rapid results for quick impact on instruction.

Further, DRC INSIGHT offers the convenience of a “one-stop” approach: all test setup and administration functions are accessed in a single location. The **DRC eDIRECT assessment management system** provides tiered, secure access to testing software downloads, tutorials, test setup tools, reports, and educator resources. System users only need one login to access key system modules, tools, and resources.

DRC is fully capable and prepared to meet the online testing requirements under this contract, including online delivery of the PSSA, Keystone Exams, and CDT. Students, test administrators, and coordinators throughout the Commonwealth have been successfully using DRC INSIGHT and eDIRECT for many years, which means no additional burden to the field as we move into the future of the new contract together. In addition, as the online testing partner for the WIDA Consortium, DRC is the only vendor that can provide Pennsylvania with the efficiencies and convenience that come from having a common online testing platform for all of the Commonwealth's assessments: PSSA, Keystone Exams, CDT, and ELL (WIDA).

We know what PDE will encounter as online testing expands, and we have the expertise, knowledge, and technology solutions to make online assessments a success for all Pennsylvania students.

MATERIALS PRODUCTION

DRC has a history of producing accurate and aesthetically appealing test materials for the Pennsylvania assessments. We propose to use the same quality processes to continue our record of superior materials production under the new contract. We are happy to be including several SDB subcontractors, like Pennsylvania-based Techni-Forms, for printing of scannable documents, manuals, handbooks, and other ancillary materials.

DRC supports PDE's desire for universally accessible assessments. We have extensive experience producing accommodated forms/versions of tests for the Pennsylvania assessments, including Large Print, Braille, and Spanish versions, as well as for other state assessment programs. Victory Productions has extensive experience producing Spanish versions of assessments for various state testing programs, and we are excited to have them on the Pennsylvania team for translations, along with Language Services Consultants, another SDB, for translation verification.

MATERIALS DISTRIBUTION AND COLLECTION

DRC has managed all aspects of secure distribution and collection of Pennsylvania test and ancillary materials for over 20 years. We understand the preferences and logistical needs and requirements of the Commonwealth's schools and districts, including the unique challenges facing some of the larger districts, such as Philadelphia and Pittsburgh. We will continue to provide accurate materials distribution and collection under the new contract, and we are pleased to expand the role of Advanced Shipping Technologies, another SDB, as our subcontractor for both delivery and return of materials throughout the Commonwealth.

SECURE MATERIALS ACCOUNTING AND IMAGE SCANNING

DRC will continue to use the same quality materials check-in and accounting procedures that have been used successfully for the Pennsylvania assessments. Our processing system, which is ISO 9001:2008 certified, offers a tremendous advantage to PDE by providing quality control measures that are specifically targeted to potential test security issues. Problems can be caught early and resolved in a timely manner.

Our state-of-the-art, proprietary image scanning system is highly configurable and fully scalable. Our system provides the flexibility needed to accommodate the quick turnaround time required for processing the Pennsylvania assessments, as we have demonstrated under the current contract. DRC's 35 years of scanning experience has resulted in a scannable document process that is extremely reliable and efficient, enabling us to guarantee adherence to the tight timelines required for the Pennsylvania assessments.

PERFORMANCE ASSESSMENT SCORING

DRC brings a tremendous amount of experience scoring student open-ended items for Pennsylvania, and we have total confidence in our ability to continue delivering superior handscoring results for the PSSA and Keystone Exams. DRC will continue to work closely with PDE to ensure that Pennsylvania students' responses are evaluated using the scoring guidelines and anchor sets that have been developed in collaboration with PDE and Pennsylvania teachers. Our scoring staff has multiple years of experience working with the Pennsylvania

assessments, monitoring Pennsylvania projects, producing accurate reports, and meeting deadlines.

PSYCHOMETRICS AND STATISTICAL ANALYSES

Our proposed Psychometrics Team is committed to quality and excellence, and is entirely devoted to ensuring our research designs and analytic procedures meet the professional measurement standards articulated in the newest edition of the *Standards for Educational and Psychological Testing* (AERA, NCME, & APA, 2014). Our psychometric staff is responsible for the design and implementation of all scaling, equating, reliability, and validation activities required to support high-quality large-scale assessment programs. Moreover, as experts in educational measurement, our goal is to facilitate sound policy-making by providing complete, accurate, unbiased information regarding the scientific and psychometric aspects of large-scale assessment and to conduct the ongoing research needed to support sound decision-making. We do not make policy decisions, but our Psychometric Services staff can provide information to help inform decisions regarding the best direction for the PSSA, Keystone Exams, and CDT testing programs.

REPORTS AND DATA

At the core of DRC's proposed offering is our commitment to continue to provide PDE with accurate and on-time delivery of data and reports. We are pleased to be able to include eMetric (an SDB) as our reporting partner for the Pennsylvania assessments. eMetric has a history of providing innovative technology-based solutions for displaying and managing assessment data, including many years of direct Pennsylvania assessment experience. Together, we have developed a superior reporting offering for the Pennsylvania assessments that includes the following:

- Hard-copy, full-color student reports designed to present assessment results in an easily understood and psychometrically sound manner.
- School and district summary reports focused on the importance of both assessment and accountability results.
- Accountability reporting (Required Federal Reporting Measures) that fulfills the needs of schools, districts, and the media.
- eMetric's highly functional *Data Interaction*TM dynamic data query and reporting tool.
- Timelines for data and report distribution that meet or exceed PDE's requirements.
- Processes and systems that have been successfully used by DRC and eMetric for reporting Pennsylvania assessments results and that are familiar to PDE and schools/districts throughout Pennsylvania.

DRC and eMetric offer the combination of proven excellence in designing and implementing customized data management solutions to meet PDE's expectations; in-depth understanding of the complexities of assessment reporting; and a cadre of highly qualified professionals who will work collaboratively to address all reporting requirements, as well as the needs of students, parents, and educators.

SECURITY OF THE ASSESSMENT SYSTEM

DRC understands that ensuring security is critical to maintaining the technical quality, perceived fairness, and integrity of any testing program. DRC joins PDE in its recognition that assessment security is of the utmost importance, since data are increasingly being used for high-stakes decision making. DRC has crafted a security solution with data integrity in mind, as the cornerstone of the assessment process. PDE can be assured that all Pennsylvania assessments, assessment materials, student responses, and resulting data will be handled and stored in a secure manner, as DRC has always done in managing the Pennsylvania assessments.

The importance of proactive security steps and prevention of irregularities cannot be over emphasized when it comes to quality and integrity of test results. Therefore, implementing and communicating proactive and preventative security measures should help to minimize the number of testing policy violations. There are several approaches that DRC and PDE can collaboratively discuss for implementation. Preventing inappropriate testing behaviors is the goal for both PDE and DRC. Every effort—including training for test administrators, communication of security requirements, and monitoring of results—will be implemented to achieve those proactive and preventative goals.

However, since the possibility of security breaches and other irregularities persists, DRC will continue to conduct forensic analyses services for Pennsylvania, as we have done in the past several years. Our forensic offerings include the evaluation of erasure data, response-pattern similarity, and performance fluctuation within paper/pencil administered assessments, as well as answer change analyses within online test administrations. DRC will continue to work with PDE's data forensic team to implement the comprehensive examination of the paper and online administrations, and will collaborate on new analyses as they become available in the forensic research community.

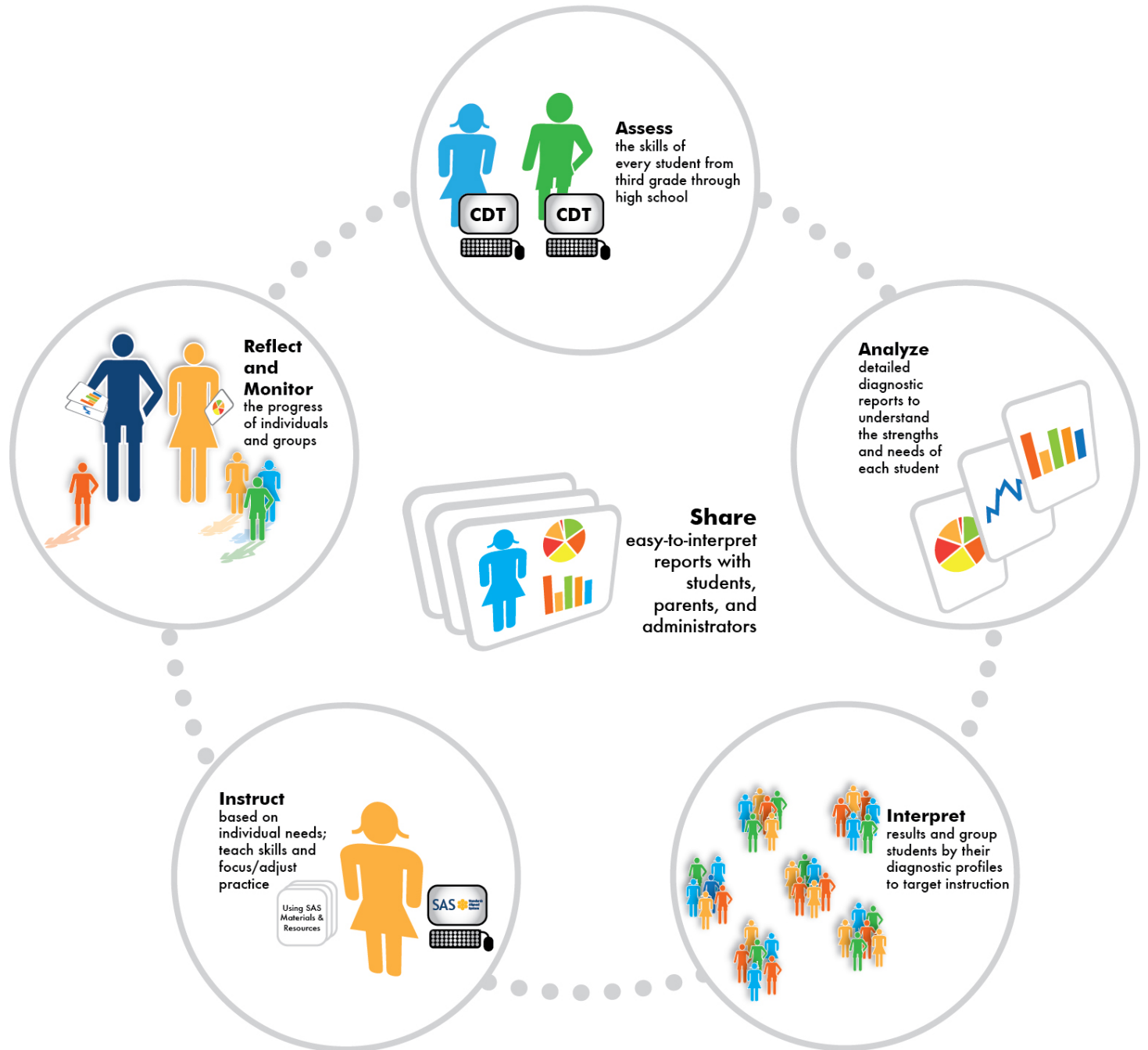
The security of the assessment process, the data collected, and the integrity of the inferences drawn from the data are a shared priority for PDE and DRC. DRC takes these processes very seriously, will totally support PDE in its important work, and will work collaboratively to do everything we can to assist the Commonwealth's efforts.

INNOVATIVE PRODUCT DEVELOPMENT FOR THE CDT

DRC is proud to have worked with PDE over the past six years to create the CDT. PDE's important vision is now a fully operable, pioneering, adaptive diagnostic testing system that is recognized across the nation as innovative and state-of-the-art. We will continue to work with PDE to innovate, refresh, and expand the CDT, including further enhancement of the features of the interactive reporting suite. A graphic depicting the dynamic nature of the CDT is included on the following page.

The CDT Cycle

The Teaching and Learning Process is Continuous



An important aspect of the CDT is the dynamic reporting suite, which

- provides Pennsylvania educators with immediate, on-demand data that will directly impact instruction in the classroom;
- allows educators to easily explore and analyze CDT performance and quickly pinpoint students' strengths and areas of need; and
- identifies and links to targeted curriculum and instructional resources, aligned to Pennsylvania's standards and Assessment Anchors/Eligible Content, based on students' needs.

DRC is committed to continue enhancing the CDT reporting tool under the new contract. In our work plan, we explore possible enhancements that we believe would improve teachers' ability to use report data and, ultimately, increase CDT participation even further in the field. DRC looks forward to discussing these enhancements with PDE upon award.

PROJECT MANAGEMENT

Effective project management is integral to a well-run assessment program. A major strength of DRC's approach to project management is the experience and long-term tenures of our staff. For Pennsylvania, this continuity provides PDE with a team that appreciates the unique requirements of the Pennsylvania assessments and is dedicated to the continued success of the program. We are pleased to propose that Ms. Shaundra Sand continue in her role as Pennsylvania Assessments Program Director under the new contract. Ms. Sand's in-depth knowledge of the Pennsylvania assessment program and her willingness to embrace change and innovation will ensure that the next five and a half years of DRC's collaboration with PDE are as successful as our past work with the Commonwealth.

Under the direction of Ms. Sand, DRC's Pennsylvania Project Management Team will ensure that all Pennsylvania assessment deliverables are innovative, on time, within budget, aligned to PDE specifications, and of the highest quality. Our proposed team has nearly 50 years of combined experience on the Pennsylvania assessments, allowing PDE to rely heavily on DRC's Project Managers without the need to provide training or mentoring to the team. We will continue to provide PDE with the same superior level of service under the new contract.

Commitment to the Commonwealth

DRC has made a long-term investment in the success of Pennsylvania's assessment programs and is eager to maintain and enhance these successes. Over the course of the current contract, the scope of testing in Pennsylvania has increased substantially, especially with the addition of the Keystone Exams and the CDT. DRC has readily met the needs of the growing program by adding to our infrastructure in terms of facilities, equipment, and staff. These changes have been

made without sacrificing quality or compromising the personal level of service provided to PDE and school/district personnel.

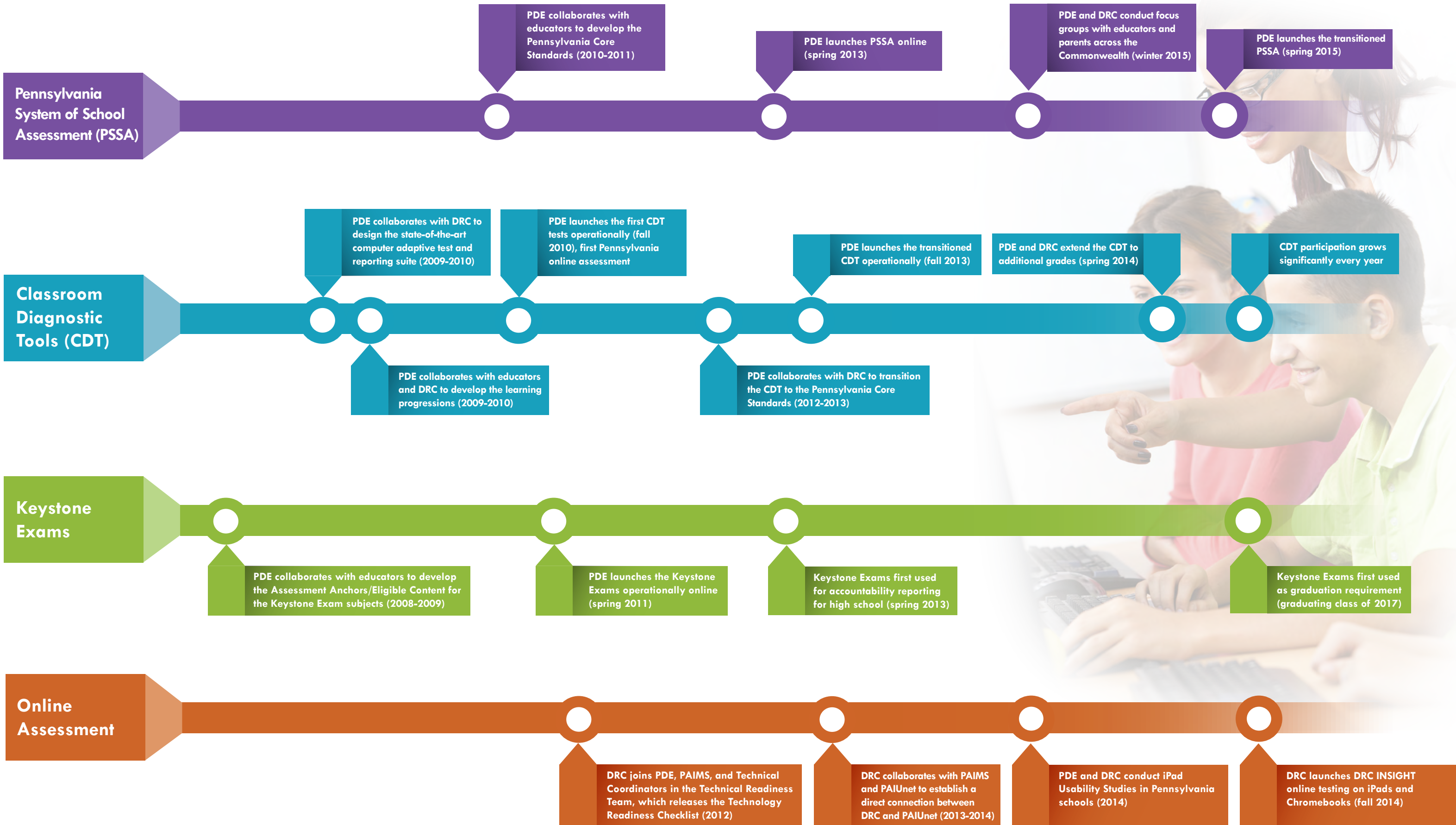
DRC shows our commitment to Pennsylvania education stakeholders through supporting PDE with in-person training, focus groups, and usability studies, such as the iPad usability study. In particular, DRC collaborated with PDE to provide independent focus group services during PDE's development of the Pennsylvania School Performance Profile system. Several successful sessions were held across Pennsylvania. We also held focus groups this past year to solicit feedback from stakeholders regarding design of the new PSSA reports.

We show our commitment to PDE through our annual sponsorship of the Standards Aligned System (SAS) Institute, Pennsylvania Teacher of the Year, and the Pennsylvania Educational Technology Expo and Conference (PETE&C). DRC looks forward to being involved in these and other initiatives in the future.

The DRC Team—A Superior Solution for the Continued Success of the Pennsylvania Assessments

DRC has developed positive relationships with the Commonwealth and its many stakeholders through the years. This experience with PDE and with the stakeholders in the field has allowed DRC to remain familiar with the Commonwealth's processes, policies, and needs, including work plans and master schedules. Gathering input from the field about products and deliverables has allowed DRC to get to know the stakeholders of the state and to appreciate their many contributions to the Commonwealth's goals. These positive relationships and a collaborative work approach, built over time, have contributed to high expectations being met and a successful program delivered.

We will continue to enhance our processes and offerings to meet the dynamic needs of the Pennsylvania assessment program. Pennsylvania is a national leader in student assessment, and DRC is proud to be a part of the innovative work being done in the Commonwealth. Our team is ready to support Pennsylvania's goals in improving student achievement, improving instruction through the use of data, and accountability for students, schools, and educators. We believe that PDE and DRC have opportunities to accomplish even more in the future as partners working together. We look forward to your review and evaluation of our proposal and trust that it will demonstrate our commitment to PDE and to the students, families, and educators of the Commonwealth.





SECTION 3. WORK PLAN (REDACTED)

1. OBJECTIVES

1.A. General

Data Recognition Corporation (DRC) and our partners are pleased to offer our services to the Commonwealth of Pennsylvania for the development, paper and online administration, processing, scoring, analysis, reporting, and management of the Pennsylvania System of School Assessment (PSSA), Keystone Exams, and Classroom Diagnostic Tools (CDT), as described in Request for Proposals (RFP) 6100032526. DRC acknowledges that the contract awarded in response to Pennsylvania's RFP will begin on January 1, 2016, and will be a five-and-one-half-year contract in effect through June 2021. The contract will include an option for an additional three-year renewal. The initial administration for each program included under the new contract will be Summer 2016 for the Keystone Exams and Spring 2017 for the PSSA. The CDT will begin on July 1, 2016, under the terms of this new contract.

DRC recognizes that the Pennsylvania Department of Education (PDE) embraces their responsibility to ensure quality education, maintain high standards, develop valid and reliable assessments for all students, and academically prepare children and adults to succeed as productive citizens. DRC also understands PDE's commitment to remain compliant with the mandates of the federal *Elementary and Secondary Education Act* (ESEA) and the State Board of Education (SBE) Chapter 4 regulations, as it relates to Pennsylvania's accountability system. DRC is also keenly aware of the necessity of designing assessments that are aligned to the Pennsylvania Core Standards (PCS) and the Pennsylvania Academic Standards (science) and matched to the appropriate Assessment Anchors and Eligible Content. Likewise, DRC and our partners are well-versed in assessment requirements for accountability as authorized through the ESEA and amended by *No Child Left Behind* (NCLB) legislation to meet the guidelines established by the Peer Review process. We are offering Pennsylvania an experienced Test Development and Psychometrics Team that will ensure the Pennsylvania assessments meet the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) and can be used to accurately measure student achievement from one year to the next.

In preparing our response, DRC has carefully reviewed the RFP, and we believe that we have the superior in-depth knowledge, technical expertise, and experience to provide support to PDE in the development and administration of the Pennsylvania assessments. We will meet and exceed PDE's goals by providing innovative solutions to all of the services and deliverables of this contract.

As we have already discussed in *Section 1, Statement of the Problem*, and in *Section 2, Management Summary*, and as we will continue to demonstrate throughout this Work Plan, DRC has the history, knowledge, expertise, creativity, and dedication to ensure the continued successful development and administration of the Pennsylvania System of School Assessment (PSSA), Keystone Exams, and Classroom Diagnostic Tools (CDT) programs.

1.B. Specific

DRC and our subcontractors will work with PDE to provide a comprehensive assessment program and collect evidence to ensure that the Pennsylvania assessments are appropriate for the following objectives:

1. Providing students, parents, educators, and citizens with an understanding of student and school performance consistent with the *Elementary and Secondary Education Act (ESEA)*.
2. Determining the degree to which school programs enable students to attain proficiency of the Pennsylvania Core Standards (PCS) for English Language Arts and Mathematics and the Pennsylvania Academic Standards for Science and Technology and Environment and Ecology.
3. Providing information to Commonwealth policymakers, including the General Assembly and the State Board of Education (SBE), on how effective schools are in promoting and demonstrating student proficiency of the Pennsylvania Core Standards (PCS) for English Language Arts and Mathematics and the Pennsylvania Academic Standards for Science and Technology and Environment and Ecology.
4. Providing information to the general public on school performance.
5. Providing results to school entities based upon the aggregate performance of all students, for students with an Individualized Education Program (IEP) and for those without an IEP.
6. Assessing student proficiency in the PCS for English Language Arts and Mathematics and the Pennsylvania Academic Standards for Science and Technology and Environment and Ecology for the purpose of determining, in part, a student's eligibility for high school graduation.

2. NATURE AND SCOPE OF THE PROJECT

2.A. Introduction and Overview of the Assessment Program and Current Components

The Pennsylvania state assessment system is composed of assessments and the reporting associated with the results of those assessments. The assessment system includes the Pennsylvania System of School Assessment (PSSA), the Keystone Exams (end-of-course), and the Classroom Diagnostic Tools (CDT). PDE, per the federal *Elementary and Secondary Education Act* (ESEA) and the SBE Chapter 4 regulations, measures academic progress across the Commonwealth through the use of statewide standardized criterion-referenced assessments. These assessments are aligned to the Pennsylvania Core Standards (PCS) for English Language Arts and Mathematics and the Pennsylvania Academic Standards (PAS) for Science and Technology and Environment and Ecology and matched to the appropriate assessment anchors and eligible content. The development of assessments, distribution of test materials, instructions to educators on administering assessments, maintenance and implementation of test security, collection of test materials, scoring of tests, tabulation of scores, and reporting information are necessary to meet the requirements of the ESEA and SBE Chapter 4.

We understand that PDE desires a comprehensive approach to the development and administration of the Pennsylvania System of School Assessment (PSSA), the Keystone Exams (end-of-course), and the CDT. Brief summaries of these three components are included in *Subheadings 2.A.1, 2.A.2, and 2.A.3.*

2.A.1. PENNSYLVANIA SYSTEM OF SCHOOL ASSESSMENT (PSSA)

The annual Pennsylvania System of School Assessment (PSSA) is a standards-based, criterion-referenced assessment used to measure a student's attainment of the academic standards while also determining the degree to which school programs enable students to attain proficiency of the standards. Every Pennsylvania student in grades 3 through 8 is assessed in English language arts (ELA) and mathematics. Every Pennsylvania student in grades 4 and 8 is assessed in science.

The English language arts and mathematics PSSAs include items that are consistent with the Assessment Anchors and Eligible Content aligned to the PCS in English language arts and mathematics. The science PSSA includes items that are aligned to the Assessment Anchors and Eligible Content aligned to the PAS for Science and Technology and Environment and Ecology.

The PSSA provides score reports for two purposes: (1) individual student scores, provided only to their respective schools, can be used to assist teachers in identifying students who may be in need of additional educational opportunities, and (2) school scores provide information to schools and districts for curriculum

and instruction improvement discussions and planning. The PSSA is also used for school accountability for state and federal purposes.

2.A.2. KEYSTONE EXAMS

The Keystone Exams are currently administered in Algebra I, Literature, and Biology. New tests may be developed in the future for English Composition and Civics & Government, in the event funding is made available by the state legislature.

The Keystone Exams are end-of-course (EOC) exams to assess achievement in designated content areas. The Keystone Exams serve two purposes: (1) school accountability for federal and state purposes, and (2) high school graduation requirements for students beginning with the class of 2017.

The Algebra I and Literature Keystone Exams include items written to the Assessment Anchors and Eligible Content aligned to the PCS in English language arts and mathematics. The Biology Keystone Exam includes items written to the Assessment Anchors and Eligible Content aligned to the PAS for Science and Technology and Environment and Ecology.

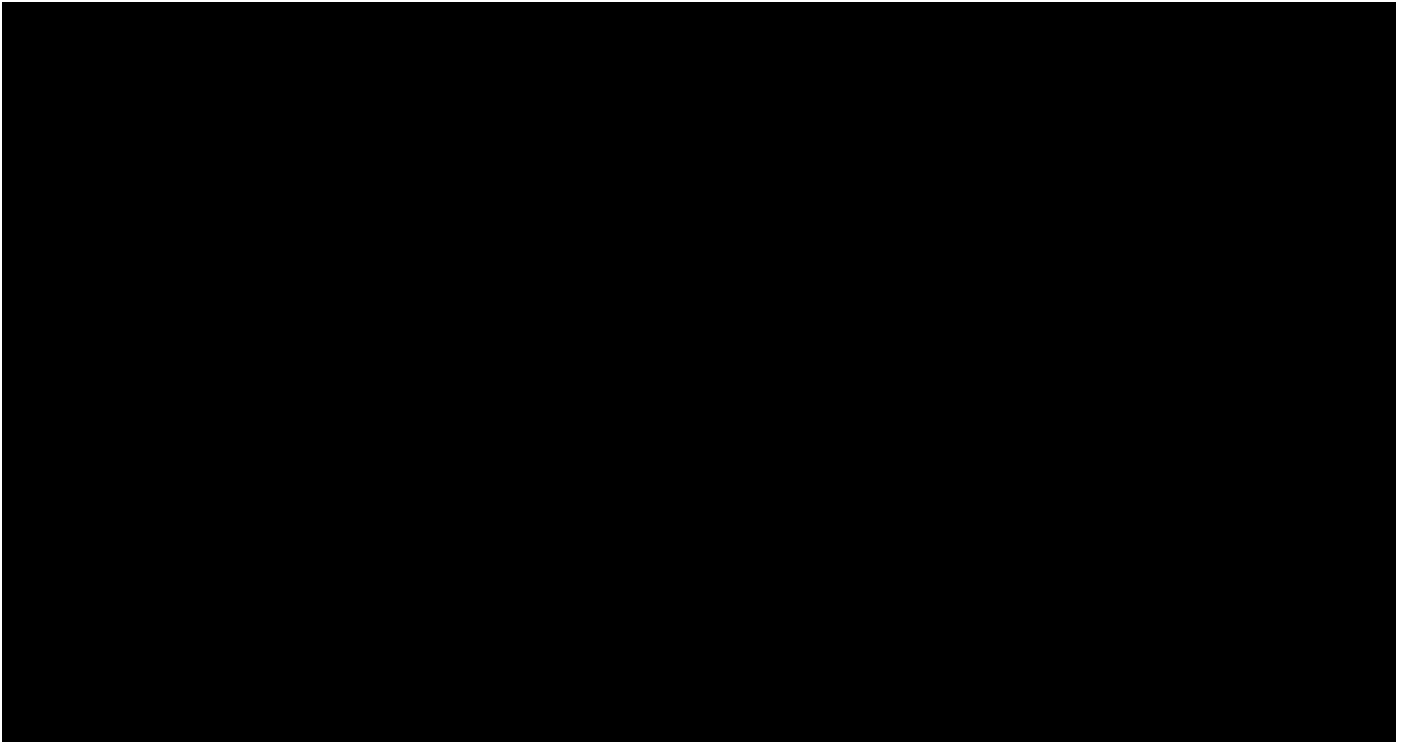
2.A.3. CLASSROOM DIAGNOSTIC TOOLS (CDT)

The CDT is currently available for Mathematics, Algebra I, Algebra II, Geometry, Reading/Literature, Science, Biology, Chemistry, and Writing/English Composition for students in grades 6 through high school and for students in grades 3–5 in mathematics, reading, writing, and science.

The Pennsylvania CDT is a set of computer-adaptive tests (CAT), divided by content area and/or course, and designed to provide diagnostic information in order to guide instruction and targeted support for students. The CDT online reporting system is fully integrated in the Pennsylvania Standards Aligned System (SAS). It assists educators in identifying student academic strengths and areas in need of improvement and provides links to classroom resources. The dynamic, interactive diagnostic reports provide easy-to-follow links to targeted curricular resources and materials, including units and lesson plans found within the SAS system.

The following table presents the number of CDT tests administered under DRC's current contract with the Commonwealth of Pennsylvania. As illustrated, CDT participation has increased substantially since its inception. **To date, DRC has administered over 1.3 million CDT tests this school year.**

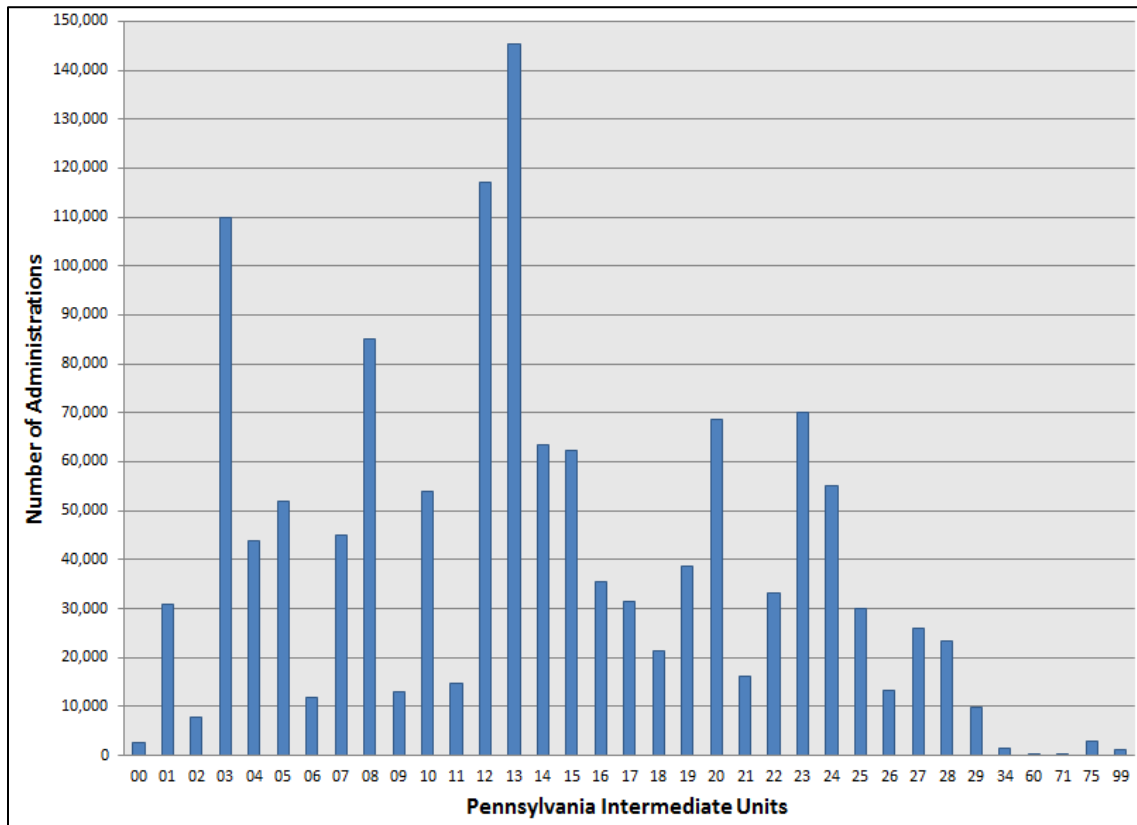
***Classroom Diagnostic Tools—Number of Tests Administered**



**This table has been redacted.*

The following table shows the number of CDT tests administered by each of Pennsylvania's Intermediate Units in 2014-2015, as of May 21, 2015. This shows just how widely-used the CDT is across the commonwealth.

Number of CDT Tests Administered by Intermediate Units in 2014-2015*



*As of 5/21/2015

2.B. Optional Services

There are four optional services included in the RFP. In the event funding becomes available in the future, the Commonwealth may elect to incorporate select options into the contract. If selected, an amendment will be processed to implement the optional service at the price established during contract negotiations. Please see *Subheading 6, Optional Services and Associated Tasks* for a complete description of DRC proposed work for the optional services listed in the RFP.

2.B.1. OPTION 1: ENGLISH COMPOSITION EXAM

Option 1 is for services for the development and delivery of an operational English Composition Keystone Exam.

2.B.2. OPTION 2: CIVICS & GOVERNMENT EXAM

Option 2 is for services for the development and delivery of an operational Civics & Government Keystone Exam.

2.B.3. OPTION 3: PERFORMANCE BASED ASSESSMENTS – PERFORMANCE TASKS

Option 3 is for the development of new performance tasks that will be administered as a separate event to supplement the summative assessments for PSSA. This includes the development and field testing of performance tasks for the mathematics and ELA tests at each grade, 3–8, so that one operational performance task per content area, per grade level can be administered each year.

2.B.4. OPTION 4: EXPANSION OF CLASSROOM DIAGNOSTIC TOOLS (CDT) TO INCLUDE KINDERGARTEN THROUGH GRADE 2

Option 4 is for the extension of the CDT to include students in kindergarten through grade 2 in two content areas—English language arts and mathematics. Option 4 also includes the development of a set of Voluntary Model Curriculum (VMC) units and lesson plans for the pre-kindergarten (PK) level along with the related expansion of the Learning Progression Map for PK.

3. REQUIREMENTS

3.A. Compliance

DRC has reviewed and agrees to comply with the Information Technology Policies (ITPs) issued by the Office of Administration, Offices for Information Technology (OA-OIT) ITPs as described in Part I-30 of the RFP.

DRC has reviewed and agrees to comply with the Hosting Requirements as outlined in Appendix I: Non Commonwealth Hosted Applications Service of the RFP.

DRC has reviewed Appendix J: Service Level Agreements of the RFP. Per page 67 of the RFP, Offerors are allowed to propose modifications to the Service Level Agreements. Please see *Volume IV; Appendix T, Service Level Agreements* for DRC's proposed modifications.

3.B. Emergency Preparedness

DRC's Emergency Response Management Plan is compliant with the requirements outlined in the Commonwealth Continuity of Government (COG) Initiative and Business Continuity framework. For more detailed information regarding DRC's emergency response process, please refer to the *Emergency Response Management Plan Executive Summary*, provided in *Volume IV; Appendix N*.

In the event of an emergency, DRC's Emergency Response Management Plan will be immediately activated by a DRC management representative who has responsibility for emergency preparedness across the company. The Emergency Response Management Plan includes details and specific actions for defined risks and threats to the program that are most likely to occur and includes contingency plans for all areas that are required to support the operation: human resources, physical property/buildings, and equipment and technology.

An important aspect of the emergency response planning process is to evaluate various emergency "scenarios," not only for DRC, but those that may impact our clients as well. These scenarios are evaluated annually by DRC's Emergency Response Team and Executive Management Teams.

DRC's emergency response process is led by Mr. Niall Finn, who serves as DRC's Emergency Response Coordinator. The Emergency Response Coordinator at minimum is responsible for the following:

- Consulting with DRC's Chief Executive Officer and President to determine and initiate plan of response
- Initiating the Emergency Response Team

- Ensuring emergency response process and procedures are current, maintained, and tested

The following table lists the current membership of DRC’s Emergency Response Team.

| Emergency Response Team—Functional Lead | Name |
|----------------------------------------------------|--------------------------|
| Chief Executive Officer and President | Ms. Susan Engeleiter |
| Emergency Response Coordinator | Mr. Niall Finn |
| Chief Information Officer | Mr. John Bandy |
| Chief Financial Officer | Mr. Lonny Wittnebel |
| Chief Quality Officer | Ms. Lisa Peterson-Nelson |
| Sr. Vice President of Operations | Mr. Doyle Kirkeby |
| Sr. Vice President of Education Program Management | Mr. Doug Russell |
| Sr. Vice President, Human Resources | Jennifer Eastman |
| Sr. Director of Facilities Management | Ms. Veta Micevic |
| Sr. Director of Marketing Communications | Ms. Pam Enstad |

The Emergency Response Team is responsible for the following:

- Managing the emergency response process
- Ensuring adequate resources are available (as appropriate)
- Communicating to key stakeholders:
 - DRC executive management and board members
 - Clients
 - Subcontractors/suppliers
 - DRC employees
 - Emergency backup providers
 - Other aspects of communication such as media relations (where appropriate)
 - Evaluating annually the effectiveness of the Emergency Response Management Plan through the use of assessment tools and sanction tests of potential scenarios (e.g., fire, pandemic, tornados) that DRC and Pennsylvania may experience

Below, we have outlined the primary steps of DRC’s emergency response process.

DRC High-Level Emergency Response Process

- I. Emergency Response Coordinator receives alert notification of potential issue.
 - Standard contact number accessible 24 hours, 7 days a week
 - Point person for managing the Emergency Response process
- II. Emergency Response Coordinator notifies Emergency Response Team
 - Briefs Emergency Response Team and DRC ownership on current situation
 - If required, defines designated site for Emergency Response Team to meet (including time, locale, directions to site, and other pertinent information)
- III. Emergency Response Team evaluates situation at designated site
 - Emergency Response Coordinator brings emergency response procedures and tools (resumption plan framework, employee, client, and subcontractor lists, etc.)
 - Immediate situation is evaluated and short-term actions defined
 - Review status of existing business conditions
 - Assess essential staffing requirements and contact essential employees
 - Develop communication plan regarding initial steps
 - Emergency Response Team situation analysis documented (including defined assignments)
 - If appropriate, define command center location for follow-up sessions
- IV. Emergency Response Team representative(s) contact key stakeholders regarding existing situation.
 - Emergency backup providers
 - Clients
 - Subcontractors/suppliers
 - DRC personnel, as appropriate
- V. Emergency Response Team action planning
 - Emergency Response Coordinator coordinates team assembly to command center
 - Review short-term action plan deployment
 - Communication requirements to stakeholders must be included
 - Utilize essential and nonessential employee lists as appropriate
 - Develop long-term recovery plans
 - Communication requirements to stakeholders must be included
 - Utilize essential and non-essential employee lists as appropriate
 - Develop emergency-recovery-plan timelines and milestone reviews
- VI. Manage emergency recovery plan
 - Emergency Response Coordinator leads update sessions
 - Manage recovery plan to closure
- VII. Conduct “management review” of recovery process
 - Assess “lessons learned”

EMPLOYEE TRAINING

All full-time and part-time regular DRC employees are required to attend emergency response training. This training is incorporated into new employee orientation, as well as being given annually to reinforce necessary procedures in the event an emergency occurs. Managers and designated essential employees attend a separate training session that addresses issues specific to their involvement in DRC's Emergency Response Management Plan.

Training is customized for our business and conducted by representatives from our Human Resources Department. Training addresses the process employees should follow in the event of an emergency and is customized to address various types of potential emergencies that could occur.

For example, in the event of a pandemic flu outbreak, mandatory training addresses such issues as:

- Availability of flu shots
- Symptoms and health effects of influenza
- Treatment and sources to contact for appropriate medical care
- Steps to take if exposure is suspected
- Company representatives to whom to report known or suspected exposures
- Procedures for reporting exposure to co-workers, family members, friends, or others who are ill with the flu
- Proper use of DRC-provided personal-protection equipment; proper hygiene in the workplace and at home
- Communications

Information regarding this annual training is included in our employee handbook as well as in our manager's guide.

ESSENTIAL BUSINESS FUNCTIONS AND KEY EMPLOYEES

DRC maintains a comprehensive list identifying all employees as essential or nonessential personnel. This list is updated regularly and includes employee work and home phone numbers, and emergency contact names. DRC expects designated essential personnel (approximately 25% of the population is designated as such) to be available for work during an emergency. DRC acknowledges, however, that even essential personnel might become ill and unavailable to work or not be able to reach our worksite because of conditions beyond their own or DRC's control. Consequently, DRC has devised back-up arrangements where designated personnel are trained and equipped to fulfill duties of unavailable essential employees. In addition, DRC has equipped our

most essential personnel with computers and cell phones to support employees by working remotely in emergencies.

CONTINGENCY PLANS FOR STAFFING ISSUES

DRC is prepared to continue key operations from multiple locations within the Twin Cities area (Maple Grove, Brooklyn Park, Plymouth, Woodbury), nationwide (Lansing, Michigan; Sharonville and Columbus, Ohio; Pittsburgh, Pennsylvania; Madison, Wisconsin), and at essential employees' home offices. DRC has a strong teaming approach and employees are cross-trained to provide ready back-up in the event of an emergency. In addition, DRC has partnered with preferred temporary employment providers to identify workers who could fill in for staffing shortfalls if needed.

DRC acknowledges that during an emergency, local, state, or federal authorities might prohibit or severely curtail individuals' access to and use of public services and public transportation; close or prevent access to buildings or public highways; isolate or quarantine buildings' occupants; and prevent interstate or intrastate delivery of goods and services. Although such events may occur, DRC employees have a history of rising to the occasion and meeting similarly challenging situations.

COMMUNICATIONS PLAN

DRC's Emergency Response Team has responsibility to ensure our company's ability to continue operating in emergencies. The Emergency Response Team has devised a system under which essential personnel can be directed to take specific actions at a specific time based on a series of alerts (e.g., "Warning," "Full Shutdown") based on the seriousness of conditions. DRC trains all essential personnel in the use and understanding of this communications system.

DRC's hotline number is activated in the earliest stages of an emergency. Employees are instructed to call this number for pre-recorded messages regarding DRC's response to the emergency at hand. In addition, managers are required to maintain at work and home, an up-to-date Employee Call List for their department.

DRC also provides hotline numbers for communications with customers, suppliers, vendors, and government officials. If landlines are down, DRC will communicate through all available communication vehicles such as cell phones, local radio, television stations, and Internet websites.

In an emergency, DRC will consult with outside authorities to coordinate dissemination of instructions or other important information as quickly as possible to all employees. DRC will notify employees via the communication network described above.

TESTING DRC'S EMERGENCY RESPONSE PROCEDURES

Testing of Emergency Response Procedures is performed regularly throughout the year to address situations such as:

- Fire fighting
- Loss control (security of materials, data and facilities)
- Evacuation
- Tornadoes
- Bomb threats

These are conducted to ensure emergency response plans are adequate and workable, and also to provide an opportunity to train personnel.

Testing and evaluating the emergency response plan (as well as the business continuity plan) is one of the most important aspects of successful business continuity planning. Since emergencies do not occur very often, it is difficult to ensure adequacy and proficiency of personnel and plans without regular training and testing.

The use of third-party testing is another method of validating our preparedness. Where appropriate, third-party assessments are used to evaluate our processes.

For more detailed information regarding DRC's emergency response and business continuity plan, please see our *Emergency Response Management Plan Executive Summary*, provided in *Volume IV; Appendix N*.

ASSISTING OUR CLIENTS DURING EMERGENCIES

In addition to having internal plans in place to deal with emergency situations, DRC is prepared for and committed to helping our clients during emergencies as well.

One key example of this was our ability to handle the myriad of issues that arose in August 2005 when Hurricane Katrina severely impacted our Louisiana client. Within days after the hurricane, DRC began developing contingency plans for the statewide assessment program for the Louisiana Department of Education (LDE). Schedules were altered; committee meeting logistics were changed; test material shipping plans were reconfigured; and data collection procedures were redesigned. As a result of the collaborative efforts of the LDE and DRC, all tests were administered as originally scheduled for the 2005–2006 school year, and quality was not compromised.

We are dedicated to assisting Pennsylvania during any emergencies that may arise during the course of our contract.

4. TASKS

4.A. Transition

4.A.1. PSSA TRANSITION

During the transition from the scope defined within the existing current contract to scope defined within the proposed new contract, all components will need to be coordinated so that the transition occurs without disruption to the PSSA program, to PDE, or to local school districts across the Commonwealth. Since DRC is the current partner with PDE to develop and deliver the PSSA program and because of our long history of working with PDE on the PSSA, DRC will be able to provide PDE with a seamless transition to the new scope of work.

DRC's transition from the current contract to the next contract will include responsibility for all activities and deliverables associated with the spring 2016-2017 administration, including but not limited to:

- Field test items
- Online enrollment system
- Online test setup system
- Directions for Administration (DFA) manuals for all grades and all content areas for both paper/pencil testing (PPT) and online administrations
- Handbook for Assessment Coordinators
- Materials ordering and management system
- Printing, shipping, scoring, and reporting
- Related psychometric activities
- Test administration, customer service, and technical support
- Training activities for district personnel
- Distribution and collection of test materials
- Secure materials accountability activities and reporting

4.A.2. KEYSTONE EXAMS TRANSITION

During the transition from the scope defined within the existing current contract to scope defined within the proposed new contract, all components will need to be coordinated so that the transition occurs without disruption to the Keystone Exams program, to PDE, or to local school districts across the Commonwealth. Since DRC is the current partner with PDE to develop and deliver the Keystone Exams program, and since DRC has guided PDE closely during the foundation

and creation of the Keystone Exams, DRC will be able to provide PDE with a seamless transition to the new scope of work.

Under the new contract, all activities and deliverables required for the summer 2016 administration of the Keystone Exams will be included. The contract will also include responsibility for the full implementation of all activities and deliverables for the 2016-2017 Keystone Exams administrations, including, but not limited to:

- Field test items
- Online enrollment system
- Online test setup system
- DFA manuals for both PPT and online administrations
- Handbook for Assessment Coordinators
- Materials ordering and management system
- Printing, shipping, scoring, and reporting
- Related psychometric activities
- Test administration, customer service, and technical support
- Training activities for district personnel
- Distribution and collection of test materials
- Secure materials accountability activities and reporting

4.A.3. CDT TRANSITION

The operational administration of the CDT for the 2015-16 school year is a component of DRC's existing contract with Pennsylvania. Historically, the CDT has remained active through each July; therefore, a transition process to host the CDT beginning July 1, 2016, will not be necessary. PDE, Pennsylvania educators, and students will benefit from the consistency of the user interface. Additionally, the CDT is a proven tool, with the CAT engine itself and associated configurations, the CDT items, and CDT reporting, including direct linking to the Pennsylvania's Standard Aligned System (SAS) website, already in place.

4.A.4. ASSISTANCE TO PDE

Because DRC is the incumbent vendor for the PSSA, Keystone Exams, and CDT, a transition plan will not be needed for the new contract. DRC is prepared to offer continuous, uninterrupted delivery of all the services and products required under this contract.

4.B. Design of the Assessments

DRC understands the designs of Pennsylvania’s assessment programs, and we will provide PDE with assessments that are identical to the designs described in the RFP.

Throughout our comprehensive partnership, DRC has worked with PDE to provide the knowledge and expertise to create a cohesive assessment system, providing the support necessary to plan and implement the innovative and world-class assessment designs envisioned by Pennsylvania’s leaders. DRC has worked to internalize PDE’s vision, and our understanding of this vision will allow DRC to continue our commitment to PDE to implement a fully integrated and rigorous assessment design to meet the requirements of this RFP.

Underlying the Pennsylvania assessments are the Pennsylvania Core Standards (PCS) for English language arts and mathematics and the Pennsylvania Academic Standards (PAS) for science and technology and environment and ecology. DRC understands that the **Assessment Anchors and Eligible Content (AAEC)** were derived from these standards. The AAEC statements were created by groups of Pennsylvania educators charged with the task of clarifying the standards assessed on the Pennsylvania System of School Assessment (PSSA), the Keystone Exams, and the Classroom Diagnostic Tools (CDT). The Assessment Anchors are designed to hold together, or *anchor*, the entire assessment system and the curriculum and instructional practices in schools across the Commonwealth.

DRC, through supporting PDE in the development of the Assessment Anchors as defined by the Eligible Content, understands that they were created to be clear, focused, rigorous, and manageable.

- The AAEC are readable, user-friendly, and clearly detail which standards are assessed.
- The AAEC identify the core set of standards that are assessed, providing purposeful understanding of the standards that are critical to the student learning process and part of the large-scale assessment process.
- The AAEC support the rigor of the standards by assessing higher-order and reasoning skills.
- The AAEC define standards to allow local districts to incorporate key ideas into curriculum to prepare students for success.

As stated in the AAEC documents, the AAEC are organized into cohesive test designs and blueprints, each structured with a common labeling outline. The framework is organized first by Reporting Category (PSSA) or Module (Keystone Exams); then by Assessment Anchor; followed by Anchor Descriptor; and finally, at the greatest level of detail, by an Eligible Content statement.

- **Reporting Category/Module:** The Assessment Anchors are organized into broad Reporting Categories or Modules for each assessment and exam. In addition to the state, district, and school aggregated reporting, individual student results are reported at this level.
- **Assessment Anchor:** The Assessment Anchors represent categories of subject matter (skills and concepts) that anchor the content. Each Assessment Anchor is part of a Reporting Category or Module and has one or more Anchor Descriptors unified under and aligned to it.
- **Anchor Descriptor:** Under each Assessment Anchor are one or more specific Anchor Descriptors. The Anchor Descriptor adds a level of specificity, further delineating the scope of the content covered by the Assessment Anchor. Each Anchor Descriptor is part of an Assessment Anchor and has one or more Eligible Content statements unified under and aligned to it.
- **Eligible Content:** The Eligible Content is the most specific description of the skills and content that are assessed. This level is considered the assessment limit and helps educators identify the range of the content covered.

4.B.1. PSSA TEST DESIGN AND BLUEPRINTS

A high-level outline of our proposed test design is included below. The designs follow the requirements of the RFP. As such, they meet the needs of the program, including providing items for Item Samplers, breach forms, reporting at the school and district level, and banking the item pool for the construction of the following year's core forms. DRC is prepared to work closely with PDE as the program evolves, ensuring a flexible and responsive approach to test development.

The PSSA Mathematics Test Plan shown in the following table is organized by grade and broken down between multiple-choice (MC) and open-ended (OE) items. Core items are also distinguished from items that serve the role of equating block (EB) and field test (FT).

PSSA Mathematics Test Plan per Form

| Grade | Multiple-Choice (MC) | | | Open-Ended (OE) | | | Total Core Items | Total of Core Points |
|-------|----------------------|-----------------|---------------------|-----------------|-----------------|---------------------|------------------|----------------------|
| | Core | Equating Block* | Embedded Field Test | Core | Equating Block* | Embedded Field Test | | |
| 3 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |
| 4 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |
| 5 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |
| 6 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |
| 7 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |
| 8 | 60 | 2 | 10 | 3 | 0 | 1 | 60 MC 3 OE | 72 |

*Note that not all equating block items shown in the table will be unique on all forms.

Please see 4.C.5., *PSSA Item and Test Development Process* for more information on the PCS-based PSSA test designs for the mathematics assessments.

The PSSA English Language Arts (ELA) Test Plan shown in the following table is organized by grade and broken down between selected-response (SR) and constructed-response (CR) items. SR items are also delineated into passage-based MC, standalone MC, and evidence-based selected-response (EBSR) items. CR items are delineated into passage-based short-answer (SA), writing prompts (WP), and text-dependent analysis (TDA) items. Core items are also distinguished from items that serve the role of equating block (EB) and field test (FT). Since many of the ELA items are linked to a stimulus passage, the number of passages associated with a specific item type is also provided.

PSSA English Language Arts Test Plan per Form

| Grade | Selected-Response | | | | | | | Constructed-Response | | | | | Total Core Items | Total Core Points (Raw) | Total Core Points (Weighted) |
|-------|------------------------------------|-------------------|----------------|---------------|-------------------|-----------------------------------------|-------------|---------------------------------|-------------|-------------|-------------------------------|-------------|------------------|-------------------------|------------------------------|
| | Passage-Based Multiple-Choice (MC) | | | Standalone MC | | Evidence-Based Selected Response (EBSR) | | Passage-Based Short-Answer (SA) | | Prompt (WP) | Text Dependent Analysis (TDA) | | | | |
| | Core | Psychometric Use* | Embedded FT | Core | Psychometric Use* | Core | Embedded FT | Core | Embedded FT | Core | Core | Embedded FT | | | |
| 3 | 20 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 4 | 2 | 2 | 1 | 1 | 0 | 0 | 42 SR 3 CR | 58 | 62 |
| 4 | 23 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 6 | 2 | 0 | 0 | 1 | 1 | 1 | 47 SR 2 CR | 64 | 84 |
| 5 | 23 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 6 | 2 | 0 | 0 | 1 | 1 | 1 | 47 SR 2 CR | 64 | 84 |
| 6 | 23 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 6 | 2 | 0 | 0 | 1 | 1 | 1 | 47 SR 2 CR | 64 | 84 |
| 7 | 23 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 6 | 2 | 0 | 0 | 1 | 1 | 1 | 47 SR 2 CR | 64 | 84 |
| 8 | 23 (4 pass.) | 6 (1 pass.) | 8 (1 pass.) | 18 | 2 | 6 | 2 | 0 | 0 | 1 | 1 | 1 | 47 SR 2 CR | 64 | 84 |

*Note that not all equating block items shown in the table will be unique on all forms.

Please see 4.C.5., *PSSA Item and Test Development Process* for more information on the PCS-based PSSA test designs for the ELA assessments.

The PSSA Science Test Plan is shown in the following table. The table is organized by grade and broken down between multiple-choice (MC) and open-ended (OE) items. Core items are also distinguished from items that serve the role of equating block (EB) and field test (FT). Note that not all equating block items shown in the table will be unique on all forms.

PSSA Science Test Plan per Form

| Grade | Multiple-Choice (MC) | | | Open-Ended (OE) | | | Total Core Items | Total Core Points |
|-------|--------------------------|-----------------|-------------------------|-----------------|-----------------|-------------|------------------|-------------------|
| | Core | Equating Block* | Embedded FT | Core | Equating Block* | Embedded FT | | |
| 4 | 58 | 2 | 8 | 5 | 0 | 1 | 58 MC 5 OE | 68 |
| 8 | 54 + 4 scenario-based | 2 | 6 + 4 scenario-based | 5 | 0 | 1 | 58 MC 5 OE | 68 |

Please see 4.C.5., *PSSA Item and Test Development Process* for more information on the PAS-based science assessments.

4.B.1.a. Test Content Blueprint for ELA and Math

Based on our experience and long-term partnership in Pennsylvania, DRC is firmly grounded with a solid understanding of the Pennsylvania Core Standards (PCS) that form the foundation of the new Assessment Anchors and Eligible Content (AAEC) for ELA and mathematics that have been used on the operational PSSA since the spring 2015 assessments. Since 2003, we have worked closely with PDE and with local Pennsylvania educators as decisions about PSSA assessable anchors, eligible content, and cognitive complexity have been made, and we have provided guidance and support to PDE on the development of the new PCS-based AAEC. Not only has DRC successfully implemented the new PCS-based content blueprint for the PSSA, but we are also knowledgeable of, and sensitive to, the perspectives local educators across the Commonwealth bring to the PCS-based AAEC.

With the transition to a PCS-based PSSA program, DRC has worked in close cooperation with PDE to present test designs and content blueprints that fulfill the requirement that the PCS articulate across curricular, instructional, and assessment practices, cohesively integrating the Voluntary Model Curriculum, the Learning Progressions, the Classroom Diagnostic Tools, the PSSA, and the Keystone Exams.

DRC understands the PSSA, the Assessment Anchors, and the PCS. This places us in a unique position to respond to any future refinements and clarifications in the Assessment Anchors or other parameters that may impact the content

blueprints. Our team is committed to providing PDE with the necessary articulation to process any future changes to the content blueprints across the assessment system. Additional information regarding rigor and cognitive complexity of the mathematics and ELA assessments and information on item types can be found in *Subheadings 4.C.1., General Requirements* and *4.C.2., Test Items* of this proposal.

Mathematics PSSA Test Content Blueprints

As stated in the released PDE AAEC documents, DRC understands that there are four proposed Reporting Clusters. Each cluster is broken down into Reporting Categories that are associated with specific grades or grade spans. The corresponding Reporting Categories are as follows (grade associations are shown in parentheses):

- A = Numbers and Operations
 - A–T = Numbers and Operations in Base Ten (grades 3–5)
 - A–F = Numbers and Operations – Fractions (grades 3–5)
 - A–N = The Number System (grades 6–8)
 - A–R = Ratios and Proportional Relationships (grades 6, 7)
- B = Algebraic Concepts
 - B–O = Operations and Algebraic Thinking (grades 3–5)
 - B–E = Expressions and Equations (grades 6–8)
 - B–F = Functions (grade 8)
- C = Geometry
 - C–G = Geometry (grades 3–8)
- D = Data Analysis and Probability
 - D–M = Measurement and Data (grades 3–5)
 - D–S = Statistics and Probability (grades 6–8)

DRC understands that PDE treats the PCS-aligned Eligible Content for Mathematics as assessment limits for the purpose of item and test development rather than as the sole statement to which an item must align. Both open-ended and multiple-choice mathematics items can align to one or more Eligible Content, Descriptors, or Assessment Anchors, which allows for richer, more authentic assessment items.

DRC’s recommendation regarding the proposed mathematics blueprints is provided in the following table. The proposed blueprint for the PCS-based mathematics PSSA is consistent with the 2015 PSSA administration.

PCS-Based PSSA Mathematics Blueprint: Percent and Points of the Core by Reporting Category by Grade

| Reporting Category | Grade | | | Reporting Category | Grade | | Reporting Category | Grade |
|--------------------|----------------------|----------------------|----------------------|--------------------|----------------------|----------------------|--------------------|----------------------|
| | 3 | 4 | 5 | | 6 | 7 | | 8 |
| A–T | 14–17% 10–12 pts. | 18–22% 13–16 pts. | 24–28% 17–20 pts. | A–N | 18–22% 13–16 pts. | 14–17% 10–12 pts. | A–N | 14–17% 10–12 pts. |
| A–F | 14–17% 10–12 pts. | 20–25% 14–18 pts. | 26–30% 19–22 pts. | A–R | 17–21% 12–15 pts. | 24–28% 17–20 pts. | B–E | 30–35% 22–25 pts. |
| B–O | 26–32% 19–23 pts. | 24–28% 17–20 pts. | 14–17% 10–12 pts. | B–E | 26–30% 19–22 pts. | 24–28% 17–20 pts. | B–F | 20–25% 14–18 pts. |
| C–G | 14–17% 10–12 pts. | 14–17% 10–12 pts. | 14–17% 10–12 pts. | C–G | 14–17% 10–12 pts. | 18–22% 13–16 pts. | C–G | 17–21% 12–15 pts. |
| D–M | 26–32% 19–23 pts. | 17–21% 12–15 pts. | 17–21% 12–15 pts. | D–S | 18–22% 13–16 pts. | 14–17% 10–12 pts. | D–S | 14–17% 10–12 pts. |
| Total | 100% 72 pts. | 100% 72 pts. | 100% 72 pts. | Total | 100% 72 pts. | 100% 72 pts. | Total | 100% 72 pts. |

English Language Arts PSSA Test Content Blueprints

The proposed content blueprints for the PCS-based ELA assessment (consistent with the 2015 PSSA administration) are shown in the tables that follow. The proposed blueprint is organized around three Reporting Clusters—Reading, Writing, and Text-dependent analysis (TDA)—based on the expressed emphasis contained within the PCS. As stated in the released PDE Assessment Anchor and Eligible Content documents, the Reporting Categories are as follows:

- A = Literature Text
- B = Informational Text
- C = Writing
- D = Language
- E = Text-dependent Analysis

In addition to the above, the first two Reporting Categories (Literature Text and Informational Text) are understood to be the “Genre Reporting Categories.” DRC proposes to continue to map the Genre Reporting Categories A and B for ELA as part of a dual-alignment into Core Competencies Reporting Categories. There are three themes prevalent throughout the PCS-ELA Standards. These themes appear in both the Literature Text and Informational Text that will appear on the PCS-based PSSA ELA test. The following table shows how the results of specific PCS-based Assessment Anchors and Eligible Content will be mapped to provide for a second layer of reporting. These three additional (dual) Reporting Categories are as follows:

- A–K + B–K = Key Ideas and Details [Key Ideas]

- A–C + B–C = Craft and Structure, and Integration of Knowledge and Ideas [CSI]
- A–V + B–V = Vocabulary Acquisition and Use [Vocabulary]

PCS-Based PSSA ELA Blueprint: Dual Reporting for Reporting Categories A and B

| Genre Reporting Categories | Core Competencies Reporting Categories | | |
|----------------------------|----------------------------------------|-------------------------------------------------------------|--------------------------------|
| | Key Ideas and Details | Craft and Structure, and Integration of Knowledge and Ideas | Vocabulary Acquisition and Use |
| | (Key Ideas) | (CSI) | (Vocabulary) |
| A: Literature Text | A–K.1.1.1 | A–C.2.1.1 | A–V.4.1.1 |
| | A–K.1.1.2 | A–C.2.1.2 –G 6, 7, and 8 only | A–V.4.1.2 |
| | A–K.1.1.3 | A–C.2.1.3 –G 6, 7, and 8 only | |
| | | A–C.3.1.1 | |
| B: Informational Text | B–K.1.1.1 | B–C.2.1.1 | B–V.4.1.1 |
| | B–K.1.1.2 | B–C.2.1.2 | B–V.4.1.2 |
| | B–K.1.1.3 | B–C.2.1.3 –G 6, 7, and 8 only | |
| | | B–C.3.1.1 | |
| | | B–C.3.1.2 | |
| | B–C.3.1.3 –G 3, 4, and 5 only | | |

PCS-Based Reporting Summary Table

| ELA Reporting Framework, Clusters, and Categories | | | Reporting Category Code |
|---------------------------------------------------|-------------------|---------------------------------------------------------------|-------------------------|
| Reading | Genre | Literature Text | A |
| | | Informational Text | B |
| | Core Competencies | Key Ideas and Details [Key Ideas] | A–K / B–K |
| | | Craft and Structure/ Integration of Knowledge and Ideas [CSI] | A–C / B–C |
| Vocabulary Acquisition and Use [Vocabulary] | | A–V / B–V | |
| Writing | Types of Writing | | C |
| | Language | | D |
| Text-dependent Analysis | | | E |

DRC’s recommendation regarding the proposed English language arts blueprint is provided in the following table. The proposed blueprint for the PCS-based ELA PSSA is consistent with the 2015 PSSA administration.

PCS-Based PSSA ELA Blueprint: Percent and Points of the Core by Reporting Category by Grade

| Area | Reporting Category | Grade | | | | | |
|-----------------|--------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| | | 3 | 4 | 5 | 6 | 7 | 8 |
| Reading | A | 24–34% 15–21 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. |
| | B | 24–34% 15–21 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. | 18–27% 15–23 pts. |
| Writing | C* | 13% 8 pts. | 14% 12 pts. | 14% 12 pts. | 14% 12 pts. | 14% 12 pts. | 14% 12 pts. |
| | D | 29% 18 pts. | 21% 18 pts. | 21% 18 pts. | 21% 18 pts. | 21% 18 pts. | 21% 18 pts. |
| TDA | E* | | 19% 16 pts. | 19% 16 pts. | 19% 16 pts. | 19% 16 pts. | 19% 16 pts. |
| All Areas Total | | 100% 62 pts. | 100% 84 pts. | 100% 84 pts. | 100% 84 pts. | 100% 84 pts. | 100% 84 pts. |

*Reflect the impact of weighted values

4.B.1.b. Test Content Blueprint for Science

As with the mathematics and ELA assessments, DRC’s experience and partnership in Pennsylvania provides a firm foundation to understand and articulate the standards that form the foundation of the PSSA science assessment. We have worked closely with PDE as decisions about assessment anchors, eligible content, and cognitive complexity have been made concerning the PSSA science assessment. For example, DRC has worked closely with PDE and Pennsylvania educators to help ensure that the Pennsylvania Academic Standards (PAS)—both the *Science and Technology Standards* and the *Environment and Ecology Standards*—are reflected clearly in the science Assessment Anchors and Eligible Content, helping to ensure that the design of the assessments fulfills the requirement that the PAS articulate across curricular, instructional, and assessment practices.

DRC’s thorough understanding of the PSSA science assessment, the Assessment Anchors, and the PAS places us in a unique position to respond to any future changes in the science Assessment Anchors or other parameters of development that may impact the content blueprints. Our item development team is conversant in all aspects of the content and standards that are at the heart of the PSSA science assessment. DRC will continue to be able to provide PDE with the necessary articulation to process any future changes to the content blueprints across the science assessment system.

The proposed content blueprint for the PAS-based PSSA science assessment is shown in the table that follows. The proposed blueprint is organized around four Reporting Categories based on the expressed emphasis contained within the PAS, including three under Science Content. The four corresponding Reporting Categories are:

- A = The Nature of Science
- B = Biological Sciences
- C = Physical Sciences
- D = Earth and Space Sciences

**PAS-Based PSSA Science Blueprint:
Percent and Points of the Core by Reporting Category by Grade**

| Area | Reporting Category | Grade | |
|-----------------------|--------------------|----------------------|----------------------|
| | | 4 | 8 |
| The Nature of Science | A | 50% 34 pts. | 50% 34 pts. |
| Science Content | B | 16–17% 11–12 pts. | 16–17% 11–12 pts. |
| | C | 16–17% 11–12 pts. | 16–17% 11–12 pts. |
| | D | 16–17% 11–12 pts. | 16–17% 11–12 pts. |
| All Areas Total | | 100% 68 pts. | 100% 68 pts. |

Subheading 4.C.1., General Requirements of this proposal includes additional information on the rigor and cognitive complexity of the science assessment.

Subheading 4.C.2., Test Items of this proposal includes additional information on the item types to be used with the PAS-based PSSA science assessment.

4.B.2. KEYSTONE EXAMS TEST DESIGN AND BLUEPRINTS

4.B.2.a. Keystone Exams Test Design and Blueprints

A high-level outline of our proposed test design is included below. Our design meets the needs of the program, including providing items for Item Samplers, breach forms, reporting at the school and district levels, and overage in the item bank for the construction of the following year’s core forms. DRC is prepared to work closely with PDE as the program evolves, ensuring a flexible and responsive approach to test development.

The Keystone Exams Algebra I Test Plan is shown in the following table. This table is organized by Module, and broken down between multiple-choice (MC) and constructed-response (CR) items. Core items are also distinguished from items that serve the role of field test (FT). Note that the test plan for spring includes FT items, but for the summer and winter administrations the FT positions will be filled with placeholder (PH) items.

Keystone Exams Algebra I Test Plan per Form for Spring

| Algebra I | Module | Core | | Field Test | | Total Core Items | Total Core Points |
|-----------|--------------|------|----|------------|----|------------------|-------------------|
| | | MC | CR | MC | CR | | |
| | 1 | 18 | 3 | 5 | 1 | 18 MC 3 CR | 30 |
| | 2 | 18 | 3 | 5 | 1 | 18 MC 3 CR | 30 |
| | Total | 36 | 6 | 10 | 2 | 36 MC 6 CR | 60 |

The following table, the Keystone Exams Biology Test Plan, is organized by module and broken down between multiple-choice (MC) and constructed-response (CR) items. Core items are also distinguished from items that serve the role of field test (FT). Note that the test plan for spring includes FT items, but for the summer and winter administrations the FT positions will be filled with placeholder (PH) items.

Keystone Exams Biology Test Plan per Form for Spring

| Biology | Module | Core | | Field Test | | Total Core Items | Total Core Points |
|---------|--------------|------|----|------------|----|------------------|-------------------|
| | | MC | CR | MC | CR | | |
| | 1 | 24 | 3 | 8 | 1 | 24 MC 3 CR | 33 |
| | 2 | 24 | 3 | 8 | 1 | 24 MC 3 CR | 33 |
| | Total | 48 | 6 | 16 | 2 | 48 MC 6 CR | 66 |

The following table, the Keystone Exams Literature Test Plan, is organized by module and broken down between multiple-choice (MC) and constructed-response (CR) items. Core items are also distinguished from items that serve the role of field test (FT). Since each Literature item is linked to a stimulus passage, the number of passages per Module is also provided. Note that the test plan for spring includes FT items, but for the summer and winter administrations the FT positions will be filled with placeholder (PH) items.

Keystone Exams Literature Test Plan per Form for Spring

| Literature | Module | Core | | | Field Test | | | Total Core Items | Total Core Points |
|------------|--------------|----------|----|-----|------------|----|----|------------------|-------------------|
| | | Passages | MC | CR | Passages | MC | CR | | |
| | 1 | 2 | 17 | 3* | 1 | 6 | 1 | 17 MC 3 CR | 26 |
| | 2 | 2 | 17 | 3** | 1 | 6 | 1 | 17 MC 3 CR | 26 |
| | Total | 4 | 34 | 6 | 2 | 12 | 2 | 34 MC 6 CR | 52 |

*For Module 1, one core passage has two CR and one core passage has one CR.

**For Module 2, one core passage has two CR and one core passage has one CR.

Please see *Subheading 4.C.6., Keystone Exams Item and Test Development Process* of this proposal for more information on the Pennsylvania Core Standards (PCS)-based Keystone Exams test designs.

As with the PSSA, our experience and partnership in Pennsylvania has firmly grounded DRC with a solid understanding of the college- and career-ready focus of the PCS that form the foundation of the Keystone Assessment Anchors and Eligible Content (AAEC) currently used on the operational Keystone Exams. Since 2008, we have worked closely with PDE as decisions about Keystone assessable anchors, eligible content, and cognitive complexity have been made, and we have provided guidance to PDE on the development of the Keystone AAEC. Not only is DRC fully prepared to maintain the PCS-based Keystone Exams blueprints, but we are also knowledgeable of, and sensitive to, the perspectives local educators across the Commonwealth bring to the PCS-based Keystone AAEC.

During DRC’s partnership with PDE to develop the Keystone Exams program, DRC has worked in close cooperation with PDE to design the assessments to fulfill the requirement that the PCS articulate across curricular, instructional, and assessment practices, cohesively integrating the Voluntary Model Curriculum, the Learning Progressions, the Classroom Diagnostic Tools, the PSSA, and the Keystone Exams.

DRC possesses thorough understanding of the Keystone Exams, the Assessment Anchors, the content standards, and the cognitive complexity of the required items, which places us in a unique position to respond to any future changes in the Assessment Anchors or other parameters of the design that may impact the content blueprints.

The table that follows contains the blueprints for the PCS-aligned Keystone Exams. The blueprint is organized around two thematic Modules per exam based on the expressed emphasis contained within the PCS. The six Reporting Categories (Modules) organized under three content areas and courses are:

1. Mathematics

- Algebra I
 - Module 1 = Operations and Linear Equations & Inequalities
 - Module 2 = Linear Functions and Data Organization

2. Literacy

- Literature
 - Module 1 = Fiction Literature
 - Module 2 = Nonfiction Literature

3. Science

- Biology
 - Module 1 = Cells and Cell Processes
 - Module 2 = Continuity and Unity of Life

Keystone Exams Blueprint: Percent and Points of the Core by Reporting Category

| Exam | Module | Reporting Category | Percent |
|------------|-------------------------|------------------------------------------------|-------------------------------|
| Algebra I | 1 | Operations and Linear Equations & Inequalities | 50% 30 pts. |
| | 2 | Linear Functions and Data Organization | 50% 30 pts. |
| | Total Algebra I | | 100% 60 pts. |
| Biology | 1 | Cells and Cell Processes | 50% 33 pts. |
| | 2 | Continuity and Unity of Life | 50% 33 pts. |
| | Total Biology | | 100% 66 pts. |
| Literature | 1 | Fiction Literature | 50% 26 pts. |
| | 2 | Nonfiction Literature | 50% 26 pts. |
| | Total Literature | | 100% 52 pts. |

Please see *Subheading 4.B.1., General Requirements* of this proposal for more information on the rigor and cognitive complexity of the Keystone Exams.

4.B.2.b. Modules

DRC understands that the Keystone Exams are designed around a Module format, with specific Assessment Anchors associated with a single Module. Each exam has two equally sized Modules (discussed in the previous subsection) that define a thematic category used to provide a framework for reporting results. This design allows for student results to be reported at the individual Module level as well as at the level of an aggregated total score for the exam, while still providing summary results at the Anchor, Module, and Total Score levels.

Modules provide the flexibility necessary to organize content around curricular interests. This organizational feature of the Keystone Exams blueprints follows a consistent pattern across all Keystone Exams. Diving deeper into the framework reveals the increasing level of content detail organized across the Keystone Exams like an outline. Modules have two or more Assessment Anchors, each Assessment Anchor has one or more Anchor Descriptor, and each Anchor Descriptor has one or more Eligible Content.

The following table shows the role of the Module in the percent and point distribution for the three current operational Keystone Exams.

Operational Keystone Exams: Module Map by Points and Percent

| Exam | Module | | Total Exam |
|-------------------|----------------|----------------|-----------------|
| | 1 | 2 | |
| Algebra I | 50% 30 pts. | 50% 30 pts. | 100% 60 pts. |
| Biology | 50% 33 pts. | 50% 33 pts. | 100% 66 pts. |
| Literature | 50% 26 pts. | 50% 26 pts. | 100% 52 pts. |

Please see *Subheading 4.C.6., Keystone Exams Item and Test Development Process* of this proposal for specific information about the Modules and their role in the designs of the Keystone Exams.

4.B.2.c. Item Types

DRC understands that the current operational Keystone Exams employ two types of test items: multiple-choice (MC) and constructed-response (CR). DRC will fully support the development of the two types of test items. DRC will develop multiple-choice items that are dichotomous, scoring only one (correct) or zero (incorrect). DRC will also develop constructed-response items that are polytomous, scoring on a 0–3 or 0–4 scale, based on the content and quality of the

student’s response measured against a pre-determined scoring guideline and model correct responses. Our team of item writers understands that these item types (MC and CR) assess different levels of knowledge and provide different kinds of information about achievement. Our team will continue to write items to support the design of the Keystone Exams.

The following table provides the design considerations for item types on the current operational Keystone Exams, examining how the item types used relate as a percentage of the entire core. The current distribution allows for a reasonable balance between the two item types, especially when framed against the unique nature of each of the content areas and the number of Assessment Anchors and Eligible Content associated with each content area.

**Keystone Exams Design Considerations: Item Types
and the Relationship to Raw Points and AAEC Coverage**

| Exam | MC as a % of Core | CR as a % of Core | # of Raw Points | | # of Assessment Anchors | # of Eligible Content |
|-------------------|-------------------|-------------------|-----------------|--------|-------------------------|-----------------------|
| | | | per MC | per CR | | |
| Algebra I | 60 | 40 | 1 | 4 | 6 | 33 |
| Biology | 73 | 27 | 1 | 3 | 8 | 38 |
| Literature | 65 | 35 | 1 | 3 | 4 | 56 |

DRC will develop CR items for Algebra I, Biology, and Literature. For the Algebra I exam, DRC will develop two main types of CR items: scaffolded completion (S-CR) items and extended scaffolded completion (E-CR) items. S-CR items will be developed to elicit two to four distinct responses placed in designated answer spaces/boxes. S-CR items require objective and concise responses to their stems, like “150 kilometers,” “plot point at (2, -2),” or “ $y = 8x^2 + 2.5$.” E-CR items generally require that students provide extemporaneous written explanations and provide work shown for all or part of the item. DRC will develop parts of E-CR items designed to specifically ask students to show all of their work or to explain why and/or provide reasoning for the answer. In addition, at PDE’s direction, DRC will also develop CR items for the Algebra I exam that contain alignments to multiple assessment anchors (crossing assessment anchors) within the same CR item.

Should PDE desire, DRC proposes working with PDE to develop a plan to augment the Keystone Literature program so that it incorporates text-dependent analysis style CR (TDA) items, so that the Literature CR items align with the PSSA English language arts TDA prompts. DRC would provide PDE with guidance about how to approach a change of this nature, including an outline of the necessary steps to determine the impacts that this change would have on the overall Keystone Literature Exams. The cost associated with this additional effort can be discussed upon award.

For the development of the CR items for Algebra I, Biology, and Literature, item-specific scoring guides will be developed by DRC. The item-specific rubrics will also be reviewed by DRC's performance-scoring staff members, who are knowledgeable about how students respond to CR items.

4.B.3. CDT TEST DESIGN AND BLUEPRINTS

DRC's experience and partnership in Pennsylvania has firmly grounded DRC with a solid understanding of the college- and career-ready focus of the Pennsylvania Core Standards (PCS) and the Pennsylvania Academic Standards (PAS) that form the foundation of the Assessment Anchors and Eligible Content (AAEC) currently used on all of Pennsylvania's assessments, including the Pennsylvania Classroom Diagnostic Tools (CDT) in addition to the PSSA and Keystone Exams. We have worked closely with PDE as decisions about assessable anchors, eligible content, and cognitive complexity have been made, and we have provided guidance to PDE on the development of the AAEC used with the CDT. Not only is DRC fully prepared to maintain the PCS-based CDT blueprint in mathematics and literacy and the PAS-based CDT blueprint in science, but we are also knowledgeable of, and sensitive to, the perspectives local educators across the Commonwealth bring to the Pennsylvania AAEC.

During DRC's partnership with PDE to develop the CDT program, DRC has worked in close cooperation with PDE to design the assessments to fulfill the requirement that the PCS and PAS articulate across curricular, instructional, and assessment practices, cohesively integrating the Voluntary Model Curriculum, the Learning Progressions, the Classroom Diagnostic Tools, the PSSA, and the Keystone Exams. DRC's thorough understanding of the CDT program, the Assessment Anchors, the content standards, and the cognitive complexity places us in a unique position to respond to any future changes in the Assessment Anchors or other parameters of the design. DRC looks forward to continued partnership with all the CDT stakeholders in the Commonwealth, including PDE and the CDT Core Team. DRC stands ready to support CDT professional development and training initiatives. For more information on CDT professional development support, please see *Subheading 4.I.8.j., CDT Reporting Tool*.

The CDT is unique from the PSSA and Keystone Exams in that each assessment that is a part of the CDT is a computer-adaptive test (CAT). As with the PSSA and Keystone Exams, students complete a CAT by responding to a series of item. However, in an adaptive test like the CDT, the CAT uses complex algorithms to determine the next test item to ask the student, using the student's own responses to previous items to determine which follow-up item would give the most information about the student's performance on the AAEC. The CAT is designed to select an optimal set of questions for each student in order to give diagnostic information about each student's understanding and abilities of the AAEC. Each item is developed to measure specific Pennsylvania AAEC and therefore reflects the content on the PSSA and Keystone Exams.

The items on the CDT were developed specifically to measure Pennsylvania Assessment Anchors and Eligible Content at grades K through high school and end-of-course. As a result, the CDT is based on content assessed by the PSSA and the Keystone Exams. However, unlike the PSSA and Keystone Exams, which use Reporting Categories and Modules, the CDT program uses Diagnostic Categories. Following a CDT administration, the scores obtained for each Diagnostic Category link to the AAEC covered in the assessment for that Diagnostic Category, and each AAEC then links to curriculum and resources available for that AAEC.

The CDT uses a dynamic and interactive reporting system that is fully integrated in Pennsylvania's Standards Aligned System (SAS), linking students, teachers, parents, and other stakeholders with the same detailed information about student performance. Reports of the results from the CDT give a representation of how a student is—or a group of students are—performing in terms of the AAEC. This helps to guide classroom instruction by going beyond the focus of what students know and are able to do. The CDT is able to provide information about how and why students may be struggling with, or extending beyond, grade- and/or course-level AAEC. As a result, the CDT actively identifies the curricular resources (including classroom resources and materials, units and lesson plans, etc.) important to assist educators in meeting students where they are and targeting each student's strengths and areas of need to allow the maximum potential for growth.

Educators access Learning Progression reports to gain greater understanding about, or “drill down” into, exactly where each student is struggling along the learning continuum or exceeding beyond the learning continuum. With this knowledge, educators are able to support students' areas of need and identify strengths to build on. This provides valuable information about academic strengths and needs and helps students to understand the process of their own learning. As students receive descriptive feedback within the process of learning and creating, students move along the path toward college- and career-readiness. Detailed information about the CDT reporting system is provided in 4.1.8.j., *CDT Reporting Tool*.

There are three Content Areas in the CDT (literacy, mathematics, and science), and each Content Area is made up of two to four subjects. Students take a CDT assessment by subject, and items contained in the selected CDT are grouped by the following diagnostic categories.

CDT Diagnostic Categories

■ Literacy

- Reading Grades 3–5 and Reading/Literature
 - Key Ideas and Details: Literature Text
 - Key Ideas and Details: Informational Text
 - Craft and Structure, and Integration of Knowledge and Ideas: Literature Text
 - Craft and Structure, and Integration of Knowledge and Ideas: Informational Text
 - Vocabulary Acquisition and Use
- Writing Grades 3–5 and Writing/English Composition
 - Quality of Writing: Focus and Organization
 - Quality of Writing: Content and Style
 - Quality of Writing: Editing
 - Conventions: Punctuation, Capitalization, and Spelling
 - Conventions: Grammar and Sentence Formation

■ Mathematics

- Mathematics Grades 3–5 and Mathematics
 - Numbers and Operations
 - Algebraic Concepts
 - Geometry
 - Measurement, Data, and Probability
- Algebra I
 - Operations with Real Numbers and Expressions
 - Linear Equations & Inequalities
 - Functions & Coordinate Geometry
 - Data Analysis
- Geometry
 - Geometric Properties
 - Congruence, Similarity, & Proofs
 - Coordinate Geometry & Right Triangles
 - Measurement
- Algebra II
 - Operations with Complex Numbers
 - Non-Linear Expressions & Equations
 - Functions
 - Data Analysis

■ Science

- Science Grades 3–5 and Science
 - The Nature of Science
 - Biological Sciences
 - Physical Sciences
 - Earth/Space Sciences
- Biology
 - Basic Biological Principles/Chemical Basis for Life
 - Bioenergetics/Homeostasis & Transport

- Cell Growth & Reproduction/Genetics
- Theory of Evolution/Ecology
- Chemistry
 - Properties & Classification of Matter
 - Atomic Structure & the Periodic Table
 - The Mole & Chemical Bonding
 - Chemical Relationships & Reactions

The following table shows the blueprints for the CDTs. Each of the mathematics and science CDTs is made up of four Diagnostic Categories, while each literacy CDT reports scores for five Diagnostic Categories.

CDT Blueprint: Volume by Diagnostic Category

| # of Diagnostic Categories per Content Area | % per Diagnostic Category within a Content Area | Items per Diagnostic Category | Items Per CDT Assessment (Min/Max) |
|---------------------------------------------|-------------------------------------------------|-------------------------------|------------------------------------|
| 4 | 21–29% | 12–15 | 48/60 |
| 5 | 17–23% | 10–12 | 50/60 |

The CAT engine gives preference to on- or adjacent-grade-level items in order to increase the probability that students are administered items that include content that each student has had the opportunity to learn. In addition, the CAT requires other content-based rules that impact how the blueprint is implemented within an individual CDT assessment. The following table defines the rules that govern the content of CDT item pools for students in grades 3 through high school.

CDT Blueprint: Content Pool Rules for Grades 3–HS

| CDT Subject Area | Content Pool Rules |
|-------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Mathematics Grades 3–5 | Items 1–5: no grade 7 Items 1–10: no grade 8 Items 1–20: no Algebra I No Geometry or Algebra II throughout |
| Mathematics | Items 1–5: no Algebra I Items 1–10: no Geometry Items 1–20: no Algebra II |
| Algebra I | Items 1–16: no Algebra II |
| Geometry | None |
| Algebra II | None |
| Reading Grades 3–5 | None [However, reading load is a testing concern, so a passage consideration of 66% is used. Only passage combinations that use 66% or more of the associated items are considered for use. Near the end of the test, this consideration has to be relaxed in order to meet content constraints.] |

| CDT Subject Area | Content Pool Rules |
|------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Reading/Literature | None [However, reading load is a testing concern, so a passage consideration of 66% is used. Only passage combinations that use 66% or more of the associated items are considered for use. Near the end of the test, this consideration has to be relaxed in order to meet content constraints.] |
| Writing Grades 3–5 | None |
| Writing/English Composition | None |
| Science Grades 3–5 | Items 1–40: no grade 11 No Biology or Chemistry throughout |
| Science | Items 1–20: no grade 11 unless student grade is 11 or 12 Items 1–20: no Biology Items 1–20: no Chemistry |
| Biology | None |
| Chemistry | None |

For more information on the CDT test designs, please see *Subheading 4.C.7., CDT Item and Test Development Process.*

For more information on CAT algorithms and configuration considerations of the CDT, please see *Subheading 4.F.12., Computer-Adaptive Tests (CAT) System for the CDT.*

4.C. Development of New Items and Test Forms

BACKGROUND

DRC is pleased to propose an item development plan that will continue to ensure that the Commonwealth assesses student, school, and district performance with validity, reliability, and efficiency. Over the past ten years, we have developed the staff, knowledge, expertise, and processes necessary to effectively address all key components of Pennsylvania’s item development needs—content standards, assessment anchors, eligible content, item specifications, and approved style. In fact, our close, effective collaboration with PDE has helped to inform and shape some of these components. DRC is an assessment industry leader and will continue to provide expertise in developing and implementing innovative assessment designs for the Pennsylvania assessments, including the PSSA, Keystone Exams, and CDT. We look forward to our continued partnership as we work with PDE and Pennsylvania educators in this next phase of assessment development.

DRC recognizes that the quality of a test is directly linked to the expertise of the staff associated with the development effort, and we have taken great measure to select an experienced item development team for the PSSA, Keystone Exams, and CDT that is uniquely qualified to provide the assessment development services to Pennsylvania as outlined in this RFP. In our previous work on the PSSA, Keystone Exams, and CDT programs we have established a consistent record of reliability and quality. We believe we have been integral to supporting Pennsylvania’s assessment and reform efforts, and we are committed to continue providing this same level of quality service. To ensure continuity, we are proposing the same content leads and management staff for the continued leadership of the work.

The Pennsylvania assessments are composed of individual assessment components and the reporting associated with the results of those assessments. The system includes the Pennsylvania System of School Assessment (PSSA), the Keystone Exams (end-of-course), and the Classroom Diagnostic Tools (CDT), as well as the sub-portions of those assessments like the individual content- and course-specific tests/exams and the Voluntary Model Curriculum (VMC). DRC understands that per the federal Elementary and Secondary Education Act (“ESEA”) and the SBE Chapter 4 regulations, PDE uses these statewide standardized criterion-referenced assessments to measure academic progress across the Commonwealth. Further, DRC recognizes that these assessments must be aligned to the Pennsylvania Core Standards (PCS) for Mathematics and English Language Arts/Literacy, the Pennsylvania Academic Standards for Science, and matched to the appropriate assessment anchors and eligible content.

Under this responsibility, DRC understands that the development of assessments, the distribution of test materials, the instructions to educators on administering assessments, the maintenance and implementation of test security, collection of test materials, the scoring of tests, the scaling and equating of test scores, and the

production of assessment reports are necessary to meet the requirements of the ESEA and SBE Chapter 4.

SCOPE OF THE PENNSYLVANIA ASSESSMENTS

DRC understands that the Pennsylvania assessments include the components shown in the following table and that they are consistent with the Assessment Anchors and Eligible Content aligned either to the Pennsylvania Core Standards (PCS) or to the Pennsylvania Academic Standards (PAS) for Science, Technology, Environment, and Ecology.

Scope of the Pennsylvania Assessments

| Program | Subject and Content Area | Administered in Grades | Alignment to Standard Set | Mode of Delivery | Status |
|----------|----------------------------------------------------------------|------------------------|---------------------------|------------------------------|-------------|
| PSSA | English Language Arts | 3, 4, 5, 6, 7, and 8 | PCS | Print and Online; Fixed Form | Active |
| PSSA | Mathematics | 3, 4, 5, 6, 7, and 8 | PCS | Print and Online; Fixed Form | Active |
| PSSA | Science | 4 and 8 | PAS | Print and Online; Fixed Form | Active |
| Keystone | Mathematics: Algebra I | End-of-Course | PCS | Print and Online; Fixed Form | Active |
| Keystone | Science: Biology | End-of-Course | PAS | Print and Online; Fixed Form | Active |
| Keystone | Literacy: Literature | End-of-Course | PCS | Print and Online; Fixed Form | Active |
| CDT | Mathematics (Mathematics, Algebra I, Algebra II, and Geometry) | Grades 3-HS | PCS | Online; Computer-Adaptive | Active 3-HS |
| CDT | Literacy (Reading/Literature and Writing/English Composition) | Grades 3-HS | PCS | Online; Computer-Adaptive | Active 3-HS |
| CDT | Science (Science, Biology, and Chemistry) | Grades 3-HS | PAS | Online; Computer-Adaptive | Active 3-HS |

In support of these assessments, DRC presents the following plan for the development of new items and test forms.

4.C.1. GENERAL REQUIREMENTS

DRC development staff have in-depth knowledge of the Pennsylvania’s Content Standards, test blueprints and specifications, and all previous test forms. DRC also has expertise in item development for dual-mode assessment programs, in which items will appear in both paper and computer formats. In these ways, DRC is well prepared to undertake item development for Pennsylvania in an informed manner and can bring questions or issues requiring clarification to the attention of PDE before item development begins.

4.C.1.a. Provide Items, Passages, Graphics, and Scenarios for All Assessments

Overview of Items

DRC will provide all appropriate items, along with their corresponding passages, graphics, and scenarios, for the PSSA, Keystone Exams, and CDT programs, and we understand that all items must be secure within Pennsylvania and released to the public only when PDE has granted permission.

When appropriate, the assessments will contain passages, graphics, and/or scenarios. As outlined in this proposal, all items will be developed and reviewed for content alignment, grade-level appropriateness, difficulty, Dr. Norman Webb’s depth-of-knowledge (DOK), performance level descriptor (PLD), and for bias, fairness, and sensitivity.

DRC understands that all materials must be reviewed by Pennsylvania educators or other experts as designated by PDE for the following:

Review Criteria

- Alignment
- Grade-level Appropriateness
- Correct Keys
- Difficulty
- Source of Challenge
- Distractors
- Universal Design
- Depth of Knowledge
- Bias/Fairness/Sensitivity

Overview of Stimuli: Passages, Graphics, and Scenarios

Using stimuli like passages, graphics, and scenarios, that are accessible to the diverse Pennsylvania student population and that are consistent with the content standards, are key to the successful implementation of Pennsylvania's assessments. DRC will use a multi-faceted strategy to ensure a sufficient and appropriate sample of potential passages and scenarios. Content specialists will examine a wide array of primary source materials for a range of authentic topic areas. They will search and prioritize Pennsylvania-based themes directly related to the intent of the content standards (i.e., range of difficulties and content and amenable to a wide range of item types). In addition, we consider the criteria in the following figure when evaluating content for its appropriateness for inclusion in a statewide assessment.

Criteria for Evaluating Content

- Have interest value for students.
- Are grade appropriate in terms of vocabulary and language characteristics.
- Are free of bias, fairness, and sensitivity issues.
- Represent different cultures.
- Are able to stand the test of time.
- Sufficiently "rich" to generate a variety of items.
- Avoid dated or specific subject matter unless a relevant historical context is provided. (For passages, students should not have to have extensive background knowledge in a particular discipline or area to understand a text.)

In addition, PDE and members of the content committee will be invited to recommend potential stimuli for consideration for use on the assessment. Many of these representatives are familiar with the content standards and the history of assessment in Pennsylvania. All stimuli identified in this fashion will undergo the same thorough review as those discovered by DRC content specialists, including review by the remaining members of the content committee.

Item Development Management Overview

DRC will develop and house all items and graphics in DRC's Item Development and Educational Assessment System (IDEAS), the DRC-developed secure item management system. Passage-based English Language Arts (ELA) items will be housed as item sets with their accompanying passage(s). Graphics for ELA, mathematics, and science items will be created by our graphic designers following exacting specifications to ensure content integrity and adherence to the

specifications outlined in the PDE-reviewed and approved Pennsylvania Style Guide. They will be embedded directly into items as they are developed. Items housed in IDEAS may be viewed by PDE staff at any time during development. PDE staff can make changes to items directly in IDEAS and/or add notes to items for developers or other PDE staff to review.

Upon completion of the development of the full set of items, DRC content staff will assist their PDE counterparts in a full, face-to-face review by committee members. Educators will be asked to review the items using the following criteria:

- **Alignment**—Does the content of the item align with the Standard/Anchor/Eligible Content? Each item will be written to assess a particular Standard/Anchor/Eligible Content statement, which is indicated on the individual Item Card. Writers will be trained to consider the degree to which the item is, in fact, aligned with the indicated eligible content. In making this judgment, it is important for writers to consider whether the content is aligned (e.g., do the eligible content and the item both deal with fractions) and whether the required performance is aligned (e.g., if the eligible content calls for a comparison to be made, is this reflected in the item).
- **Grade-level Appropriateness**—Is the item grade-level appropriate? Is the content consistent with the experiences of a student at the grade level assessed? Is the challenge level appropriate for the grade?
- **Correct Keys**—Is there one clear, correct answer? There should be no other answer that “could” be correct. Note: This does not mean that “good” distractors are unfair.
- **Difficulty**—Do you agree with the item’s difficulty rating? Item Difficulty is indicated as Easy, Medium, and Hard. Is your rating in agreement with the difficulty rating on the Item Card?
- **Source of Challenge**—Is the source of challenge appropriately targeted to the content? The hardest part of the item (i.e., source of challenge) should be the content that is targeted. For example, in mathematics, the mathematics should be the major source of challenge rather than the wording or graphic. Students should not give an incorrect answer to a mathematics item because the reading level is too high or a graphic is flawed or excessively complex. Conversely, students should not give correct answers for reasons such as prior knowledge that make the answer to the item obvious (e.g., if the item asks which country has the largest population and students are to read a graph that includes China, there is no need to read the graph to answer the item).

- **Distractors**—Are distractors fair and appropriate? Distractors that are appropriate offer students reasonable choices that can be arrived at by making common errors. There should be no distractors that make no sense at all. It should be possible to examine each option and to reason how a student with some deficiency in knowledge or skill could choose it. The distractors should be formatted according to acceptable standards of test construction (e.g., a phrase that is common to each distractor should be placed in the stem).
- **Universal Design**
 - **Language Demand:** Is the language clear, well-formatted, and precise? Does the item use correct terminology for the content area? In order for all students to enter into the items of the assessment, they must be able to understand them. If the items are formatted poorly, use unnecessarily complex words or phrases, or use figures or layouts that are difficult to understand, some students will give incorrect answers due to these factors rather than the content is being assessed.
 - **Bias:** Is the item free of bias? All students will not be able to enter into the assessment if bias considerations are not resolved. Does the item contain clear bias problems? *A thorough, independent bias review will be completed for all items.*
- **Depth of Knowledge**—Depth of Knowledge is based on the alignment work of Dr. Norman Webb. Rate each item based on the cognitive demand, using the following levels:
 - **Recall:** Recall of a fact, information, or procedure.
 - **Basic Application of Skill or Concept:** Use of information, conceptual knowledge, procedures, two or more steps, etc.
 - **Strategic Thinking:** Requires reasoning, developing a plan or sequence of steps; has some complexity; more than one possible answer.
 - **Extended Thinking:** Requires an investigation, time to think and process multiple conditions of the problem or task, and more than 10 minutes to do non-routine manipulations. (This level is generally not assessed in on-demand assessments.)

4.C.1.b. Item Development Considerations

DRC proposes addressing the following considerations within the item development process:

Item Development Considerations

- Alignment to the Assessment Anchors and Eligible Content
- Grade-level appropriateness (reading/interest level, etc.)
- Depth of knowledge
- Cognitive level
- Item/task level of complexity
- Estimated difficulty level
- Performance Level Descriptor
- Relevancy of context
- Rationale for distractors
- Accuracy
- Style
- Correct terminology

A strong assessment system is built upon sound assessment items that are instructionally sensitive and which align to Pennsylvania's standards, either the Pennsylvania Core Standards or the Pennsylvania Academic Standards. The DRC development team is committed to providing PDE with items that provide the optimal match to the standards and that establish clear, focused expectations for grade-level performance by tightly defining the rigor required for grade-level proficiency. These assurances will be met through the annual review and refinement of the item specifications and adherence to our test development processes, which are designed to ensure alignment. In the sections below we outline our proposed item development processes.

4.C.1.c. Conformity with Professional Standards

Our item development work plans follow the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) and are designed to produce reliable and instructionally valid tests that reflect the range of cognitive ability articulated in the standards. Furthermore, our item development work plans also adhere to the Principles of Universal Design, and reflect that we clearly understand how items and tests must lend themselves to accessibility by diverse groups of students and function appropriately across a broad range of test administration accommodations. Every effort will be made to identify and address any content that is viewed as potentially biased or sensitive in nature.

In addition to the committee review process, psychometric procedures for detecting bias will be implemented by DRC. Both the *Code of Fair Testing Practices in Education* (Joint Committee on Testing Practices 1988) and the

Standards for Educational and Psychological Testing (AERA, APA, and NCME 2014) assert that test items must be free from construct-irrelevant sources of differential difficulty. It is important that subgroup differences in performance be examined when sample sizes permit, and actions should be taken to ensure that differences in performance are due to factors that are construct-relevant, rather than construct-irrelevant. As part of the effort to identify construct-irrelevant differences in performance, assessment items will be evaluated by means of differential item functioning (DIF) analysis procedures.

4.C.1.d. Universal Design

Our Pennsylvania-specific knowledge and expertise is further complemented by our knowledge of the Principles of Universal Design. We share the commitment with PDE to develop a fair test that provides an accurate measure of what all assessed students know and can do without compromising reliability or validity. In so doing, members of our leadership item development team have received direct training from the National Center on Educational Outcomes (NCEO). Therefore, we carefully employ the Principles of Universal Design throughout all stages of both the item development process and the test development process.

Our development processes have been informed by the elements of universal design that characterize sound assessment practice. The Principles of Universal Design were created to ensure accessible environments for all people through equitable use, simple and intuitive design, effective communication, tolerance for variability, and minimal fatigue. Their application is defended by research that links them to higher performance for all students.

DRC has found that explicit universal design considerations are critical because they provide a systematic means for developing assessments in which the context for testing, user diversity, and equitable access are examined at each step of the process. All phases of the DRC test development cycle reflect the integration of universal design principles with sound measurement theory, current research, and best practices in assessment.

Since the National Center for Educational Outcomes has published guidelines (Thompson, Johnstone, & Thurlow, 2002) for universal design, we have incorporated these principles in both the development of items and the layout of test forms. All item developers, editors, graphic artists, and desktop publishers are trained in applying universal design principles. Our current item writing and editing practices are noted in the following figure.

Item Writing and Editing Practices

- Using consistent naming and graphics conventions
- Replacing low-frequency words with simple, common words
- Avoiding irregularly-spelled words, words with ambiguous or multiple meanings, technical terms unless defined and integral to meaning, and concepts with multiple names, symbols, or representations
- Ensuring clarity of noun-pronoun relationships
- Simplifying keys and legends

We recognize that the Commonwealth has a legal and ethical obligation to ensure that Pennsylvania’s assessments are accessible and fair for all students. Implementation of universal design principles will contribute to participation by the widest range of students in the state assessment program and provide support for the validity of inferences about levels of student performance. By focusing attention on inclusive design principles and providing for a full range of test performances during item development, item quality will be improved. As these items are intended to complement current pedagogical practices, test results are likely to give teachers and parents a more accurate picture of what their students really know and can do in key content areas.

Educators now agree that adherence to universal design principles may offer a valid alternative to the traditional system of retrofitting changes to a test after-the-fact to address individual needs. They cite research suggesting that the development of universally designed assessments may be a feasible, effective alternative to the use of some accommodations, and that the implementation of proactive design principles can reduce the need for some kinds of assistive technology devices and assistive services by building in accommodations for individuals with disabilities before rather than after test production (National Research Council, 2001; Assistive Technology Act of 1998; Scott, et al., 2003).

The Frameworks for Universal Design for Computer-Based Testing (UD-CBT) and Universal Design for Learning specify how digital technologies can create tests that more accurately assess students who possess a diverse range of physical, sensory, and cognitive abilities and challenges. UD-CBT has been found to “level the playing field” for students with disabilities and for English language learners. Our team has previously used these Principles of Universal Design in the development of interactive test content, such as the ecosystems simulations developed for enhanced assessments in collaboration with the state of Utah and other states (Quellmalz, Timms, and Silbergliitt 2011). Please refer to *Subheading 4.F.3, Tools and Accommodations* for additional information on online accessibility and accommodations.

We are especially knowledgeable of applying the Principles of Universal Design not only when items are initially developed, but also when graphics are created. The DRC Test Development team will incorporate the Universal Design checklist in all stages of our process.

Universal Design Checklist

- Items measure what they are intended to measure.
- Items respect the diversity of the assessment population.
- Items have a clear format for text.
- Stimuli and items have clear pictures and graphics.
- Items have concise and readable text.
- Items allow changes to other formats, such as Unified English Braille, without changing meaning or difficulty.
- The arrangement of the items on the test has an overall appearance that is clean and well organized.

Further information concerning our approach to applying the Principles of Universal Design throughout all stages of the development of graphics can be found in *Subheading 4.C., Development of New Items and Test Forms* and specifically *Subheading 4.C.5., PSSA Item and Test Development Process*.

4.C.1.e. Alignment, Rigor, and Cognitive Complexity

DRC understands that all items on each component of the Pennsylvania System of Assessments must be aligned to the Pennsylvania Core Standards (ELA and mathematics) or the Pennsylvania Academic Standards (science). To this end, all items will be written specifically for Pennsylvania.

Pennsylvania classifies items using Dr. Norman Webb’s depth-of-knowledge framework (Webb, N.L. 1997, 1999, 2007), and DRC staff has extensive knowledge and experience using Webb’s Depth of Knowledge to classify cognitive complexity.¹ We recognize the importance in a statewide assessment of the alignment between the overall assessment system and the state’s standards. The methodology Dr. Webb (1999) developed offers a comprehensive model that can be applied to a wide variety of contexts. With regard to the alignment between standards and assessment instruments, Dr. Webb’s criteria include five categories, one of which deals with content. Within the content category is a useful set of levels for evaluating depth of knowledge (DOK) According to Dr. Webb (1999), “dependence of knowledge consistency between standards and

¹ We are also well familiar with the other methodologies for classifying cognitive complexity that are widely in use, including those developed by Bloom et al. and Porter.

assessments indicates alignment if what is elicited from students on the assessment is as demanding cognitively as what students are expected to know and do as stated in the standards” (p. 7-8). The four levels of cognitive complexity (i.e., depths of knowledge) are as follows:

Level 1: Recall

Level 2: Application of a Skill/Concept

Level 3: Strategic Thinking

Level 4: Extended Thinking

All items on the PSSA, Keystone Exams, and CDT are considered in alignment if they align to the Assessment and Eligible Content and the DOK level inherent in the Assessment and Eligible Content.

In determining the depth of knowledge (DOK) level for each item, the content specialists at DRC have worked closely with PDE staff to internalize and implement PDE’s definition for the overall cognitive complexity by clarifying objectives and developing strategies to expand the depth of knowledge of the item pool. Our team of item developers is well positioned to continue to meet the Commonwealth’s goals for complexity within the PSSA, Keystone Exams, and CDT. Additional information regarding Universal Design and depth of knowledge can be found in *4.C.5. PSSA Item and Test Development Process*. Please also refer to *Volume III; Appendix B, Test Development Samples* for information regarding depth of knowledge and cognitive complexity.

4.C.1.f. Stimulus Passage Development and the Use of Copyrighted Materials

DRC understands that the use of copyrighted materials in the development of PSSA, Keystone Exams, and CDT assessment items should be limited, and that original work should only be used if required to measure certain anchors for content where material available in the public domain is not sufficient for this purpose. If copyright materials are used, we will be responsible to secure all permissions for use of such material on behalf of the Commonwealth of Pennsylvania. In the sections that follow, we detail the proposed process for procuring both non-copyrighted and, should PDE desire, permissioned text.

Non-Copyrighted Passage Development

DRC’s qualified English Language Arts staff will seek to ensure diversity in the selection of fictional and nonfictional non-copyrighted reading passages that lend themselves to assessing various Pennsylvania Core Standards. Our designated PSSA, Keystone Exams, and CDT ELA teams will seek to ensure that passages represent a variety of topics to include, but not limited to, the following: science, biography, technology, how-tos, and other informational topics as well as poetry, dramas, and narratives for literary passages.

Passage Development Process

DRC uses a number of quality control procedures to ensure the appropriateness and viability of passages. One step includes a review of the content accuracy and viability of the passages. *Volume III; Appendix B, Test Development Samples* contains our Passage Fact Verification Review Process that presents the protocols through which passages are subjected and processed. We understand that PDE expects operational assessments that are balanced in terms of reading load, grade-level appropriateness, topic selection, relevancy of context, and diversity. DRC's ELA content and diversity specialists will support PDE through all stages of the process to create balanced ELA assessments that are aligned to the Pennsylvania Core Standards and that meet the requirements defined in the Pennsylvania Test Specifications.

In order to select passages for the ELA assessments that meet the approved test and item specifications, DRC proposes to use passage finders and writers who have previous experience with us, along with our ELA test development specialists who have experience selecting and editing passages for large-scale reading assessments, including selecting passages for the Pennsylvania assessments. DRC's designated ELA Team Leads, our ELA test development specialists, and passage finders have had, or currently have, classroom teaching experience, or have core content knowledge in the field of English language arts and/or reading. Our ELA test development specialists, passage finders, and passage writers are also trained to use a variety of non-copyrighted sources as well as primary and secondary published sources, including magazines and books. Our passage writers come from a pool of published authors, current teachers, and English majors. We believe our passage finders and writers are some of the best in the industry, and we believe PDE will be pleased with the passage selections we will provide.

Procedures for Passage Selection

Before beginning the process to secure passages, DRC proposes to meet with PDE. The purpose of the meeting will be to review our passage selection process. We propose that this meeting with PDE take place during the initial item development planning meeting to be held each year. At this meeting, we will confirm with PDE the number of passages per passage type, the passage criteria, and the item specifications required by the program. As a result of our experience in selecting passages for Pennsylvania, we have learned that a meeting with PDE prior to the passage selection process helps ensure that expectations are clearly defined for us and are in alignment with the requirements of PDE. It is vital that our passage finders, writers, and reading item and test development specialists have a clear understanding of all special considerations required by the program. At this meeting, we will discuss with PDE our preliminary understanding of the types of passages required by the program. We will also present sample non-copyrighted and limited copyrighted passages to PDE to secure feedback on our selections and to determine whether our initial sample selections are

representative of the types of passages that PDE deems technically appropriate for each year's development.

Once we have met with PDE and have received approval to proceed with passage finding and possible passage writing, we will train the passage finders and writers. This passage training will include the following:

- Overview of the Pennsylvania assessment programs, including purpose of the programs
- General information concerning the number and types of passages needed
- General and specific requirements, including the specifications of the ELA tests
- Timelines for submission of passages to DRC
- Specific information concerning how passages are to be written and prepared, including documentation of the source, type of passage, etc., as required by the criteria established by PDE

General Guidelines for Passage Selection and Writing

Passages will have:

- The appropriate length (for given grade and use) and complexity for the designated grade level
- Text that is rich enough to allow for the needed number of items to be generated
- Relevancy of context
- Text that will appeal to students at the designated grade level
- Appropriate subjects for the designated grade level
- Grade-appropriate vocabulary
- Text structures that will be familiar for the designated grade level
- Text that is written in Standard American English. Fiction passages may contain colloquial expressions in dialogue, but these expressions should be grade-level appropriate

In addition, during our passage training all passage finders and passage writers, including our ELA Test Development team members, will receive passage instructions and general guidelines. A sample of our general guidelines for passage selection and writing can be found below. The instructions will be customized to meet the needs of the Pennsylvania assessment programs.

Passage Complexity

The Pennsylvania Core Standards require students to read increasingly complex texts with greater independence and proficiency as they progress toward college- and career-readiness. DRC has worked with PDE to develop a process that measures (1) the quantitative evaluation of the text, and (2) the qualitative evaluation of the text that is reported out on a passage placemat found in *Volume III; Appendix B, Test Development Samples*. In addition, a third component, matching reader to text and task, is also taken into consideration during passage evaluation and teacher committee reviews.

Quantitative Evaluation

Evaluating the complexity of a passage is essentially a judgmental process by individuals familiar with the classroom context and what is developmentally and linguistically appropriate for students at a given grade level. Although readability indices will be computed and made available on the passage placemat for each passage, we believe that these indices measure different aspects of readability and can result in various interpretations. Consequently, as we have historically practiced for the Pennsylvania assessments, we recommend that the common readability formulas not be used in a rigid way, but that they be considered more informally to provide the quantitative evaluation for consideration in the selection of final passages for development. In addition, it is not possible to produce an accurate readability estimate for some types of passages (e.g., poems, dramas). Because no readability formula is perfect, qualitative measures have been implemented to help determine placement and appropriateness for passages used in the Pennsylvania assessments. These measures include: 1) rubric-based qualitative evaluations, and 2) teacher content review committees to provide expert opinions on grade-level appropriateness as part of matching the reader to text and task considerations.

Qualitative Evaluation

Rubrics found in *Volume III; Appendix B, Test Development Samples* provide the qualitative measures for literary and informational passages. As indicated on these placemats, the quantitative measures suggest the appropriate grade band of the text, while the qualitative rubrics pinpoint the specific grade level. These rubrics provide a powerful and comprehensive way of evaluating a range of stimulus materials that cover the literary and informational scope outlined in the Pennsylvania Core Standards. Passages selected for the Pennsylvania assessments should have evidence of their complexity determination and grade-level placement, based on both quantitative and qualitative measures as specified above.

Sources for Passages

The sources DRC's passage finders and ELA item and test development specialists use, or consider appropriate for use, include non-copyrighted and copyrighted newspapers; novels; trade books; anthologies of literature and poetry; short story collections; and children's, young adult, and general magazines. Our

passage finders typically avoid sources such as Newbery Medal-winning book titles, Caldecott Medal-winning book titles, federal government forms, and selections from any basal reading series or from textbooks used in Pennsylvania. During training, we also direct our passage finders to avoid selecting passages that are older and contain outdated information, especially when collecting nonfictional materials and passages that are too popular or may have been used in reading/English curricula within Pennsylvania classrooms. DRC's initial, internal item and passage review process will also identify any passages from sources that do not meet DRC's or PDE's standards. In our initial meeting with PDE, we will discuss our preliminary plans for sources of passages and incorporate any suggestions and/or revisions PDE might have.

DRC will select any required reading passages (literature and informational) and graphics (e.g., drawings, timelines, photographs, graphs) based on the criteria established by PDE. We understand that reading passages, items, and graphics will also be reviewed for bias and sensitivity. In an effort to ensure that a sufficient numbers of passages survive PDE review, Content Review by committees of Pennsylvania educators, and the bias, fairness, sensitivity review by external experts and Pennsylvania educators, DRC's ELA item and test development team will review each passage before it is submitted to PDE. DRC's ELA item and test development team members will review each passage based on the criteria in the following figure.

Passage Review Criteria

- Match to passage type required by the Pennsylvania Core Standards for the Reading (ELA) PSSA and the Keystone Assessment Anchors and Eligible Content.
- Quality of the writing, including real-life authentic context that lends itself to high-quality, robust item development as required by the Pennsylvania Core Standards and the PSSA and Keystone Assessment Anchors and Eligible Content
- Interest level and content appropriateness, including whether the content is meaningful and important for students
- Relevancy of context
- Accuracy of the information provided in the passage
- Cultural diversity and freedom from issues of bias, fairness, and/or sensitivity
- Grade-level appropriateness, including conceptual load, vocabulary, syntactic patterns, sentence length, and clarity
- Reading level, as defined by what is typically found at a given grade level
- Passage/text complexity
- Use of illustrations, graphics, timelines, photographs, etc., including whether they are reproducible and adhere to the Principles of Universal Design
- Other, as requested by PDE

DRC acknowledges that all reading passages and graphics will be reviewed and approved by PDE prior to review by the external Content Review Committees and the external Bias, Fairness, and Sensitivity Review Committee following a delivery schedule agreed upon by PDE and DRC. Our passage submissions will include the test-ready version, with any proposed art and graphics, as well as other information required by PDE.

Capturing and Maintaining Data: Maintaining Passages Electronically

DRC proposes the use of our IDEAS item-banking system to house all of the passages and eventually the items along with all accompanying illustrations, graphics, etc. IDEAS will be configured specifically for the Pennsylvania assessments. As passages are entered, information will be stored such as genre, word count, text complexity including readability, grade, etc. Other information can be held in our IDEAS item-banking system for ELA as requested by PDE.

Permissioned Passage Development

Whenever permissioned pieces are required by PDE, DRC's qualified English Language Arts staff will seek to ensure diversity in the selection of a limited number of literature and informational permissioned reading passages that lend themselves to assessing various Pennsylvania Core Standards. Our ELA teams

will seek to ensure that passages represent a variety of topics to include, but not limited to, the following: science, biography, technology, how-tos, and other informational topics; poetry, dramas, and narratives for literary passages. For purposes of our cost proposal and in keeping with the philosophy of the Pennsylvania assessments, DRC understands that the use of copyrighted materials in the development of assessment items should be limited, that original work should only be used if required to measure certain anchors or content where material available in the public domain is not sufficient for this purpose.

Permission Process

The Commonwealth of Pennsylvania wants to use limited copyright materials. Permissions must be obtained for these limited PDE-approved, previously published reading passages and graphics. DRC employs a full-time, experienced permissions editor who will oversee the permissions process. Our permissions editor is detail-oriented, and keeps accurate records throughout the process. The editor will seek to secure all necessary copyright permissions. Permissions for printed tests, computer-administered tests, use in interpretive products, and electronic media release via the internet, will be obtained from the relevant parties. All rights will be secured on behalf of the Commonwealth of Pennsylvania and fees paid by DRC. Using databases and electronic tracking means, our permissions editor will seek permissions for the limited copyrighted, newly developed passages and any copyrighted legacy passages, and maintain copyright permissions for these materials for five years for all tests and ancillary products.

Our copyrighted permissions acceptance rate is one of the best in the industry—rarely is a passage denied usage. We are sure that PDE will be pleased with our passage selection process and our rate of securing passages for the Pennsylvania assessments. Historically, finding both non-copyrighted materials and copyrighted materials and commissioning passages has been extremely successful, and we will continue to provide this excellent passage selection process and service to PDE.

4.C.1.g. Arrangements for Content, Bias, and Data Review Committee Meetings

Content, Bias, and Data Review Meetings

As required by the RFP, DRC will be responsible for all arrangements for the content, bias, and data review meetings for the PSSA, Keystone Exams, and CDT programs. We understand that PDE will select external qualified individuals for the bias review only and Pennsylvania educators for the content review, bias review, and data review processes. It is our belief that the educators of Pennsylvania offer invaluable insight into the passages and items appropriate for their students, and we anticipate continued success with providing support to PDE in this process. The following sections describe DRC's processes in the facilitation of each review meeting.

Arranging Meeting Logistics

DRC has extensive experience arranging meeting logistics, and our meeting coordination staff excels at providing exceptional customer service to meeting attendees. We provide full-service meeting administration services, including organizing and coordinating services for meeting participants; developing and distributing letters and email communications to attendees; tracking participant registration; and processing invoices, travel vouchers, stipends, and reimbursement forms to ensure proper payment. Our meeting coordinators will handle all arrangements for content, bias, and data review meetings, for which PDE will select the participants.

Committee Review Security Process

At the beginning of the Content Review meeting, Bias, Fairness, and Sensitivity Review Committee meeting, and the Data Review meeting, each committee reviewer who is invited to attend will be asked to sign a **Confidentiality Agreement** specifying the confidentiality and security regulations. The agreement will also outline the ownership regulations. DRC acknowledges that all work developed under this contract will be the sole property of the Commonwealth of Pennsylvania. DRC also understands that no confidential materials related to the project will be released without PDE's explicit approval.

During the review meeting, items, passages, scenarios, etc., will not be left unattended. In other words, DRC facilitators will monitor the security of all items, scenarios, and passages throughout the entire process. All materials sent to the meeting will be sent through a secured mailing process and have tracking documentation. DRC facilitators attending the meeting will oversee the delivery of all materials and the return of all materials. These same members will arrange for shredding bins should any materials need to be shredded. In addition, all materials provided to the external committees will be numbered and secure materials collected and accounted for at the end of each day.

Content Review Meetings

After all newly developed proposed items, scenarios, etc., have been reviewed, revised per PDE's request, and accepted by PDE, they will be prepared for presentation to separate grade-level (or course-level) review committees of Pennsylvania educators. Only items, passages, scenarios, and graphics approved by PDE will be included in the final pool for review by the external committees of Pennsylvania educators. PDE anticipates that up to 96 Pennsylvania educators from the appropriate grade level and content area will attend the review for the PSSA. Up to 36 Pennsylvania educators will attend the review for the Keystone Exams and for the CDT. Final plans are subject to PDE's modification.

For each grade-level/course-level committee, the items, passages, scenarios, and graphics will be secured in binders, according to the Assessment Anchor and Eligible Content based on the Pennsylvania Core Standards (PCS) in English Language Arts, mathematics, Algebra I, and Literature, and based on the

Pennsylvania Academic Standards for Science and Biology. In addition, items will also be organized by stimulus-based prompts for science scenarios and by passages for ELA (reading). Items, scenarios, etc., will typically be printed one per page and will include all information such as, but not limited to, what each item is measuring (Assessment Anchor and Eligible Content), focus, depth-of-knowledge level, PLD level, answer key or scoring guideline, grade level, distractor rationale, and other information as requested by PDE.

Content Review Committee Training

It is our belief that the educators of Pennsylvania offer invaluable insight into the review of items, passages, and scenarios appropriate for their students, and we anticipate success by providing support to PDE in this process.

DRC will develop materials designed to support the training of the committee members to review items, passages, etc. Meeting materials will be submitted for approval to PDE prior to use. All requested changes provided by PDE will be incorporated into the materials before the review meetings.

DRC believes that providing a comprehensive training program, designed specifically for Pennsylvania educators, is a vital component in ensuring that items will be reviewed specifically for the requirements outlined in Pennsylvania's assessment system. The materials we develop in support of the review will be provided to PDE for review and feedback. We propose that the training materials contain the information highlighted in the following figure.

Review Committee Training Materials

- Overview and purpose of each Pennsylvania assessment
- Description of the Content Review Committee review process
- Item/Test Specifications, Standards, Assessment Anchors and Eligible Content, and other guiding documents, including test blueprints
- Dr. Norman Webb DOK classification levels for each content area to be assessed
- Guidelines for item alignment
- Guidelines for bias, fairness, and sensitivity
- Principles of Universal Design
- List of security procedures to be followed during the review process
- Other information as required by PDE

DRC proposes beginning with a large-group training session. This will include training on the item types (e.g., multiple-choice, constructed-response, text-

dependent analysis prompts), the Pennsylvania Core Standards, and Pennsylvania Academic Standards. We propose that **Ms. Patricia McDivitt, Project Advisor, Mr. Christopher McCullough, Project Director, Ms. Deedra Arvin, Program Manager, and Ms. Mary Basch, Senior Project Lead**, will provide support to PDE for the training and for the facilitation of the reviews. They have extensive experience in working with state departments of education to provide training to educators and community members in the review of items for content, as well as for bias and sensitivity. In addition to our experience in Pennsylvania, DRC provided support of the training of educators for many large-scale assessment programs, including programs for South Carolina, Michigan, Idaho, Louisiana, Alabama, Alaska, and Nebraska.

Per PDE's approval, we will provide the guiding documents for the assessments, test blueprints, depth-of-knowledge descriptions, item tracking/tally sheet, secure-materials tracking forms, and other information as required by PDE. Those documents will assist committee members in evaluating test passages and items during the process.

After the large-group training session, participants will break into content area and grade level or grade-span-specific meeting rooms. In each committee meeting, a DRC facilitator will instruct the committee members to review each item individually. The review of each item will be followed by a group discussion.

Content Review Committee Process

After the training, committees of Pennsylvania educators will review all newly developed items (e.g., alignment, grade-level appropriateness, cognitive demand and rigor alignment, bias and sensitivity, correct keys, alignment to the performance-level descriptors, and adherence to the Principles of Universal Design). In addition, scoring guidelines for open-ended items, short-answer items, and text-dependent analysis prompts will also be reviewed. DRC content-area specialists will support PDE as facilitators and note takers.

PDE will select Pennsylvania educators for the content review committee. DRC will assist PDE in selecting the committee members if requested. For example, if PDE requests, we could work with PDE to draft an invitation to potential review committee members, including an overview of the task, time, and date of meetings, and all other relevant information. In addition, the invitation might include a questionnaire designed to capture information about each potential review committee member, including number of years of classroom teaching experience, educational background, item content review experience, diversity, gender, and geographical location within the Commonwealth of Pennsylvania. We would carefully proof the invitation and questionnaire and provide both to PDE for review and final approval.

DRC is knowledgeable of the challenges involved with recruiting meeting participants. DRC would like to discuss with PDE, upon contract award, the use of incentives (beyond ACT 48 credits) to bolster participation.

DRC's proposal includes the following additional activities associated with supporting PDE with the Item Content Review committee process.

Supporting the Item Content Review Committee Process

- Coordinating and establishing all meeting logistics, including hotel procedures, meeting rooms, computers, copier capability, etc.
- Corresponding with committee members, including travel arrangements, meeting announcements, etc., should PDE request. (Note: All written communication will be reviewed and approved by PDE prior to being sent to content review committee members.)
- Paying expenses for committee members and compiling the information necessary for professional development hours.
- Obtaining all supplies, including paper, pencils, flip charts, name tags, travel reimbursement forms, security/confidentiality documents, review tracking documents and approval/revision tally sheets, and other documents, as requested by PDE.
- Supporting PDE staff with the development of the Item Content Review training materials, including PowerPoint training presentation slides, should PDE request such support. These materials will include information necessary to train participants to review items for content alignment, rigor level alignment, technical design, issues, and Principles of Universal Design.
- Supporting PDE staff with the facilitation of the committee review, including compiling the feedback information.

Costs for all relevant committee review meeting tasks and expenses as required by the RFP are included in our *Cost Submittal*, provided under separate cover. The detailed schedule in *Subheading 4.C.3.d., New Item Development Review Schedule* provides our proposed schedule for the Content Review Committee meetings that will take place beginning in summer 2016 for review of any newly developed items.

Staff for Content Review Meetings

DRC understands that the Content Review Committee meetings will be facilitated by PDE and DRC. As a result, DRC proposes to provide the necessary number of content-area experienced staff to support the completion of all review tasks in the time available. The staff will include content-area item and test development specialists and editors. Staff from DRC's Performance Assessment Services division will also be made available at PDE's request. DRC proposes that one

additional staff member from DRC serve as the meeting logistics coordinator. We understand the importance of providing the Commonwealth of Pennsylvania with staff members who have previous experience facilitating content review meetings and/or supporting the facilitation of content review meetings in Pennsylvania. We believe that PDE will be pleased with the expertise of our staff. Collectively our content-area test development staff members have successfully provided co-facilitation support to PDE for the Content Review meetings, the Data Review Committee meetings, and the Bias, Fairness, and Sensitivity Committee meetings since 2004.

Written Summary Reports of the Content Review Meetings

Committees will be asked to accept, accept with revision, or reject passages and items. With PDE's approval, DRC may rewrite rejected items during the review process and re-present them to the Committees to maximize item acceptance and to provide an adequate number of items to populate field test forms. As stated, DRC will record and document all edits and revisions suggested by committee members. Following the meeting, DRC's content-area test development team members will prepare a final summary report of the results of the meeting. DRC proposes that the summary report describe the process used during the Content Review Committee meetings, the number of items that were rejected for any reason, the number of items to be revised and/or were revised during the meetings, and any additional information as requested by PDE. DRC will work with PDE prior to the first Content Review Committee meetings with Pennsylvania educators to determine the format for compiling the feedback and preparing the summary reports. In compiling the feedback, DRC will also review any remaining suggested revisions to items with PDE. We acknowledge that PDE has the prerogative to overrule any of the recommendations made by a content review committee.

Bias Review Meetings

The delivery of bias-free, high-stakes, large-scale standards-based assessments is critical to the success of any assessment program. Our item developers follow the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014 and subsequent revisions). DRC employs experienced and competent content members who seek to ensure that items and assessments are accurate in terms of content for the Pennsylvania assessments and free of issues of bias, fairness, and sensitivity. In addition to DRC's own internal review of passages, items, graphics, and scenarios, our proposal includes our support for the external bias, fairness, and sensitivity review by a panel of qualified individuals selected by PDE.

DRC proposes that the Bias, Fairness, and Sensitivity Review Committee meetings take place in Pennsylvania at a location approved by PDE. The Committee members will consist of Pennsylvania residents, as well as nationally recognized diversity experts. As indicated in the *Current List of Meetings and Number of Attendees* charts (page 32 of the RFP), PDE anticipates that each

year's Committee will consist of up to 12 members, including 6 local Pennsylvania educators and 6 national experts. The Bias, Fairness, and Sensitivity Committee meetings will total three days each for all assessments, grades, and content areas. Final plans are subject to PDE's modification.

PDE will establish the Bias, Fairness, and Sensitivity Review Committee. DRC will assist PDE in selecting the committee members should PDE request. For example, if PDE requests, DRC could work with PDE to suggest names of national diversity experts who have experience reviewing items for bias, fairness, and sensitivity for other large-scale assessment programs. We have provided this support to PDE in the past, and we have worked collaboratively with PDE to seek to ensure that the Bias, Fairness, and Sensitivity Review Committee represents the demographics of the Commonwealth of Pennsylvania. Per the RFP requirements we will assume the costs for the meeting space, travel, lodging, food, and relevant expenses for Bias, Fairness, and Sensitivity Committee members. DRC will provide the national experts an honorarium of up to \$1,000 per day, plus expenses (travel, lodging, meals, and materials). Documentation will also be provided to allow local educators to earn professional development credit through PDE.

In supporting PDE during the Bias, Fairness, and Sensitivity Review Committee meetings, DRC's proposal includes overseeing the following meeting activities.

Oversight of Bias Meeting Activities

- Coordinating and establishing all meeting logistics, including hotel procedures, meeting rooms, computers, copier capability, and so forth
- Assisting PDE with the establishment of the Bias, Fairness, and Sensitivity Review Committee members, should PDE request
- Corresponding with committee members, including information about travel arrangements, meeting announcements, etc., should PDE request. (Note: All written communication will be reviewed and approved by PDE prior to being sent to review committee members.)
- Paying expenses and honorariums for national experts serving as committee members and paying expenses for local Pennsylvania educators serving as committee members (as well as providing documentation for professional development credits)
- Obtaining all supplies, including nametags, travel reimbursement forms, security/confidentiality documents, review tracking documents, approval/revision tally sheets, and other documents as required by the program
- Preparing copies of passages and copies of all items and scenarios. Items, passages, and scenarios will be printed, one per page, and banded together by content area and grade/course level unless otherwise directed by PDE
- Supporting PDE staff, facilitating the review, including compiling the feedback information

Should PDE request, DRC would be pleased to provide additional support to PDE with the development of Bias, Fairness, and Sensitivity Review training materials, including PowerPoint training presentation slides. We will include training in three common areas of bias-related concerns:

- **Opportunity and Access:** The content of the text or test item(s) and task(s) will provide students with a fair opportunity to demonstrate what they know, regardless of their race, ethnicity, gender, religion, disability, socioeconomic status, or region where they live.
- **Portrayal of Groups Represented:** Issues and/or themes will be approached in a manner that does not demean, offend, or inaccurately portray any religious, ethnic, cultural, gender, social, or disability group.
- **Protecting Privacy and Avoiding Offensive Content:** The content of the text or test item(s), etc., will not intrude on the privacy of the values and beliefs of students or their families, or offend students, parents, or the general public of Pennsylvania.

DRC will facilitate a meeting process that uses a consensus method designed to encourage all committee members to actively participate throughout the training session and during the review meetings (please see *Volume III; Appendix B, Test Development Samples; Pennsylvania Bias, Fairness, and Sensitivity Review Procedures*). Reviewers will be assigned to review all grade-level/course content-area passages, items, graphics, scenarios, etc. Committee members will be encouraged to share their suggestions, ideas, and contributions, as this is a collaborative effort. Each reviewer will record any potential type of bias/sensitivity concern found on the Bias, Fairness, and Sensitivity Review tracking form with very specific references so that there is no guesswork on the part of PDE or DRC when DRC is compiling the comments.

Staff for Bias, Fairness, and Sensitivity Review Meeting

DRC has extensive experience in the facilitation of Bias, Fairness, and Sensitivity Review Committee meetings, both internally as a part of our item review process and externally with bias, fairness, and sensitivity state-specific review panels. We understand the importance of providing the Commonwealth of Pennsylvania with experienced and appropriate staff, staff members who have had previous experience facilitating fairness and sensitivity review meetings. We propose that **Ms. Kimberly Fountain, Bias, Fairness, and Sensitivity Lead**, with the assistance of **Ms. Maria Eiffler, Spanish Project Lead**, will provide PDE with support for facilitation of these meetings. Ms. Fountain has provided this service to PDE for a number of years. She has facilitated many bias, fairness, and sensitivity reviews throughout the country and provided training for such reviews. Ms. Eiffler, a linguistic and cultural expert, has managed the translation of test materials for the Pennsylvania programs since 2012.

Written Summary Reports of the Bias, Fairness, and Sensitivity Review Meeting

The DRC staff members supporting PDE will record all comments. Following the meeting, DRC will compile all feedback and prepare a summary report of the results of the meeting. The summary report will describe the committee review process; the number of items, scenarios, passages, etc., that were accepted, accepted with revision(s), and rejected for potential bias, sensitivity, and/or fairness concerns; and any additional information as requested by PDE. We acknowledge that PDE has the prerogative to overrule any of the recommendations made by a bias review committee.

Post Meeting Internal Review Processes

After the external Content Review Committee reviews and the Bias, Fairness, and Sensitivity Committee reviews have been completed, DRC content specialists will meet with PDE to update the status of the items, passages, scenarios, etc., as accepted, accepted with revisions, or rejected. All PDE-requested and approved revisions will be made. We acknowledge that PDE has the prerogative to overrule any of the recommendations made by any review committee.

To ensure quality of the items, passages, scenarios, etc., and to ensure that all revisions are made during each step in the process, DRC's item and test development editing team will be responsible for coordinating word-for-word proofreading. At least two editors will perform two, independent, word-for-word reviews of passages and items to ensure that all requested revisions have been made.

Once items have been revised per PDE request, DRC will provide PDE with an initial selection of items to be field tested. Initial test map plans for recommended item placement of the embedded field test items will also be provided to PDE for review. Approved test construction guidelines and test layout design guidelines will be followed when providing the test maps. A Directory of Test Specifications (DOTS) will also be created to include answer keys, standards alignment, focus, etc.

Upon approval from PDE, the forms will be reviewed internally by our combined item and test development team members and quality control staff. Staff will conduct and monitor internal reviews and quality control processes following all steps in our quality assurance process. Additional information about test construction is presented in *Subheading 4.C.8., Construction of Test Forms*.

Data Review Meetings

In addition to item reviews for newly developed items—which are focused on content, bias, and sensitivity—DRC will facilitate a *data review* of field tested items. This review will be conducted after the items have been field tested and prior to selection of items for the operational administration. It will focus on content validity, curricular alignment, and the statistical functioning of newly-developed items. PDE anticipates that up to 60 Pennsylvania educators from the

appropriate grade level and content area will attend the review for the PSSA, and up to 36 Pennsylvania educators will attend the review for the Keystone Exams and the CDT. Final plans are subject to PDE’s modification.

DRC proposes the same types of support for the content review with data review meetings, as discussed under *Content Review Meetings* earlier in this proposal.

The Pennsylvania educators must meet minimum qualification standards as determined by PDE. DRC will cover educator travel, lodging, food, and relevant expenses.

The review will be co-facilitated by DRC content assessment specialists and DRC psychometricians. The goal of this review is to ensure that only high-quality items are made available for the construction of the base forms for upcoming testing cycles. Item-level data will be brought to the Item Data Review meetings on item data cards, which will include statistics from the field test analysis. Item cards will contain answer keys, or rubrics, and associated data with the complete item metadata information. A sample item card is presented in the following figure.

Sample Item Card Side 1

| | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Standard: Describe and/or use the relationship of data displayed on a rate of change graph (e.g., how does the x-axis data relate to the y-axis data).</p> | <p>PA - Data Card</p> |
| <p>The graph below shows the relationship between the time, in minutes, a hot air balloon has been descending and the altitude, in feet, of the balloon.</p> <p style="text-align: center;">Hot Air Balloon Descent</p> <p>Based on the graph, which statement about the rate at which the balloon descends is true?</p> <p>A. The balloon descends at a rate of 100 feet every 1 minute. B. The balloon descends at a rate of 400 feet every 3 minutes. C. The balloon descends at a rate of 600 feet every 5 minutes. D. The balloon descends at a rate of 1,000 feet every 7 minutes.</p> | <p>Item ID 649931</p> <p>Content Area Mathematics</p> <p>Passage ID</p> <p>Passage Title</p> <p>Grade 7</p> <p>Standards D.3.1.2</p> <p>Item Type Multiple Choice</p> <p>Points 1</p> <p>Depth of Knowledge 2</p> <p>PLD</p> <p>P</p> <p>Est Difficulty Medium</p> <p>Key C</p> <p>Calculator C</p> |

Note: Graphic is blurred to maintain item security and/or student confidentiality.

Sample Item Card Side 2

| PA - Data Card continued | | | | | | | | | | |
|---------------------------------|--------------|-----------|-----------------|-----------|------|---------|------|-----------|-------|--|
| Administration(s) | | | | | | | | | | |
| Form Name | Use Function | Rptg Flag | Seq | Period | Year | Session | Calc | Model/Ext | Grade | |
| 04D | FT | | 85 | Spring | 2013 | 3 | Yes | Rasch | 7 | |
| Traditional Statistics | | | | | | | | | | |
| N | P-Val | Mean | Item Total Corr | | | | | | | |
| 14888 | 0.03 | | 0.48 | | | | | | | |
| Distractor/Step Specific | | | | | | | | | | |
| Label | Proportion | Corr | Avg Meas | Step Meas | | | | | | |
| A | 0.67 | -0.16 | | | | | | | | |
| B | 0.11 | -0.12 | | | | | | | | |
| C | 0.20 | 0.42 | | | | | | | | |
| D | 0.09 | -0.32 | | | | | | | | |
| MULTS | 0.00 | | | | | | | | | |
| OMITS | 0.00 | | | | | | | | | |
| DIF Analysis | | | | | | | | | | |
| Category | Bias Code | Num Value | N - Ref | N - Focal | | | | | | |
| MALEFEMALE | 01 | 0.06 | 1994 | 1971 | | | | | | |
| WHITEBLACK | 01 | 0.06 | 1977 | 2018 | | | | | | |
| WHITEHISPANIC | 01 | 0.00 | 1977 | 1988 | | | | | | |

Note: Graphic is blurred to maintain item security and/or student confidentiality.

DRC Psychometric Services staff will provide committee members with the training necessary to make appropriate, well-informed, item-related evaluation decisions regarding item statistics. This training will help the committee members understand how both statistics and content are needed to present a clearer perspective of an item's performance than may be gained by either statistical or content review alone. To provide the appropriate level of psychometric support, senior staff from DRC's Psychometric Services Department will oversee the training. During training, and subsequent data review, the following topics will be discussed.

- p -values (percent correct)
- Point-biserial correlations
- Differential Item Functioning (DIF): introduction to bias-free measurement
- Number of students who omitted an item
- Data on the curricular alignment of the items
- Other materials as may be necessary to review the functioning of the items

The psychometric data perform a critical role in determining whether an item eventually is accepted into the operational item bank; however, they should not be the sole determining factor. Psychometric data, for any given item, must be viewed as cautionary flags to draw attention to potentially problematic items. Whether such items are ultimately approved for use on an operational form will also depend on content and curricular considerations. The fact that these sessions

will be co-facilitated by both content and psychometric staff underscores this important balance. DRC content assessment staff will address this and other topics during training.

Data Review committee members, with the assistance of DRC Psychometrics staff, will consider the statistical *quality* of the items. The specific triggers for flagging items will be guided by PDE. The following are examples of various item flagging criteria:

- Item means less than half the points possible for constructed-response (CR) items
- Item-to-total correlations less than .20
- Option-to-total correlations for incorrect multiple-choice (MC) or selected-response (SR) answers that are greater than 0.00
- Attractiveness of all answer choices for MC and SR items
- Expected patterns of percent earning each score based on the overall difficulty of the item for CR items
- Differential Item Functioning codes of B or C

Based on the consensus of the committee members, items will be accepted, accepted with minor revisions, or rejected for use on operational forms. Items that are rejected by the committee, after collaboration with PDE, can either be revised and re-field tested where appropriate, or removed from the item bank. We acknowledge that PDE has the prerogative to overrule any of the recommendations made by a data review committee.

A complete record of all relevant committee actions, recommendations, comments, and rationale will be maintained. DRC will consult with PDE on all decisions regarding the status of the items. DRC acknowledges that PDE will have final approval of all changes made. After they have been approved by the item, bias, and data review committees, items are ready for forms construction.

4.C.1.h. Costs for Content, Bias, and Data Review Committee Meetings

DRC will be responsible for bearing all costs for the Item Content Review and Bias meetings. These costs will include facilities, food, materials, lodging, and travel reimbursement. We will follow the Commonwealth's Management Directive 230.10 when handling travel reimbursement and will ensure that all costs associated with these meetings are direct-billed to DRC. Costs for all relevant meeting tasks and expenses as required by the RFP are included in our cost proposal, provided under separate cover.

4.C.1.i. Honorariums for National Level Attendees of Bias Meetings

For the bias review meetings, DRC will be responsible for paying national-level attendees an honorarium of up to \$1000 per day. Although educators will not receive financial compensation for participating in these meetings, they will receive professional development credits from PDE.

4.C.1.j. Procedures and Responsibilities of the Content, Bias, and Data Review Committees and PDE’s Oversight of the Committees’ Actions

It is our belief that the educators of Pennsylvania offer invaluable insight into the passages and items appropriate for their students, and we anticipate continued success with providing support to PDE in this process. DRC understands that the committees of Pennsylvania educators who participate in the content, bias, and data review meetings may accept or reject items and they may also ask for revisions of items. Further, PDE reserves the right to overrule any of the recommendations made by any of the committees or committee members. To facilitate this process, DRC proposes to use specific procedures for the content, bias, and data review committee meetings.

DRC believes that providing a comprehensive training program, designed specifically for Pennsylvania educators, is a vital component in ensuring that items will be reviewed specifically for the requirements outlined in Pennsylvania’s assessment system. As discussed in *Subheading 4.C.1.g*, DRC will develop materials designed to support the training of the committee members to review items, passages, etc. The materials we develop in support of the review will be submitted for approval to PDE for review and feedback prior to use. All requested changes provided by PDE will be incorporated into the materials before the review meetings.

For each committee meeting, DRC will provide copies of documents that will assist committee members in evaluating test passages and items. These guiding documents (test blueprints, depth-of-knowledge descriptions, item tracking/tally sheet, secure-materials tracking forms, PowerPoint training presentation slides, PLD documentation, and other information) will be provided as required by PDE to train participants to review items for content alignment, rigor level alignment, technical design, issues, and Principles of Universal Design. DRC will support PDE staff with the development of the Item Content Review training materials, including PowerPoint training presentation slides, should PDE request such support.

DRC will also support PDE staff with the facilitation of the committee review meetings, including compiling feedback information. We will record and document all decisions, or revisions, suggested by committee members, and will prepare a final summary report of the results of each meeting. Procedures for each meeting are outlined in the following subsections.

Proposed Item Bias, Fairness, and Sensitivity Review Procedures

A committee of national experts and Pennsylvania educators convenes on a scheduled basis to provide expert reviews of multiple-choice items, selected-response items, text-dependent analysis items, and other corresponding stimulus materials that are candidates for inclusion on future embedded field test administrations. To foster stable, consistent, and open opportunities to provide input on candidate materials, the following set of procedures are offered.

Proposed Item Bias, Fairness, and Sensitivity Review Procedures

- 1.** On the first morning of the meetings, all participants are greeted by PDE and the DRC facilitator(s), directed to sign in at the sign-in table, and provided with a folder. Each participant receives the following handouts in a folder:
 - a.** Security/Confidentiality Agreement.
 - b.** Name badge.
 - c.** Two-sided table tent with pre-printed name.
 - d.** Emergency Information Form.
 - e.** Travel Voucher (reimbursement application form to record and report reimbursable travel expenses).
 - f.** Pre-paid envelope to return Travel Voucher.
 - g.** PDE Reimbursement Policy Document.
 - h.** Update on mileage reimbursement rate (if applicable).
 - i.** Personal Information Input/Change Form.
 - j.** Hotel/Meeting Facilities Evaluation Form.
 - k.** Meeting/Facilitator Evaluation Form.
 - l.** Copy of presentation(s) (if applicable).
 - m.** Pennsylvania Specific *Fairness in Testing* manual.
 - n.** Bias Review Guidelines.

- 2.** Opening Session (8:30 AM): Overview of process by PDE and DRC
 - a.** Welcome by DRC and PDE (includes purpose of the meeting).
 - b.** Introduction of all participants by participants.
 - c.** Overview of facilities by DRC.
 - d.** Discussion of Security/Confidentiality agreement.
 - e.** Participants read and sign the security/confidentiality agreement.
 - f.** After signing the agreement, participants return the signed agreement to a DRC representative.
 - g.** Discussion of remainder of handouts and folder contents by DRC.
 - h.** Bias training and discussion of process.
 - i.** Following the opening session, experienced bias review participants begin the review of items. Committee members are not allowed to participate in the review of items until they have signed the confidentiality agreement.

- 3.** In the meeting room DRC facilitator distribute item binders to each committee member.
 - a.** Necessary supplies, such as pencils, pens, self-stick flags, etc. are provided for each committee member.
 - b.** Members have assigned item binders and are required to sign in for them daily. (This counts as the sign-in for the daily meeting.)
 - c.** There are binders available for observer use in each room.
 - d.** All binders are to remain in the rooms at all times (including facilitator binders, observer binders, and committee binders).
 - e.** Binders may only be removed from meeting rooms with the permission of senior staff from either PDE or DRC.
- 4.** The new bias review participants break out into a small group for bias review training (as applicable).
 - a.** Facilitation is conducted by DRC, with PDE approval.
 - b.** Bias review training by DRC (approximately 8:45 am).
 - c.** Presentation: PDE, with DRC's support, provides training on bias review criteria and procedures.
 - i.** DRC Pennsylvania Bias, Fairness, and Sensitivity Training Manual
 - ii.** Other handouts (as applicable)
 - d.** After training, the small group of new members joins the large group for the review of items.
- 5.** Committee members review items individually, initially. They are instructed to write any bias or sensitivity concerns on the designated bias, fairness, and sensitivity review form provided in their bias review binders.
- 6.** After committee members have individually reviewed a subject area's grade level or partial review of that grade level (as determined by DRC), they are encouraged to cooperate as a group to come to consensus decisions.
- 7.** Per PDE approval, the DRC facilitator(s) leads this discussion for group consensus.

8. Committee members are encouraged to cooperate as a group to come to consensus decisions.
 - a. Facilitators record the committee's consensus decisions.
 - i. *Accepted as is*
 - ii. *Accepted with revision*
 - iii. *Rejected as is*
 - b. The facilitator documents information about the discussions and decisions made about each item.
 - c. At the end of each brief discussion, the facilitator assigns the next group (subject area or grade level) of items until all items have been reviewed.
 - d. Art, graphics, passages, and other stimuli are included in item binders where relevant.
 - e. Committee members may record notes in the item binders only, and all notes are to remain in the binders. Committee members may not retain any copies of the items or remove any notes from the room.
9. The process continues each bias review day.
 - a. At the end of each day, the binders are collected and secured.
 - b. Evaluation forms (for meeting facilities and meeting facilitator(s)) are completed on the last day.
10. DRC keeps the original Master Binder and Master Bias Sensitivity Review Form for each grade and content (as applicable) as a record of the bias review meeting. All remaining committee binders are securely shredded.
11. DRC records the committee consensus in IDEAS, the item-banking system.
 - a. Following the electronic update, individual item records in IDEAS will reflect the consensus decision of the bias review committee.
 - b. PDE may provide final arbitration as to which items are accepted or rejected based on the bias review committee recommendations.

Proposed Item Content Review Procedures

Committees of Pennsylvania Educators convene on a scheduled basis to provide expert reviews of items and other corresponding stimulus materials that are candidates for inclusion on future standalone and embedded field test administrations. To foster stable, consistent, and open opportunities to provide input on candidate materials, the following set of procedures are offered.

Proposed Item Content Review Procedures

- 1.** On the first morning of the meetings, all participants sign in at the sign-in table and receive a folder containing the following handouts:
 - a.** Security/Confidentiality Agreement.
 - b.** Agenda with map of the meeting room location.
 - c.** Name badge.
 - d.** Two-sided table tent with pre-printed name.
 - e.** Emergency Information Form.
 - f.** Travel Voucher (reimbursement application form to record and report reimbursable travel expenses).
 - g.** Pre-paid envelope to return Travel Voucher.
 - h.** PDE Reimbursement Policy Document.
 - i.** Update on mileage reimbursement rate (if applicable).
 - j.** Personal Information Input/Change Form.
 - k.** Hotel/Meeting Facilities Evaluation Form.
 - l.** Meeting/Facilitator Evaluation Form.
 - m.** Copy of presentation(s).
- 2.** Large-group Opening Session (8:30 am): Overview of process and training by PDE and supported by DRC
 - a.** Welcome by PDE.
 - b.** Introduction of all state personnel by PDE.
 - c.** Welcome by DRC.
 - d.** Presentation: PDE and/or DRC, per PDE's approval, presents item review procedures including DOK, Item Review Criteria Guidelines, and Item Rating Sheets (as applicable).
 - e.** Other handouts (as applicable).
 - f.** Introduction of all personnel by DRC.
 - g.** Overview of facilities by DRC.
 - h.** Discussion of handouts and presentation of folder contents by DRC.
- 3.** Following the presentation, the large group breaks out into smaller committees by content area and grade, or course and module.
- 4.** Participants read and sign the Security/Confidentiality Agreement and return the signed agreement to a DRC representative. Committee members are not allowed to participate in the small-group committee until they have signed the confidentiality agreement.
- 5.** Facilitation is shared between PDE and DRC, with the understanding that the PDE content representative is recognized as the committee facilitator while present and actively working with a committee. PDE may defer facilitation to DRC at any time.

6. In the breakout rooms, DRC facilitators distribute materials to each committee member.
 - a. Members have assigned item binders and are required to sign for them daily. (This counts as the daily sign in for the meeting.)
 - b. There are binders available for observer use in each room.
 - c. All binders are to remain in the rooms at all times (including facilitator binders, observer binders, and committee recorder binders).
 - iv. Binders may only be removed from meeting rooms with the permission of senior staff from either PDE or DRC.
 - v. DRC facilitators are responsible for the security of the review binders.
 - d. Ancillary documents are provided applicable to the course.
 - i. Item Review Criteria Guidelines (secure).
 - ii. Considerations for Universally Designed Assessment Items.
 - iii. Item Review Rating Sheets (secure).
 - iv. DOK Level Definitions.
 - v. Bloom's Taxonomy and Webb's Depth of Knowledge.
 - vi. Assessment Anchor and Eligible Content documents.
 - e. Additional handouts may be provided applicable to the course. For example: formula sheets, generic scoring guidelines, item distribution charts, etc.
 - f. Necessary supplies (applicable per course) such as rulers, basic calculators, pencils, pens, self-stick flags, extra rating sheets, index cards, etc. are available in each room.
7. One committee member from each content area/grade or course/module group is asked to record the consensus of the Item Content Review Committee proceedings (committee recorder).
8. Binders and rating sheets are specific to each committee member.
 - a. DRC facilitators take notes in their binders and on Item Rating Sheets (to be used as necessary during resolution procedures with the committee recorder binders and PDE at a later time).
 - b. Committee members write their names on the Item Rating Sheets.
 - c. The committee recorder documents the consensus comments of the committee.

9. Building on the large-group training, the facilitators (DRC and/or PDE) in each room provide brief, additional course-specific training, lead the group through an initial short set of items, and assist members to become comfortable with the review process.
 - a. Committee members fill out the Item Rating Sheet as instructed; they may also mark suggestions for edits to the text, item characteristics, or graphics directly on the item cards.
 - b. This information may then be shared with the group when the item in question is brought up for discussion.
 - c. Committee members are encouraged to reference the Item Review Criteria Guidelines as they fill out the Item Rating Sheets.
 - d. When the whole group has finished an assigned set (including completion of the Item Rating Sheet for each item), the facilitator asks for general comments, etc.
 - e. The goal for the committee is to reach consensus about each item.
 - f. Facilitators record the committee's consensus editing decisions (including edits to the item, graphics, and item characteristics).
 - g. The committee recorder documents information about the discussions and decisions made about each item (including all technical decisions and revisions).
 - h. When an Item Rating Sheet is completed (all of the items on the Item Rating Sheet have been reviewed), each committee member signs his/her individual Item Rating Sheet to indicate that he/she has reviewed the items.
 - i. Dissenting Views
 - i. If any committee member does not agree with the majority ("the consensus") concerning an individual item, that member may note a dissenting view on his/her own Item Rating Sheet and, if necessary, may write an explanation of the dissent on the back of the rating sheet.
 - ii. As part of the individual committee member's Item Rating Sheets, all dissenting views are part of the official record of the meeting and are collected by the DRC facilitator at specific intervals.
 - j. At the end of each brief discussion, the facilitator assigns the next group of items until all items have been reviewed.
 - k. Item-specific scoring guidelines are available for committee reference (as applicable).
 - l. Art, graphics, passages, and other stimuli are included in item binders where relevant.
10. Committee members may not retain copies of the items or remove notes from the room.
 - a. This rule also applies to the committee recorder.
 - b. Committee members may record notes in the item binders only, and all notes are to remain in the binders.

- 11.** The process continues, section-by-section, through the item binders during each day.
 - a.** Signed Item Rating Sheets (with dissenting views, if any) are collected at specific intervals.
 - b.** At the end of each day, the binders are collected and secured.
 - c.** Evaluation forms (for meeting facilities and meeting facilitators) are completed on the last day.
- 12.** PDE provides final arbitration as to which edits and revisions should be made based on suggestions by the committee and DRC.
 - a.** Each afternoon (following the committee meetings), PDE may meet with DRC to discuss committee decisions.
 - b.** DRC makes an electronic copy of the original committee recorder binder for each course (as applicable) and posts it for PDE via an FTP site as a record of the item review meeting.
 - c.** DRC keeps the facilitator binder for each course (as applicable) reconciled with PDE as a record of the item review meeting.
 - d.** All remaining committee binders are securely shredded.
- 13.** PDE and DRC meet separately, following the item review meeting, to reconcile all remaining item issues.
 - a.** DRC records PDE's final decisions in IDEAS.
 - b.** Following the electronic update, individual item records in IDEAS will reflect the consensus decision of the item review committee.

Proposed PSSA, Keystone Exams, and CDT Item Data Review Procedures

Committees of Pennsylvania Educators convene on a scheduled basis to provide expert reviews of items, passages, and other corresponding stimulus materials that are candidates for inclusion on future PSSA, Keystone Exams, or CDT operational administrations. To foster stable, consistent, and open opportunities to provide input on candidate materials, the following set of procedures are offered.

Proposed PSSA, Keystone Exams, and CDT Item Data Review Procedures

- 1.** On the first morning of the meetings, all participants sign in at the sign-in table and receive a folder containing the following handouts:
 - a.** Security/Confidentiality Agreement.
 - b.** Map of meeting room location.
 - c.** Name badge.
 - d.** Two-sided table tent with pre-printed name.
 - e.** Emergency Information Form.
 - f.** Travel Voucher (reimbursement application form to record and report reimbursable travel expenses).
 - g.** Pre-paid envelope to return Travel Voucher.
 - h.** PDE Reimbursement Policy Document.
 - i.** Update on mileage reimbursement rate (if applicable).
 - j.** Personal Information Input/Change Form.
 - k.** Hotel/Meeting Facilities Evaluation Form.
 - l.** Meeting/Facilitator Evaluation Form.
 - m.** Copy of presentation(s).
 - n.** Data Review Criteria Guidelines.
- 2.** Large-group Opening Session (8:30 am): Overview of process by PDE/DRC
 - a.** Welcome by PDE
 - b.** Introduction of all state personnel by PDE
 - c.** Introduction of contractor by PDE
 - d.** Welcome by DRC
 - e.** Introduction of all contractor personnel by DRC
 - f.** Overview of facilities by DRC
 - g.** Discussion of handouts and folder contents by DRC
- 3.** Item data review training and procedure by DRC (with PDE, as applicable) (approximately 8:45 am)
 - a.** Presentation: Per PDE's approval, DRC provides training on data review criteria (shown in the following tables for PSSA Mathematics, ELA, Science, and Keystone Exams) and procedures.
 - b.** Other handouts (as applicable)
- 4.** Following the presentation, the large group breaks out into smaller committees by content or by grade/by content (as applicable).
 - a.** Facilitation is conducted by DRC and PDE.
 - b.** Participants read and sign the Security/Confidentiality Agreement and return the signed agreement to a DRC representative. Committee members are not allowed to participate in the small-group committee until they have signed the confidentiality agreement.

5. In the breakout rooms, contractors' facilitators distribute item binders to each committee member.
 - a. Necessary supplies (applicable per content) such as rulers, basic calculators, pencils, pens, self-stick flags, index cards, etc. are available in each room.
 - b. Members have assigned item binders and are required to sign in for them daily. (This counts as the sign-in for the daily meeting.)
 - c. There are binders available for observer use in each room.
 - d. All binders are to remain in the rooms at all times (including facilitator binders, recorder binders, observer binders, and committee binders).
 - e. Binders may only be removed from meeting rooms with the permission of senior staff from either PDE or DRC.
 - f. Additional handouts, applicable to the content, may be provided—for example: assessment anchors (or Academic Standards), generic scoring guidelines, item distribution charts, etc.
6. Building on the large-group training, the facilitators in each room provide brief, additional content-specific training, lead the group through an initial short set of items, and assist members to become comfortable with the review process.
 - a. Committee members are encouraged to write comments on the item cards in their data review binders.
 - b. When the whole group has finished an assigned set, the facilitator asks for general comments, etc.
 - c. The goal for the committee is to reach consensus about each item.
 - d. Facilitators and recorders record the committee's consensus decisions.
 - i. *Accepted as is*
 - ii. *Rejected as is*
 - e. Both the facilitator and the recorder document information about the discussions and decisions made about each item.
 - f. At the end of each brief discussion, the facilitator assigns the next group of items until all items have been reviewed.
 - g. Art, graphics, passages, and other stimuli are included in item binders where relevant.
 - h. Committee members may record notes in the item binders only, and all notes are to remain in the binders. Committee members may not retain any copies of the items or remove any notes from the room.
7. The process continues section by section through the item binders during each data review day.
 - a. At the end of each day, the binders are collected and secured.
 - b. The facilitator and the recorder should reconcile their binders throughout or at the end of each day to ensure that both binders contain all of the committee's observations.
 - c. Evaluation forms (for meeting facilities and meeting facilitators) are completed on the last day.

8. DRC keeps the original Master Binder for each grade and content (as applicable) as a record of the item review meeting.
 - a. PDE keeps the recorder’s binder for each grade and content (as applicable) as a record of the item data review meeting.
 - b. All remaining committee binders are securely shredded.
9. DRC records the committee consensus in IDEAS.
 - a. Following the electronic update, individual item records in IDEAS reflects the consensus decision of the data review committee.
 - b. PDE may provide final arbitration as to which items are accepted or rejected based on the data review committee recommendations.

Pennsylvania PSSA Mathematics Data Review Criteria

| | |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multiple-choice | <ol style="list-style-type: none"> 1. Point biserial correlation for the correct response < 0.20 2. Point biserial correlation for any incorrect response > 0 3. <i>P</i>-value < 0.25 or <i>p</i>-value > 0.9 4. Proportion selecting any incorrect response greater than the <i>p</i>-value 5. Gender DIF code of either C- or C+ 6. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| Open-Ended | <ol style="list-style-type: none"> 1. Any score point proportion < 0.05 2. Gender DIF code of either C- or C+ 3. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| Notes | <p>The intent of these criteria is to flag everything that should be reviewed. For this purpose, we prefer to over identify rather than under identify. Any of these flags should cause the item to be reviewed by content experts but there are many reasons the experts might want to keep an item in spite of the statistics.</p> |

Pennsylvania PSSA ELA Data Review Criteria

| | |
|------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Multiple-Choice</p> | <ol style="list-style-type: none"> 1. Point biserial correlation for the correct response < 0.20 2. Point biserial correlation for any incorrect response > 0 3. <i>P</i>-value < 0.25 or <i>p</i>-value > 0.9 4. Proportion selecting any incorrect response greater than the <i>p</i>-value 5. Gender DIF code of either C- or C+ 6. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| <p>Evidence-Based Selected-Response</p> | <p>Part One</p> <ol style="list-style-type: none"> 1. Point biserial correlation for the correct response < 0.20 2. Point biserial correlation for any incorrect response > 0 3. <i>P</i>-value < 0.25 or <i>p</i>-value > 0.9 4. Proportion selecting any incorrect response greater than the <i>p</i>-value <p>Part Two</p> <ol style="list-style-type: none"> 1. Point biserial correlation for the correct response(s) < 0.20 2. Point biserial correlation for any incorrect response > 0 <p>Overall</p> <ol style="list-style-type: none"> 1. Gender DIF code of either C- or C+ 2. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| <p>Constructed-Response</p> | <ol style="list-style-type: none"> 1. Any score point proportion < 0.05 2. Gender DIF code of either C- or C+ 3. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| <p>Notes</p> | <p>The intent of these criteria is to flag everything that should be reviewed. For this purpose, we prefer to over identify rather than under identify. Any of these flags should cause the item to be reviewed by content experts but there are many reasons the experts might want to keep an item in spite of the statistics.</p> |

Pennsylvania PSSA Science Data Review Criteria

| | |
|------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multiple-Choice | <ol style="list-style-type: none"> 1. Point biserial correlation for the correct response < 0.20 2. Point biserial correlation for any incorrect response > 0 3. <i>P</i>-value < 0.25 or <i>p</i>-value > 0.9 4. Proportion selecting any incorrect response greater than the <i>p</i>-value 5. Gender DIF code of either C- or C+ 6. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| Open-Ended | <ol style="list-style-type: none"> 1. Any score point proportion < 0.05 2. Gender DIF code of either C- or C+ 3. Ethnicity (white/black and white/Hispanic) DIF code of either C- or C+ |
| Notes | The intent of these criteria is to flag everything that should be reviewed. For this purpose, we prefer to over identify rather than under identify. Any of these flags should cause the item to be reviewed by content experts but there are many reasons the experts might want to keep an item in spite of the statistics. |

Pennsylvania Keystone Exams Data Review Criteria

| | |
|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Multiple-Choice | <ol style="list-style-type: none"> 1. Item-total correlation for the correct response less than 0.25. 2. Item-total correlation for any incorrect response greater than 0.0. 3. <i>P</i>-value less than 0.3 or greater than 0.9. 4. Proportion selecting any incorrect response greater than the <i>p</i>-value. 5. Gender DIF code of either C- or C+. 6. MALEFEMALE, WHITEBLACK, WHITEHISPANIC, and/or PAPERONLINE bias DIF code of either C- or C+. |
| Constructed-Response | <ol style="list-style-type: none"> 1. Score point proportion < .05 2. MALEFEMALE, WHITEBLACK, WHITEHISPANIC, and/or PAPERONLINE bias DIF code of either C- or C+. |
| Notes | The intent of these criteria is to flag everything that should be reviewed. For this purpose, we prefer to over identify rather than under identify. Any of these flags should cause the item to be reviewed by content experts but there are many reasons the experts might want to keep an item in spite of the statistics. |

4.C.1.k. Schedule for Content, Bias, and Data Review Committee Meetings

A schedule of meetings associated with the PSSA, Keystone Exams, and CDT assessments will be developed, based on the information for current meetings provided in the RFP. Our project management staff are highly experienced in managing meeting schedules and will review our proposed schedules in detail

with PDE to ensure that all timelines are approved. Please see *Volume IV; Appendix K, Travel and Meeting Specifications* for details.

4.C.1.i. PDE Holds Copyright to All Assessment Items Developed for This Contract

DRC acknowledges that PDE will hold the copyright to all items developed specifically under this contract, and that all materials prepared under this contract will be the sole property of PDE. This will include unedited items, rejected items, and items in the process of revision, as well as completed items and graphics associated with items. DRC also acknowledges the right of PDE to revise, edit, print, post electronically, publish, and sell any materials developed for this contract. DRC recognizes that the term “developed works,” as used in the *Commonwealth’s IT Terms and Conditions*, shall include fully and partially developed items.

4.C.1.m. Item Development Plan to Maintain the Current Item Bank

DRC understands that PDE desires to maintain or improve the balance of items that reside in its current bank of items. All items developed for this contract will be newly developed. **Items provided during the course of this contract will not be previously developed and will not come from a commercially available product.**

Prior to beginning the item development process, we propose to meet with PDE to confirm our team’s understanding of the item development needs of the program for each year (e.g., number of items per a given standard or anchor, number of items per stimulus, number of items per item type, types of scenarios), including the plan for the number of items to be embedded in field test item positions and equating block positions each spring. The meeting will also include a review of all steps in the PDE item approval process and include an overview of our item writing training materials, bias, sensitivity, fairness guidelines, universal design guidelines, etc., in order to receive feedback from PDE. We will also receive feedback from PDE as to whether there will be any changes to style, item specifications, and target complexity levels.

During the meeting, DRC will provide PDE with an analysis of the status of the item bank, noting areas requiring attention and providing reports on the status of existing item development initiatives. PDE will provide DRC with further direction and vision for future enhancements to the item bank. Based on the approval from PDE, DRC will then move forward with a development plan to produce a quantity of items that meets PDE’s requirements to maintain or improve the balance of items in the item bank. More information about the quantity of items that will be developed is contained in *Subheading 4.C.2.a.*

4.C.2. TEST ITEMS

Overview of Pennsylvania Test Items

DRC, in consultation with PDE, will develop selected-response and constructed-response items for the PSSA and Keystone Exams, and selected-response items for the CDT. Consistent with the content of these assessments and the PCS/PAS, the focus of development will be for items requiring the application of higher-order thinking skills. We believe it is critical to be mindful of the balance between the cognitive demand of an item and the amount of time available for a student to respond to that item.

As with the constructed-response items, selected-response items will be developed to assess the highest level of cognitive complexity and content knowledge that can be appropriately assessed in this format. DRC will develop multiple-choice items to include four response options. Evidence-based selected-response items are two-part items and will be developed to have four response options in Part One, and may have four or five response options in Part Two. The correct answer must be clearly correct with the incorrect options reflecting content that is drawn from common misconceptions or misunderstandings and/or reflect logical content or context.

Constructed-response items developed for Keystone Algebra I and Biology and for PSSA Mathematics and Science, as well as short-answer items in PSSA ELA grade 3, will require the development of item specific-scoring guides. The item-specific guides will be developed to clearly demonstrate the difference in performance expectations for each score point (0–2, 0–3, and 0–4 scales). Students who fully answer the item as posed will earn the top score—students will not be required to go above and beyond the item to earn the maximum number of points, nor will student writing ability enter into the scoring of student responses for mathematics or science. In addition to the score point descriptors, scoring information will be provided for each item to help scorers determine the expectations for student performance.

DRC recognizes PDE’s desire to include additional types of items on the PSSA ELA assessment. In order to meet the demands of the PCS for students to justify, reason coherently, and support analysis using text, DRC will continue to develop text-dependent analysis and evidence-based selected-response items for the PSSA ELA assessment. While constructed-response items are generally text dependent, they do not necessarily engage a student’s analytical skills. Text-dependent analysis items require a student to refer explicitly back to the text being read. Items of this type require students to use analysis and critical thinking skills to develop and defend their answers, oftentimes having to explain why their reading of specific text evidence supports a particular answer.

More information about specific item types is contained in the sections that follow.

4.C.2.a. Item Development Quantities

Prior to beginning the item development process for each year's cycle of development, DRC will analyze and update the bank of items, passages, scenarios, etc., to determine the status of the item bank. Prior to developing a plan for item development, we will review each item and the previous year's field tested items added to the existing PDE item bank for the following criteria.

Item Bank Review Criteria

- Match to Assessment Anchor and Eligible Content for English Language Arts, Mathematics, and Science
- Cognitive level alignment
- Depth-of-knowledge alignment
- General technical quality, including adherence to industry standard quality guidelines, along with adherence to PDE's guidelines
- Adherence to the psychometric guidelines of the assessment programs
- Adherence to Principles of Universal Design
- Freedom from issues of bias, fairness, and sensitivity
- Other criteria as required by PDE

Based upon our analysis of the bank, we will generate a preliminary plan that will include an overview of the creation, review, and approval processes, as well as a projected schedule for development of items, scenarios, etc.; including the format of items, scenarios, etc., to be developed for PDE review and subsequent committee reviews by Pennsylvania educators.

We will provide the information to PDE with our recommendation as to how best to target the item writing and prompt development each year to meet the number of items, passages, scenarios, etc., as required in the RFP, including a 100% overage in the number of items required for use on an operational form. Development counts are a calculation based on confirming the load required by the subsequent operational test design and then calculating an estimated yield from a field test form given the known number of field test positions in a single form. In the test design tables and other references in the RFP, PDE has provided specific information about the number of field test forms and the number of field test items per form PDE anticipates will be required.

The following table shows the anticipated number of items to be field tested each year for the PSSA and Keystone Exams programs based on information contained within the RFP. Items will be developed in excess of these numbers to account for the normal attrition that occurs throughout the review and approval process. Development for the CDT program will be done on a periodic basis according to

the plan established in the RFP, rather than determined on an annual basis. DRC understands that PDE is planning a CDT development cycle to include 4,500 items in Year 3 of the contract. See *Subheading 4.C.7* for more information on the development counts for the CDT program.

Anticipated Yearly Development Plan for PSSA and Keystone Exams for Use in Field Test Positions

| Program and Content Area | Forms to Populate | Stimuli | Selected Response Items | | Constructed-Response Items | | | |
|-----------------------------------|-------------------|--------------|-------------------------|----------------|----------------------------|--------------|-------------------------|-----------------|
| | | | Multiple-Choice | Evidence-Based | Open-Ended* | Short Answer | Text-Dependent Analysis | Writing Prompts |
| PSSA Mathematics | 9 per grade (54) | — | 540 | — | 54 | — | — | — |
| PSSA English Language Arts | 9 per grade (54) | 54 Passages | 432 | 108 | — | 9 | 45 | None*** |
| PSSA Science | 12 per grade (24) | 12 Scenarios | 168 + 48 Scenario-based | — | 24 | — | — | — |
| Keystone Algebra I | 20 | — | 200 | — | 40** | — | — | — |
| Keystone Biology | 20 | 20 Scenarios | 280 + 40 Scenario-based | — | 40 | — | — | — |
| Keystone Literature | 20 | 40 Passages | 240 | — | 40 | — | — | — |
| Total | 186 | 123 | 1894 | 108 | 192 | 9 | 45 | 0 |

* Keystone Exams use the designation “Constructed-Response” (CR) for all “Open-Ended” items.

**Algebra I uses two types of CR items, Scaffolded Constructed-Response (SCR) and Extended Constructed-Response (ECR) items.

***Writing Prompts were part of standalone field test events that occurred in 2013 and in 2014. Per the RFP, they are not scheduled to be included in any embedded field test events within the scope of this contract.

4.C.2.b. Item Types Used on Pennsylvania Assessments

DRC will develop two main types of items on the PSSA and Keystone Exams to measure student performance against the standards, Multiple-Choice/Selected Response (MC/SR) and Constructed-Response/Open-Ended (CR/OE). The CDT program uses MC/SR items only. Passages for English Language Arts and scenarios for Science and Biology are also employed in concert with these item types to measure content based on a content stimulus. The different item types are used on Pennsylvania assessments because they assess different levels of knowledge and provide different kinds of information about achievement. Consistent with the content focus of the PCS and the PAS, the focus of development will be for items requiring the application of higher-order thinking skills. SR items can be written to DOK levels 1, 2, or 3.

Selected-Response Items

Our history of staying current in best practices for item and assessment development, along with using our focused content item and editorial processes, has yielded high-quality, content-aligned test items for numerous large-scale assessment programs. DRC test development professionals have the experience and the training needed to execute critical phases of item development with accuracy and specificity.

DRC recognizes that selected-response (SR) items are an efficient method for measuring a broad range of content, and PDE uses them to assess a variety of skill levels, including problem solving and analytical thinking. As stated in the RFP, DRC will work to develop two types of SR items used on Pennsylvania assessments, multiple-choice (MC) and evidence-based selected-response (EBSR). In both cases, SR items require that a student determines the correct answer to the item posed from a provided list. While it is still possible for a student to perform some work directly related to determining the correct answer, the student is not required to generate the content of the answer when responding to a selected-response item. DRC has worked closely with PDE to internalize PDE's vision regarding SR items.

Multiple-Choice

DRC understands that all multiple-choice (MC) items on Pennsylvania assessments are to have four answer choices, including three distractors and one correct answer. Distractors for mathematics will represent common misconceptions, incorrect logic, incorrect application of an algorithm, or computational errors, etc. Distractors for ELA will be written to represent a common misinterpretation, predisposition, unsound reasoning, or casual reading, etc. A correct response to an MC item is worth one raw point. The process skills, directives, and action statements within an MC item specifically align with the Assessment Anchors and Eligible Content statements. MC items are found at all grades/courses, are used with all content areas, and are significant within the test design across the entire Pennsylvania assessment system.

DRC understands that MC items can be further defined by being linked to, or independent from, a stimulus source. Items that operate independently of a stimulus are also known as "standalone MC." Standalone items may still have tables, graphs, or other information used in support of the stem. English Language Arts uses a mixture of MC items linked to a stimulus passage and some that are standalone. Science and Biology also use a mixture of MC items linked to a stimulus scenario and some that are standalone. For Mathematics and Algebra I, all MC items are considered standalone.

Evidence-Based Selected-Response

DRC further understands that the Evidence-Based Selected-Response (EBSR) items have two parts and that PDE has designed them to elicit an evidence-based response based on what a student has read from a stimulus passage. EBSR items are used only with the PSSA English Language Arts test (all grades) and will be added to the CDT Reading/Literature (grades 6 and up) and CDT Reading grades 3–5 assessments in Spring 2016. Each EBSR item is linked to a stimulus passage or to a stimulus passage set. Part One of an EBSR item will be similar to a standard MC test item. A student analyzes a passage and chooses a single, best (correct) answer from four answer choices. Part Two of an EBSR item will elicit evidence from the stimulus passage and requires the student to select one or more correct answers based on the response the student provided to Part One. Part Two is also different from Part One in that it may have five answer options rather than the four answer options typical of an MC item. Each EBSR (Part One and Part Two combined) is worth two or three raw points, depending on whether Part Two requires one or two selected correct answers. DRC understands that students receive one point per correct response and that credit received for correct answers in Part Two are not dependent upon providing a correct response in Part One.

Constructed-Response Items

As with SR items, DRC has worked closely with PDE to internalize PDE’s vision regarding constructed-response (CR) items. In addition to our content item and test development staff, we also bring our performance assessment staff to the understanding of these items types. As such, all CR items are developed using an integrated team approach that incorporates our best thinking. As the name suggests, constructed-response items differ from selected-response items because the student must generate the content of their response to the problem or objective provided in the item rather than picking the response from options supplied within the item.

DRC understands that PDE further defines CR items, like their MC counterparts, as being linked to, or independent from, a stimulus source. Items that operate independently of a stimulus are known as “standalone CR.” Standalone items may still have tables, graphs, or other information used in support of the stem. English Language Arts uses a mixture of CR items linked to a stimulus passage and some that are standalone. For science, Biology, mathematics, and Algebra I, all CR items are considered standalone. While the base point values of each CR item varies based on the content and the test (see the table that follows), in all cases, CR items are written to DOK level 2 or 3.

- Our integrated team will work to develop CR items for mathematics and Algebra I that present real-life and mathematical situations that require students to use mathematical problem-solving, reasoning, and communication skills. Our team understands that CR items are unique in that they may also provide students with opportunities to incorporate mathematical tools (like graphing functions) and manipulatives (rulers,

protractors, etc.) as part of the development of the student response. We propose that mathematics CR items may measure content from within an anchor (measuring two or more anchor descriptors within a single anchor) or across more than one anchor or cluster (measuring two or more anchor descriptors from more than one anchor). In addition, we propose that Eligible Content may be viewed as the assessment limits for mathematics CR items.

- Our integrated team will work to develop Short or Scaffolded CR items that are designed to elicit brief written responses covering a paragraph of three or four sentences or a series of very objective and concise answers of just a few characters entered into small response boxes (no extemporaneous text/explanation/work is required).
- Our integrated team will work to develop Extended CR items that are designed to elicit an extended written response of three or four paragraphs (up to one page), or a mixture of a written text and short, concise answers placed in small response boxes.
- Our integrated team will work to develop writing prompts that are designed to elicit a written composition of two and four pages of exposition in response to the provided prompt. Prompts will be based on a specific mode of writing and may ask the students to write an opinion or argumentative piece, an informative/explanatory essay, or a narrative composition. Writing prompts will be scored on a four-point scale, and the raw scores will be weighted when final scores are calculated as defined by the test design presented in the RFP.
- Our integrated team understands that unlike a standard writing prompt, PDE uses text-dependent analysis items in a unique way to require students to provide an analysis of a reading passage or passage set that the student has read during the test event. We will develop text-dependent analysis items so that students must draw on basic writing skills while inferring and synthesizing information from the passage (making use of and referencing content from the passage to support the analysis) in order to develop a comprehensive, holistic essay response. We understand that the demand required of a student's reading and writing skills in response to a text-dependent analysis item coincides with the similar demands required for a student to be college and career ready. Text-dependent analysis items will be scored on a four-point scale. Based on consultation and approval from PDE, the raw scores will be weighted when final scores are calculated as defined by the test design presented in the RFP.

In the following table, DRC presents a summary of the types of CR items that PDE will require as part of this contract.

Constructed-Response Item Type Summary

| Program | CR Item Type | Response | Usage | Linked to Stimulus | Grade/Course | # of Raw Points | # of Parts |
|----------|---------------------------------|------------------|-------------|--------------------|--------------|-----------------|------------|
| PSSA | Short Answer | Short | ELA | Yes | 3 (only) | 3 | 1 |
| PSSA | Open-Ended | Mixed | Science | No | 4, 8 | 2 | 1–2 |
| PSSA | Open-Ended | Mixed | Mathematics | No | 3–8 | 4 | 2–4 |
| PSSA | Writing Prompt | Extended Writing | ELA | No | 3–8 | 4 (weighted) | 1 |
| PSSA | Text-Dependent Analysis | Extended Writing | ELA | Yes | 4–8 | 4 (weighted) | 1 |
| Keystone | Constructed-Response | Extended | Science | No | Biology | 3 | 1–2 |
| Keystone | Constructed-Response | Extended | Literacy | Yes | Literature | 3 | 1 |
| Keystone | Scaffolded Constructed-Response | Scaffolded | Mathematics | No | Algebra I | 4 | 2–4 |
| Keystone | Extended Constructed-Response | Mixed | Mathematics | No | Algebra I | 4 | 2–4 |

4.C.2.c. Constructed-Response Scoring Considerations for PSSA

DRC uses an integrated team approach when developing CR items. DRC understands that constructed-response (CR) items will be scored using Holistic Scoring Guidelines for English Language Arts (ELA) and Analytic scoring guidelines for mathematics and science. In addition, PDE has also developed General Scoring Guidelines for mathematics and science, and DRC understands that these general guidelines are the basis from which all Analytic scoring guidelines are created.

When CR items are developed, item writers will have access to, and will be trained with, the Holistic scoring guidelines reviewed by our performance assessment staff and used with the ELA assessment. It is important that item writers fully understand and can articulate the standards reflected within the specific criteria that are used to determine the threshold for obtaining each score point within a Holistic scoring guideline. With this understanding, not only is the response score reflective of the alignment to the objective of the standards, but it is also reflective of the effort required to construct the response.

Similarly, for each Analytic scoring guideline, the same criteria and objectives apply. With Analytic scoring guidelines, however, the item writers have been specifically trained to develop item-specific guidelines at the same time that the items are initially written. Subsequently, Analytic scoring guidelines are also

meticulously reviewed and further developed by DRC's content teams and DRC's scoring experts from our Performance Assessment Centers.

4.C.2.d. Constructed-Response Scoring Considerations for Keystone Exams

DRC understands that constructed-response (CR) items will be scored using Holistic Scoring Guidelines for Literature, and Analytic scoring guidelines for Algebra I and Biology. In addition, PDE has developed General Scoring Guidelines for Algebra I and Biology, and that these general guidelines are the basis from which all Analytic scoring guidelines are created.

As stated and as with the PSSA, DRC uses an integrated team approach when developing Keystone CR items. When CR items are developed, item writers will have access to, and will be trained with, the Holistic scoring guidelines reviewed by our performance assessment staff and used with the Literature Exam. It is important that item writers fully understand and can articulate the standards reflected within the specific criteria that are used to determine the threshold for obtaining each score point within a Holistic scoring guideline. With this understanding, not only is the response score reflective of the alignment to the objective of the standards, but it is also reflective of the effort required to construct the response.

Similarly, for each Analytic scoring guideline, the same criteria and objectives apply. With Analytic scoring guidelines, however, the item writers have been specifically trained to develop item-specific guidelines at the same time that the items are initially written. Subsequently, Analytic scoring guidelines are also meticulously reviewed and further developed by DRC's content teams and DRC's scoring experts from our Performance Assessment Centers.

4.C.3. FIELD TEST ITEMS

4.C.3.a. Field Test Events Occur in Spring to Ensure Future Administrations Measure Higher Order Thinking Skills and the Cognitive Complexity of the Standards

As stated in the RFP, field testing will occur in the spring administrations of the PSSA and Keystone Exams programs, and embedded field testing will be the primary method used to evaluate the performance of potential operational test items. It is necessary for the Spring field test events to be more than adequate to fill the core (operational) item positions in the administrations taking place in the year following the field test event. In addition, the field test events must yield a sufficient number of test items to ensure that the operational tests will measure higher-order thinking skills and that the cognitive complexity represented within the core is aligned to the complexity level present within the standards.

The number of field test forms is a function of the volume of items required for development and the number of available field test slots (item positions) within a

given field test form. In turn, item development counts are a calculation based on confirming the load required by the subsequent operational test design and then calculating an estimated yield from a field test form. In the test design tables and other references in the RFP, PDE has provided specific information about the number of field test forms and the number of field test items per form PDE anticipates will be required.

One of the main components of having the yield from a field test event be sufficient to meet blueprint and cognitive complexity requirements and expectations, is building field test items that measure what they intend to measure. Over the course of the previous contract, DRC has worked closely with PDE as decisions about assessable anchors, eligible content, and cognitive complexity were made. In so doing, we have worked together with PDE as the Commonwealth has added rigor to the assessment through increased demands for cognitive complexity. We have successfully worked with PDE to produce items and assessments that align to the identified assessable anchors that assess student knowledge and skill at the desired level of cognitive complexity. We have worked closely with PDE as PDE developed the Performance Level Descriptors, so DRC is very well attuned to the levels of performance expected of Pennsylvania students. In addition, DRC staff has extensive knowledge and experience using Dr. Norman Webb's depth-of-knowledge framework (Webb, N.L. 1997, 2007) to classify cognitive complexity.² In determining the depth of knowledge level for each item, the content specialists at DRC have worked closely with PDE staff to internalize and implement PDE's definition for the overall cognitive complexity by clarifying objectives and developing strategies to expand the depth of knowledge of the item pool. Our team of item developers is well positioned to continue to meet the Commonwealth's goals for complexity within the Pennsylvania assessments.

In addition to standards, anchors, and items' cognitive complexity, DRC has worked closely with PDE to specify features and parameters of Pennsylvania items. As a result of our conversations and training from PDE staff regarding item specifications, our staff has a full understanding of the acceptable limits of items. Whether the issue relates to acceptable choices for point of view in an ELA item, acceptable fractions to use in a mathematics item, graphics parameters for a diagram, acceptable topics or themes for science scenarios, or the understanding of subjects or topics that will engage student interest in responding to ELA prompts, we have internalized the item specifications. That enables us to efficiently develop items that are consistent with the expectations of PDE.

In the RFP, PDE has identified the number of field test forms that it anticipates will be required for building sufficient cores that meet expectations for cognitive complexity. The field test events for the PSSA are designed to yield one

² We are also familiar with the other methodologies for classifying cognitive complexity that are widely in use, including those developed by Bloom et al. and Porter.

operational core in addition to a breach form if necessary. However, for the Keystone Exams, the field test event is designed to yield not one, but three operational cores (Spring, Summer, and Winter) in addition to a breach form if necessary. In both cases, the Spring field test will yield cores for the following year. For example, the Spring 2016 PSSA field test will yield the core for the Spring 2017 PSSA administration, and the Spring 2016 Keystone Exams will yield the core for the Spring 2017, Summer 2017, and Winter 2017/2018 Keystone Exams administrations. The table below shows the number of field test forms anticipated by the RFP and the number of forms in the most recent administration year (2015).

Number of Field Test Forms per Grade

| Test Event | Number of Field Test Forms Anticipated by the RFP | Number of Field Test Forms in 2015 |
|----------------------------------------|---------------------------------------------------|------------------------------------|
| PSSA—English Language Arts, Grades 3–8 | 54 (9 per grade) | 54 |
| PSSA—Mathematics, Grades 3–8 | 54 (9 per grade) | 54 |
| PSSA—Science, Grades 4 and 8 | 24 (12 per grade) | 24 |
| Keystone Exams—Algebra I | 20 | 24 |
| Keystone Exams—Biology | 20 | 24 |
| Keystone Exams—Literature | 20 | 24 |
| Total Forms | 192 | 204 |

Should PDE determine that the number of field test forms needs to be modified from what was anticipated in the RFP, DRC will work with PDE to modify the field test plan as necessary.

Per the RFP, DRC understands that PDE expects that as part of the field testing process for items tested in dual modes (both print and online) that the item statistics for online testing will be made available separately from paper-based testing. Whenever online participation rates are sufficient to be statistically meaningful, item performance information broken out by testing mode can be used as part of the comparability study discussed under subsection *4.H.1.c Validity/Research Studies*. DRC proposes to track all items tested in dual-mode format (print and online) by paper-only use, online-only use, and aggregated use. For more information on how item performance is used in the test development process, see also subsection *4.C.1.j Procedures and Responsibilities of the Content, Bias, and Data Review Committees and PDE’s Oversight of the Committees’ Actions*, subsection *4.C.5 PSSA Item and Test Development Process*, subsection *4.C.6 Keystone Exams Item and Test Development Process*, and subsection *4.C.8 Construction of Test Forms*.

4.C.3.b. Field Test Items Embedded in 2016-17 PSSA and Keystone Exams

DRC understands that the Selected Offeror will be responsible for embedded field test items to be included in the Spring 2017 PSSA and Keystone Exams. DRC's expertise and current experience in developing embedded field test items positions DRC to successfully complete the work necessary to have field test items ready to be embedded in the 2016-17 PSSAs and Keystone Exams. Our experience includes the selection and/or development of passages; submission of passages to PDE for review and approval; development of items; submission of items to PDE for review and approval; preparation of items for review by committees of Pennsylvania educators; reconciliation with PDE of the results of both Bias, Fairness, and Sensitivity and Item Content Review committees; and preparation of items to incorporate any necessary revisions for inclusion in field test forms, including both print and online presentations. With DRC's existing Pennsylvania-oriented systems and our staff's deep knowledge of Pennsylvania's requirements and standards, we are the best team available to meet the requirement to embed items on the spring 2017 PSSA and Keystone administrations.

4.C.3.c. Annual Release of Test Items and Required Refresh

DRC understands PDE desires to release 20% of the items each year for the PSSA and Keystone Exams (from one of the three core forms only), and DRC will assist PDE to provide these released items to Pennsylvania educators, students, parents, and other stakeholders. DRC believes that the life of a test item should be patterned in such a way that PDE receives the maximum value from the test item. An economical, organized, and efficient plan for item release provides the Commonwealth with the best value for its fiscal investment and provides a stable, consistent, and open system of communication with all stakeholders while protecting the integrity of the blueprints of the Pennsylvania assessments.

The ideal life cycle of a PSSA test item's usage begins with its initial field test event. An item approved for use following its field test event can be used either as a core (C) item (contributing to student scores), or as an equating block (EB) item, or it can be banked (B) for future use. If the item is used as an equating block item, it can then be used either as a core item or it can be banked for future core use. Once the item has been used as core, it can then be used as a core-to-core link (CL), or it can be banked for future core use. Once an item has been used as core-to-core link, its exposure is deemed to be significant, and it is then an ideal candidate for release (R).

Ideal Item Life Cycle for PSSA

| Step | Primary Cycle | Alternate Cycle | Secondary Cycle |
|------|---------------------------------------------------------------|-----------------|-----------------|
| 1. | Field Test ↙ ↓ ↘ | | |
| 2. | EB ↓ | B ↓ | C ↓ |
| 3. | C ↓ | C ↓ | CL ↓ |
| 4. | CL ↓ | CL ↓ | R |
| 5. | R | R | |

Like the PSSA, the ideal life cycle of a Keystone Exams item’s usage begins with its initial field test event. An item approved for use following its field test event can be used either as a core (C) item (contributing to scores) or it can be banked (B) for future use. Once the item has been used as core, it can then be used as core overlap (CO) after a gap of one year, or it can be banked for future core use. Once an item has been used as core overlap, its exposure is deemed to be significant, and it is then an ideal candidate for release (R).

Ideal Item Life Cycle for Keystone Exams

| Step | Primary Cycle | Alternate Cycle |
|------|---------------------------------------------------------------|-----------------|
| 1. | Field Test ↙ ↓ ↘ | |
| 2. | C ↓ | B ↓ |
| 3. | | C ↓ |
| 4. | CO ↓ | |
| 5. | R | CO ↓ |
| 6. | | R |

Generally, the collective life cycle of a bank of items provides ample candidates for release at rates of 20%, as required by the RFP. At any time within the life cycle of an item, an item can be selected for release, even if the item has not been utilized to its maximum potential. Prior to a decision to release an item, the item bank must be evaluated to determine whether the loss of the item (through release) will put at risk PDE's ability to meet the test content blueprint for the operational administration for the next testing cycle. PDE will be provided with information about the item bank and the risks associated with the release of the item. PDE will make the final decision about which items can be released, both in terms of how many items will be released and when they will be released.

Items can be released individually or in groups. The release of groups of items (including a mix of SR/MC and CR/OE items) can be done within the context of an item and scoring sampler. Item and Scoring Samplers will include sample student responses for CR/OE items. For the maximum benefit, DRC recommends that the release of items should be scheduled for fall of each school year so that all stakeholders can reflect on the upcoming assessments in the subsequent spring administrations. Per the RFP, DRC understands that PDE will release up to 20% of the core items in a given year.

Instructional sensitivity is particularly important given the items to be released to the public through the Item and Scoring Samplers. Released items are an important vehicle for demonstrating the expected knowledge and skills as outlined by the assessment anchors and the standards. Further, instructional leaders and classroom teachers must be able to use the released items to inform and guide instruction. DRC's item development teams are committed to providing PDE with items that provide the optimal match to Pennsylvania's standards, and that establish clear, focused expectations for grade-level performance by tightly defining the rigor required for grade-level proficiency.

Additional information about the plan to develop Item and Scoring Samplers can be found in *Subheading 4.D.4.e.i., Item and Scoring Samples (PSSA and Keystone Exams)*. In addition, If PDE is interested in creating Online Item and Samplers, DRC would be happy to discuss pricing and options and to provide examples of products developed for other clients.

Additional information about the release of CDT items can be found in *Subheading 4.C.7, CDT Item and Test Development Process*.

4.C.3.d. New Item Development Review Schedule

PDE's review of candidate field test items is an important step in the overall test development process. DRC will work with PDE to provide a schedule for review that will allow PDE adequate time for preparation. To facilitate this and to allow PDE adequate time for preparation, DRC proposes that a new item development review schedule be provided to PDE six months prior to the start of the first review. DRC recognizes that PDE's staff is responsible to participate in and to lead a variety of additional commitments besides item development tasks, and

therefore it is necessary for DRC to provide clear information about the scope and schedule required for PDE’s review of the newly developed test items. In addition, DRC’s production schedules require efficient, but ample time for all quality steps to be completed to produce content that meets Pennsylvania’s stringent criteria for successful item development. Therefore, as stated in the RFP, exact dates for review will be mutually agreed upon.

DRC will provide a schedule to PDE that provides content to PDE early enough in the development window so that DRC can complete the development cycle as required to bring quality items to the item review meetings taking place each summer in Pennsylvania. DRC proposes that the draft schedule be provided to PDE during an annual planning meeting in order to give PDE adequate time to review the schedule and provide proposed adjustments as necessary.

If PDE desires, in the first year of this contract, DRC content staff will meet face-to-face with PDE to review the items directly with PDE content staff. Otherwise, in subsequent years, test items can be reviewed by PDE directly in DRC’s item development banking software (IDEAS). Using IDEAS would be advantageous to PDE because PDE would be able to view the newly developed items as they appear within PDE’s item bank in a secure environment. The item banking technology will allow PDE to document comments and edits in an organized way so that the comments are tied directly to the item. Convenient management and editing tools will also allow PDE to organize, sort, and modify items and item metadata at will. Alternatively, items can also be transferred to PDE digitally as an export from the item bank via a secure FTP (File Transfer Protocol) site. FTP transfer is secure and allows for the immediate exchange of large files. Files would be in the form of editable PDF (Portable Document Format) files that will allow PDE the option of adding comments and edits digitally directly on the item card. In any case, comments from PDE could be returned to DRC via hard copy, summarized in a spreadsheet, or provided during a meeting.

The following is a sample schedule, calling out the various review steps PDE used in the completion of the current contract with DRC. A similar schedule will be proposed for each PSSA, Keystone Exams, and CDT development cycle. The sample schedule shown assumes a digital delivery via IDEAS or FTP. Should PDE request a printed review, a delivery schedule with exact ship-out dates to PDE and return shipping dates to DRC will be provided.

Sample PDE New Item Review Schedule

| MA | ELA | SC | Task | Start Date | End Date |
|----|-----|----|-------------------------------------------------------------------|-------------|-------------|
| ✓ | | | DRC delivers Sample Math items to PDE for sample item review call | November 09 | November 09 |
| | ✓ | | DRC posts Passage Batch 1 for PDE to begin review | November 10 | November 10 |
| ✓ | | | Sample Item Review Call for Mathematics | November 13 | November 13 |
| | ✓ | | PDE feedback on Passage Batch 1 due to DRC | November 17 | November 17 |

| MA | ELA | SC | Task | Start Date | End Date |
|----|-----|----|------------------------------------------------------------------------|-------------|-------------|
| | ✓ | | DRC posts Passage Batch 2 for PDE to begin review | November 18 | November 18 |
| | ✓ | | DRC delivers Sample ELA items to PDE for sample item review call | November 19 | November 19 |
| | ✓ | | Sample Item Review Call for ELA | November 24 | November 24 |
| | ✓ | | PDE feedback on Passage Batch 2 due to DRC | November 25 | November 25 |
| | ✓ | | DRC posts Passage Batch 3 for PDE to begin review | December 01 | December 01 |
| | ✓ | | PDE feedback on Passage Batch 3 due to DRC | December 07 | December 07 |
| | ✓ | | DRC posts Passage Batch 4 for PDE to begin review | December 09 | December 09 |
| | | ✓ | DRC delivers Sample Science items to PDE for sample item review call | December 14 | December 14 |
| | ✓ | | PDE feedback on Passage Batch 4 due to DRC | December 15 | December 15 |
| | ✓ | | DRC posts Passage Batch 5 for PDE to begin review | December 17 | December 17 |
| | | ✓ | Sample Item Review Call for Science | December 18 | December 18 |
| | ✓ | | PDE feedback on Passage Batch 5 due to DRC | December 23 | December 23 |
| | ✓ | | DRC posts Passage Batch 6 for PDE to begin review | January 05 | January 05 |
| | ✓ | | PDE feedback on Passage Batch 6 due to DRC | January 11 | January 11 |
| | ✓ | | DRC posts Passage Batch 7 for PDE to begin review | January 13 | January 13 |
| ✓ | | | First delivery of items are available to PDE in IDEAS | January 20 | January 20 |
| ✓ | | | PDE feedback on first delivery of items complete in IDEAS (ends 2/9) | January 20 | February 09 |
| | ✓ | | PDE feedback on Passage Batch 7 due to DRC | January 21 | January 21 |
| | ✓ | | First delivery of items are available to PDE in IDEAS | January 21 | January 21 |
| | ✓ | | PDE feedback on first delivery of items complete in IDEAS (ends 2/10) | January 21 | February 10 |
| | | ✓ | First delivery of items are available to PDE in IDEAS | February 09 | February 09 |
| | | ✓ | PDE feedback on first delivery of items complete in IDEAS (ends 3/8) | February 10 | March 08 |
| ✓ | | | Second delivery of items are available to PDE in IDEAS | February 10 | February 10 |
| ✓ | | | PDE feedback on second delivery of items complete in IDEAS (ends 3/2) | February 10 | March 02 |
| | ✓ | | Second delivery of items are available to PDE in IDEAS | February 11 | February 11 |
| | ✓ | | PDE feedback on second delivery of items complete in IDEAS (ends 3/3) | February 11 | March 03 |
| | | ✓ | Second delivery of items are available to PDE in IDEAS | March 09 | March 09 |
| | | ✓ | PDE feedback on second delivery of items complete in IDEAS (ends 4/12) | March 10 | April 12 |
| ✓ | | | Third delivery of items are available to PDE in IDEAS | March 03 | March 03 |

| MA | ELA | SC | Task | Start Date | End Date |
|----|-----|----|-------------------------------------------------------------------------|------------|-----------|
| ✓ | | | PDE feedback on third delivery of items complete in IDEAS (ends 3/23) | March 03 | March 23 |
| | ✓ | | Third delivery of items are available to PDE in IDEAS | March 04 | March 04 |
| | ✓ | | PDE feedback on third delivery of items complete in IDEAS (ends 3/24) | March 04 | March 24 |
| ✓ | | | Fourth delivery of items are available to PDE in IDEAS | March 24 | March 24 |
| ✓ | | | PDE feedback on fourth delivery of items complete in IDEAS (ends 4/13) | March 24 | April 13 |
| | ✓ | | Fourth delivery of items are available to PDE in IDEAS | March 25 | March 25 |
| | ✓ | | PDE feedback on fourth delivery of items complete in IDEAS (ends 4/14) | March 25 | April 14 |
| | | ✓ | Third delivery of items are available to PDE in IDEAS | April 13 | April 13 |
| | | ✓ | PDE feedback on third delivery of items complete in IDEAS (ends 5/16) | April 14 | May 16 |
| | | ✓ | Fourth delivery of items are available to PDE in IDEAS | May 17 | May 17 |
| | | ✓ | PDE feedback on fourth delivery of items complete in IDEAS (ends 6/4) | May 10 | June 04 |
| | ✓ | | Rangefinding (ends 5/25) | May 24 | May 25 |
| | | ✓ | Rangefinding (ends 5/25) | May 24 | May 25 |
| ✓ | | | Rangefinding (ends 5/27) | May 26 | May 27 |
| ✓ | | | Seventh delivery of items are available to PDE in IDEAS | May 27 | May 27 |
| ✓ | | | PDE feedback on seventh delivery of items complete in IDEAS (ends 6/16) | May 27 | June 16 |
| | ✓ | | Seventh delivery of items are available to PDE in IDEAS | June 01 | June 01 |
| | ✓ | | PDE feedback on seventh delivery of items complete in IDEAS (ends 6/22) | June 01 | June 22 |
| | | ✓ | All feedback from PDE complete in IDEAS | June 11 | June 11 |
| ✓ | | | All feedback from PDE complete in IDEAS | June 23 | June 23 |
| | ✓ | | All feedback from PDE complete in IDEAS | June 28 | June 28 |
| | ✓ | | Bias, Fairness, and Sensitivity Review (ends 7/13) | July 12 | July 13 |
| ✓ | | | Bias, Fairness, and Sensitivity Review (ends 7/15) | July 14 | July 15 |
| | | ✓ | Bias, Fairness, and Sensitivity Review (ends 7/15) | July 14 | July 15 |
| ✓ | | | New Item Content Review (ends 7/28) | July 26 | July 28 |
| | | ✓ | New Item Content Review (ends 7/28) | July 26 | July 28 |
| | ✓ | | New Item Content Review (ends 7/28) | July 26 | July 28 |
| ✓ | | | Item Data Review (ends 8/11) | August 10 | August 11 |
| | | ✓ | Item Data Review (ends 8/10) | August 10 | August 10 |
| | ✓ | | Item Data Review (ends 8/12) | August 11 | August 12 |

4.C.3.e. Comply with the Pennsylvania Style

In addition to the knowledge of Pennsylvania's standards, anchors, and item specifications, our item development team is also fully conversant in the Pennsylvania Style Guide, Version A (Revised October 2013). As PDE's current test development vendor, DRC developed this style guide for PDE to provide a consistent presentation across the Pennsylvania assessments.

Knowledge of and consistent implementation of the Style Guide is critical to the development of items that reflect a uniform presentation of content that support the reliability and validity of the assessment. A consistent style helps to remove irrelevant elements from the assessment. Our adherence to PDE-approved style extends to the wording and format of the items, the specifications for graphics, and the final presentation of items within the test booklets and electronic or online. This is reflected in overall consistency of phrasing, development of answer choices that do not stand out such that all are plausible and logical, consistent labeling of figures and graphics, and the use of a common font style and size throughout the item pool. This knowledge is shared by all of our item writers, editors, and publishing staff, including item-banking staff members.

The item authoring and management tools (IDEAS) are customizable for Pennsylvania so that item writers and editors are always seeing a close approximation of the item as it will appear in a test booklet or on a computer screen. Likewise, IDEAS prints items for content reviews and bias, fairness, and sensitivity reviews consistent with the Style Guide to ensure that educators are evaluating the items as students would encounter them in the test situation. By implementing the Style Guide throughout all stages of the item and test development process, efficiencies are achieved during production because items do not have to be edited for style or format once they have been placed in forms. Edits at that point in the development process lead to increased production costs and significantly increase the risk of introducing errors into the forms.

Of course, during the course of development, PDE may choose to adjust style based on emerging information or new situations. When this happens, DRC will provide guidance to PDE for the best approach to successfully implement changes to PDE style, and we will maintain the style guide by updating the document to show the changes to the style. Should proposed changes to the style impact existing test items, we will provide PDE with the risks and work with PDE to determine a mutually agreed upon solution that protects the best interests of the testing program.

4.C.3.f. Develop and Provide Item Writing Training for Contract Writers

DRC proposes the use of a combination of in-house and contract item writers for PSSA, Keystone Exams, and CDT item writing, in addition to working with an item writing vendor for some PSSA item development. DRC is pleased to partner with Victory Productions, a Small Diverse Business, who will provide item writing services for PSSA English Language Arts in grades 3–8, PSSA

Mathematics in grades 3–5, and PSSA Science in grades 4 and 8. Item writers, including staff of Victory Productions, will receive training in the Pennsylvania anchors and eligible content, the expectations for alignment to the Pennsylvania anchors and eligible content, the item specifications, the Pennsylvania style guide, best practices for writing technically sound items, searching for and documenting authentic data to use in items, and using the item-banking system. For additional information about the required qualification of item writers, please see *Subheading 4.C.5. PSSA Item and Test Development Process; Writer Qualifications*.

Training Activities

Both DRC and Victory Productions believe that providing a comprehensive training program designed specifically for potential item writers to gain knowledge of the item writing process is a vital component in ensuring quality control in the item development process. Before the first item of a development cycle is written, all levels of the item and test development staff will participate in training. All writers will be trained, even if they have worked on the project previously. The training manual will be available to PDE for approval prior to the start of item writer training.

The training will be organized and conducted by the DRC content directors and leads. It will include a general overview of Pennsylvania items and style and any new development guidelines for the current cycle, based on PDE decisions. The importance of training item writers, including those with extensive writing and development experience cannot be overstated. In addition to providing insights into creative ways to represent Pennsylvania content standards, it also nurtures and supports productive collaboration among item writers and gives seasoned writers opportunities to share their knowledge. This training is designed to provide an orientation to the task, specifications, and style *in advance of development*. The general overview will serve as a review to the majority of team members, because Pennsylvania projects have had stability of personnel over the years. This initial training fits into a larger network of staff training achieved through ongoing feedback with PDE throughout the development process and immediate communication about any changes to development specifications. In addition, role-specific training is delivered (described below).

The content lead will hold regular meetings with item writers to give feedback and discuss common issues that arise during the item-writing process. During the training, examples of items will be provided. It has been the experience of DRC content-area item and test development staff that writers need to be aware of the reasons why items might be rejected. Providing sample items during the item writing training workshop will allow writers to have a better understanding of what makes a high-quality and technically sound test item.

All contract item writers will be required to sign a statement in which they agree to treat all materials and communication related to item development as confidential. The writers will represent a mix of professionals, some of whom

have expertise across the grades, and others who are specialists at particular grade spans. Assignments are made so that each assessable anchor reflects the thinking of multiple writers. Unless the item order calls for only one or two items in a particular eligible content, no single writer will develop all the items for an assessment anchor.

For more detailed information about the item writing process, see the work plan proposed in *Subheading 4.C.5., PSSA Item and Test Development Process*.

4.C.3.g. Ensure Potential Field Test Items Are Reviewed Prior to Submission

During all phases of editorial review, DRC editors check that items are grammatically correct and formatted correctly. In addition each item is reviewed to ensure that the competency/objective, the DOK level, the perceived difficulty, and the Performance Level Descriptor are correct.

The following is an outline of the editorial process we use to ensure that our items are reviewed prior to submission.

The Editorial Process

Before the first item of a development cycle is edited, all levels of the test development staff will participate in editorial training. This training will be organized and conducted by the subject-specific content lead. The training will include a general overview of Pennsylvania item types and characteristics and how the appropriate Pennsylvania Core Standards (or Pennsylvania Academic Standards, for science), item specification documents, and style considerations can be used to guide and inform item development. Additionally, training will include definitions and examples of Pennsylvania's interpretation of cognitive complexity. This training is designed to provide an orientation to the task, specifications, and style in advance of item editing. Because we have maintained a group of item editors, graphic designers, and proofreaders over time, this training and orientation is a refresher for many of our staff, but we are committed to annual training to be sure that the specifics of Pennsylvania are clearly outlined for all staff. This opening training fits into a larger network of staff training achieved through ongoing feedback throughout the development process that provides a means for prompt communication about any changes to development specifications.

Once the items are written, they will then flow through our item editing process. **Mr. Christopher McCullough, DRC's Test Development Director**, will serve as the Project Director for this work. He will provide oversight for overall staffing and content, and play a critical role in ensuring that item development is at the highest technical standards and meets all project timelines for delivery. Content leads will work together with the Director, the Project Manager, and the Project Lead to oversee the training and development of editors and item writers, as needed. (The training of staff is outlined more fully below.)

Content leads work closely with other staff, such as the assessment coordinators and graphic designers, to ensure item accuracy and alignment with state-specific expectations for content and style. The content leads are senior-level item editors who provide the final review of every developed item prior to delivery. Item editors shape the items produced by writers into a more polished product. The content expertise and assessment knowledge of the editors ensures that the items conform to the rigorous content and style guidelines required of Pennsylvania's assessment items. We employ multiple rounds of editing, consistent with the advancing levels of proficiency of the editorial staff.

Supporting these content professionals is a well-trained team of assessment development coordinators, graphic designers, and proofreaders. The assessment development coordinator works with the Project Director, the Project Manager, and the Project Lead to maintain the subject-specific project calendar for each development cycle and monitors the completion of writing, editing, and proofreading assignments. In this role, the assessment development coordinator is in close communication with the content lead regarding the flow of items throughout the editorial process. The graphic designers create the graphics required for items, following exact specifications to ensure content integrity and adherence to the specifications outlined in the style guide. The content leads work closely with the graphic designers to provide the necessary training for Pennsylvania style. Similarly, the proofreaders receive training on Pennsylvania style so that items delivered for review reflect the expected style and accuracy.

Item Development Coordination

After a writer submits an item, an item development coordinator will provide a quick review to determine if the item is viable with respect to the item development target. Acceptable items are forwarded to a content editor, along with notes. If item writers are used, rejected items are returned to the item writer with comments for revision. The quick feedback to writers provides important, timely information to build and sharpen their skills, particularly with respect to alignment and adherence to the item specifications. If an item is returned to the writer, the item writer reviews the notes from the item development coordinator, completes the revision, and resubmits the item. Graphics revisions may also be submitted.

The item development coordinator reviews all fields that an item writer is required to complete and determines whether the item meets the expected standard of quality.

The Item Development Coordinator:

- Reviews the item for alignment to the Assessment Anchors and Eligible Content
- Checks that the necessary graphics and sources for data used within the item are provided and are accurate
- Reviews the item to make sure that it is within the parameters set by the assessment-specific style guide and the item writer guidelines
- Reviews the item for accuracy, relevancy of context, rigor, grade and language appropriateness, and correct terminology
- Reviews the item to ensure it meets the identified cognitive level, level of complexity, and estimated difficulty level
- Reviews the rationales for distractors
- Evaluates the item for issues of bias and sensitivity and adherence to the Principles of Universal Design
- Provides the assessment development coordinator with general feedback for all item writers
- Determines editing priority, if needed (e.g., items with graphics may be prioritized over items without graphics)
- Ensures that all of the received intake graphics are sent to the item development coordinator, including any revised graphics
- Delivers the graphics requests to graphic design team

Graphics

A graphic designer begins to interact with a particular item after being notified by the item development coordinator that items have been processed. The graphic designer follows the writer's instructions for creating the graphic. The graphic designer may contact the item development coordinator or writer to obtain clarification or discuss a detail of the graphic. Our graphic designers have developed a strong sense of grade-level appropriateness and are encouraged to raise clarifying questions with content staff to ensure the optimal rendering of graphics that are true to the assessment content. Further, our years of experience in developing graphics for Pennsylvania have helped to consistently meet the specific style requests of Pennsylvania. Our graphic designers use the Adobe Creative Suite™, which includes the most current versions of Adobe Illustrator CS6, Adobe InDesign CS6, and Adobe Photoshop CS6, as well as Adobe Acrobat Professional Version 10. DRC graphic designers stay current with the latest design and publishing software and technologies.

Editorial Review

After an item has been evaluated, it is then reviewed by content editors. The editors will perform the following tasks.

The Item Content Editor:

- Reviews the notes from the item development coordinator
- Reviews the assigned content standard and depth of knowledge for alignment with item specifications
- Checks the item’s match to the parameters established in the style guide and the writer guidelines
- Checks the item for accuracy, rigor, grade, and language appropriateness
- Checks the answer choices, making sure that only the specified number of correct answers are present
- Evaluates the wording of the item for use of clear, precise, and concise language
- Checks the graphics for completeness and accuracy
- Checks the item for issues bias, fairness, and sensitivity
- Evaluates the item for adherence to Universal Design principles
- Makes a note about the item for the next editor (if needed)

An editor may also request a graphics revision from the graphic design team. Once an editor has completed the review of an item, the editor sends the item to proofreading.

Proofreading

After an item has been through editing, the item is sent to proofreading. The purpose of proofreading items is to check for any errors such as spelling and grammar. Item card formatting is also reviewed. The item development coordinator, content lead, and proofreader are the key staff for this step of item development.

The proofreader ensures that any errors are identified.

The Proofreader:

- Checks spelling
- Checks grammar
- Checks item card formatting
- Checks for style errors
- Checks for content errors
- Checks graphics for size, scale, and format

After an item is proofread, the proofreader revises the item status in IDEAS, our secure item banking system, to indicate that the review is complete and notifies the assessment development coordinator that the item is ready for the next stage of the process. At this stage, the content lead will perform the following tasks.

The Content Lead:

- Answers any content-specific questions that arise from the proofreading process
- Provides periodic feedback to the proofreaders
- Determines which items require editing

Content Lead Review

The Content Lead review is the analysis before an item is tagged as ready for submission to PDE for review prior to the Bias, Fairness, and Sensitivity Review and Content Advisory Committee meetings. The purpose of this stage is to ensure that each item follows the Pennsylvania-specified style, is accurate, aligns to the specific alignment criteria, and is technically sound with respect to best practices in high-stakes assessment. Items that do not meet the standard are edited as needed and then receive final review and sign-off.

At this stage, the content specialist will ensure that each item meets the following standards.

The Content Specialist Will Ensure Each Item:

- Addresses the assigned content standard and depth of knowledge
- Is grade-appropriate
- Contains only one correct answer
- Does not contain information in the stem that clues the correct answer
- Incorporates elements of universal design and is free of bias or sensitive issues
- Matches Pennsylvania style
- Does not contain any content errors

Reviewing Items for Consistency with Performance Level Descriptors

In addition to ensuring that all field test items are reviewed for alignment to specific Assessment Anchors, Eligible Content, the Webb’s Depth of Knowledge (“DOK”) level, and estimated difficulty, the items will also be reviewed for alignment to the Performance Level Descriptors. The Performance Level Descriptors articulate the expectation of what students are expected to know and be able to do, as directly aligned to the Pennsylvania Core Standards, and as further delineated by the Assessment Anchors and Eligible Content. Specifically, the descriptors provide clear guidelines for what should constitute the different levels of performance (i.e., Below Basic, Basic, Proficient, and Advanced).

Because the descriptors form the foundation for determining what and how much students are expected to know and be able to do in a given domain of content for a particular grade and subject area, it is essential that item writers have a solid understanding of these descriptors before item development. The descriptors will be provided to the item writers as an integral part of the item-writing training. Item writers will review the descriptors, along with the Pennsylvania Core Standards and Assessment Anchors and Eligible Content, with the goal of internalizing PDE’s vision of what students are expected to know and be able to do, including the expectation for performance as reflected in each descriptor. The writers will focus upon the knowledge and skills included in each descriptor in order to understand the level of demand required for a given descriptor. Item writers will also be asked, as each item is written, to determine whether the item would most likely be aligned to Basic, Proficient, or Advanced.

The alignment to the given performance level descriptor will be included on the item writer template. DRC’s item and test development specialists will review the Performance Level Descriptor designation for each item prior to presenting the items to PDE for review. DRC’s item and test development specialists will check to see if the item is, in fact, aligned to the descriptor and that the item is consistent

with the performance level of the descriptor. Along with the other item characteristic information (e.g., DOK, answer key, estimated difficulty), the item review card will include the performance level descriptor information.

4.C.3.h. All Items Reviewed and Approved by PDE and Pennsylvania Educator Committees Prior to Use

DRC understands that PDE must review and approve all items prior to the items being presented to the Pennsylvania educator committees. PDE holds high standards for quality and will expect a minimum of a 90% acceptance rate from the initial review by PDE. The Pennsylvania educator committees will also review these items prior to their inclusion on actual test forms. As part of this process, if PDE approves, DRC will provide the committee members with detailed PDE-approved training, and DRC will monitor and maintain PDE-approved security processes.

Preparing Items for PDE's Review

To achieve high quality and high acceptance rates, content-area item and test development specialists and content-editorial specialists will review items scenarios, passages, etc., for technical quality; match to anchor/standard; bias, fairness, and sensitivity; depth of knowledge; estimated difficulty; adherence to the Principles of Universal Design; etc. Two additional editors will provide an independent review. The aim for this team approach is to conduct a multi-tiered internal review of all items, scenarios, etc., prior to submission for review by PDE. PDE will provide approval prior to submission for external committees to ensure that all items align with the Pennsylvania's Assessment Anchors and Eligible Content and adhere to PDE's quality standards for high-quality items.

As stated in the previous section, our content development and editorial team, including two additional independent editors, will review all items, scenarios, etc., to ensure that they possess the following characteristics:

- Content alignment or congruence with the knowledge and skills specified in the anchors or standards
- A range of estimated difficulty levels
- Appropriate grade-level vocabulary, subject matter, and assumed student knowledge
- Freedom from issues or concerns for bias, sensitivity, or fairness
- Accessibility, following the Principles of Universal Design
- Correct grammar, usage, and structure/format
- Alignment to the performance-level descriptor

As a part of our internal review of the items, DRC’s item and test development team members and graphics specialists ensure that item art can be reproduced clearly and accurately when test booklets are printed or electronically displayed.

Test specifications will be reviewed to identify any potential display requirements that may present challenges in a print or electronic display environment. Display tolerances are impacted by line thickness, percent screening for shading, specialized fonts and symbols, photographs, color, and paper type. These are defined in the early stages of the item and test development process to help guide the delineation of style requirements and specifications.

Item art is produced using vector graphics that allow for scalar adjustments without the breakdown of image clarity that is common with lower quality bit-mapped formats. DRC’s multi-tiered quality assurance process makes certain that converted item art is carefully compared to the original format throughout the item and test development and production process.

The display of high-quality art in tests does not end with art production and the application of Universal Design principles. The medium for display and the conversion or transformation of the artist’s work to this medium are also given careful consideration.

Item Review by PDE

All newly developed items, with associated stimulus prompts, scenarios, graphics, passages, and all item characteristics such as item code, estimated difficulty, depth-of-knowledge level, performance-level descriptor, distractor analysis, focus, scoring guidelines, etc., will be prepared for review by PDE. We understand the importance of the review, and we will work with PDE to establish schedules and procedures that will facilitate PDE’s review of all items, scenarios, etc., prior to reviews by committees of Pennsylvania educators. For the review, PDE will have direct access to IDEAS, our item-banking system, and PDE may elect to review items electronically in “real time” using IDEAS. Our item development team will work with PDE to meet PDE’s review process requests.

Prepare all Materials for Item Content Reviews

It is our belief that Pennsylvania educators offer invaluable insight into the passages and items appropriate for their students, and we anticipate continued success with providing support to PDE in this process. After all newly developed items, scenarios, etc., have been reviewed, revised per PDE’s request, and subsequently accepted by PDE, they will be prepared for presentation to separate grade-level/course-level review committees of Pennsylvania educators. Only passages and items that are approved by PDE will be included in the final pool for review by the external committees of Pennsylvania educators.

For each grade-level, grade-range, or course-level committee, items, passages, scenarios, and other stimulus materials will be secured in binders, ordered according to Assessment Anchors and Eligible Content for mathematics and

science for non-scenario items, by stimulus-based prompts for science scenarios, and by passages for ELA. Items will typically be printed one per page and will include all information such as what each item is measuring (Assessment Anchor and Eligible Content), focus, depth-of-knowledge level, performance-level descriptor, answer key or scoring guideline, grade level, distractor rationale, and other information as requested by PDE.

Support PDE with the Item Content Review Committee Meeting Process

Committees of Pennsylvania educators will review all newly developed items (e.g., content-area appropriateness, curricular alignment of the items, cognitive demand and rigor alignment, bias and sensitivity, adherence to the Principles of Universal Design). In addition, scoring guidelines for constructed-response/open-ended items will also be reviewed. Our content-area specialists will support PDE as facilitators and note takers.

DRC understands that the Item Content Review meetings will take place in Pennsylvania and will consist of Pennsylvania educators and other content matter experts as specified in the test specifications.

DRC will support PDE staff with the development of the Item Content Review training materials, including PowerPoint training presentation slides, should PDE request such support. The information in these materials will include training participants to review items for content alignment, rigor level alignment, technical design, issues, and Principles of Universal Design. DRC will also support PDE staff with the facilitation of the committee review, including compiling the feedback information.

The DRC staff members supporting PDE will record all comments. Following the meeting, all feedback will be compiled and a summary report of the results of the meeting will be prepared. The summary report will describe the committee review process; the number of items, scenarios, passages, etc., that were rejected for potential bias, sensitivity, and/or fairness concerns; the number of items, scenarios, etc., needing to be revised to remove the potential area(s) of concern; and any additional information as requested by PDE.

Security Process for the External Committee Reviews

At the beginning of each Review Committee meeting, including the Bias, Content, and Data Review meetings, each committee reviewer who is invited to attend will be asked to sign a Confidentiality Letter specifying the confidentiality agreement and security regulations. The agreement will also outline the ownership regulations. DRC understands that all work developed under this contract will be the sole property of the Commonwealth of Pennsylvania. No confidential materials related to the project will be released without PDE's explicit approval.

During the review meeting, items, passages, scenarios, etc., will not be left unattended. In other words, DRC facilitators will monitor the security of all items,

scenarios, and passages throughout the entire process. All materials sent to the meeting will be sent through a secured mailing process and have tracking documentation. DRC facilitators attending the meeting will oversee the delivery and return of all materials. These same members will arrange for shredding bins should any materials need to be shredded. In addition, all materials provided to the external committees will be numbered so that secure materials are collected at the end of each day.

4.C.3.i. Quality Assurance Steps for Development of Items and Test Forms

Employing well-trained, highly competent professionals is key to success. The quality of a test is directly linked to the expertise of the staff associated with the development effort. We have taken great measures to select an experienced item and test development team. Our team will ensure that all item and test development objectives are met with timeliness. For this scope of work, DRC is pleased to propose the continuation of our existing item development team.

Effective Staffing Plan

DRC's staffing plan ensures that high-quality items are developed and that project communication is smooth and efficient. The Test Development management team at DRC executes the day-to-day project management for item development and test development tasks. Tasks include, but are not limited to, the following: project scheduling, coordination with content directors in the oversight of content leads and coordinators, facilitation of weekly meetings and conference calls among staff, budget management, management of schedule changes and any other changes to the scope of work, and communication with PDE.

Our **content directors** supervise the content leads and provide guidance for overall staffing and content. The directors provide oversight and auditing of the final review of all items before delivery to PDE to ensure item quality and accuracy of content. **Pennsylvania content leads** (DRC ELA, mathematics, and science) work together with the **content directors** to oversee the training and development of item writers and editors. Content leads work closely with other staff, such as content directors, graphic artists, and publishing experts to ensure item accuracy and alignment with Pennsylvania standards and style. The content leads also are senior-level editors of items who provide the final review of every developed item prior to delivery. **Item content editors** shape the items produced by writers into a more polished product. The content expertise and assessment knowledge of the editors ensures that the items conform to the rigorous content and style guidelines required of Pennsylvania items. DRC employs multiple rounds of editing, consistent with the advancing levels of proficiency of the editorial staff, as outlined in our item development process provided in *Volume III; Appendix B, Test Development Samples*. The initial development of items comes from the **item writers**, who possess expertise in the content and grade to which they are assigned. (The content-specific training of item writers and editors is outlined more fully later in the work plan.)

Supporting these content professionals is a well-trained team of **test coordinators, graphic artists, item-banking support staff, proofreaders, and permissions editors**. The test coordinator maintains the project calendar for a content area. The test coordinator also monitors the completion of writing, editing, and proofreading assignments. In this role, the test coordinator is in close communication with the content lead regarding the flow of items throughout the writing and editorial process. The graphic artists create the graphics required for items, following exacting specifications to ensure content integrity and adherence to the specifications outlined in the Style Guide. The content lead works closely with the **item-banking experts** since publishing style guidelines are included in the item-banking system. Item-banking experts provide the necessary training for Pennsylvania style. Similarly, our **proofreaders** receive training on Pennsylvania style so that items delivered to PDE for review reflect the expected style. The **permissions editors** secure permissions for copyrighted material in a timely manner.

Commitment to Developing High-Quality, Error-Free Items

Employing well-trained, highly competent professionals is a key reason for our success. However, our commitment to high-quality, error-free items requires that our procedures and processes be state-of-the-art and as reliable and thorough as the professionals who implement them. Before PDE reviews any item, the item has been through multiple levels of review, not counting the originating author. After an author submits an item in IDEAS, the DRC-developed item-banking system, an intake editor decides whether the item may move forward to first-level editing. (The intake process may also result in the item being rejected or sent back to the author for revision.) Two subsequent rounds of content editing follow the first review. The content director then gives the item another review before it is submitted to PDE for review. PDE staff will review all items and provide DRC with revisions prior to the content review meetings. All revisions will be made per PDE request.

These well-developed procedures are optimized via an item management system that facilitates the authoring, processing, routing, tracking, and formatting of test items. We propose to carry out the development work for this contract using IDEAS, the custom-designed item management system of DRC. PDE may wish to review the items in “real time” using our IDEAS item-banking system throughout any stage of the process. IDEAS will capture and track all edits requested by PDE and/or subsequent revisions to items, per PDE request, by DRC.

Quality Assurance Procedures during Item Development

Effective training, as described above, is a critical component of producing high-quality items. However, rigorous processes and systems are also integral to our approach.

The training our test development team undergoes gives them the knowledge to execute critical phases of item development with accuracy and specificity. In addition, redundancies have been built into our test development processes explicitly as part of our quality control checks. Multiple looks by different people, who have a sense of ownership in the product, ensure the integrity of each item's content, appearance, and style features.

The development schedule built by the test development managers, coordinator, and content leads is targeted toward an optimal mix of thoroughness and efficiency. The sharing of timely information, via formalized, regular project meetings and ad hoc conversations, ensures that team members have the information they need to produce items of high quality. This includes ensuring that all development staff—writers, editors, content leads, item-banking experts, proofreaders—have a common suite of materials, such as style guide and specifications. Development can then move forward in a coordinated way.

The item management system, IDEAS, has a number of features that streamline development and reduce the risk of error. Content specialists work on Pennsylvania items in an environment where Pennsylvania “style sheets” have been configured. As a result, the content specialists can look at items in print views that are identical to the item cards brought to content review or, alternatively, that resemble how items will appear in a test booklet or on a computer screen. The system ensures that only one user can edit an item at a time by locking out multiple editors. The item management system also has built-in features for ease of processing, such as buttons for style including bold, italic, and underline. The system also has spell check as a standard feature. Assessment anchors and focus words are linked, so that the only focus words that are options for an item are those associated with the item's selected anchor. In preparation for PDE's review, and again once approved by PDE in preparation for external content reviews, items can be batched and item cards printed directly from IDEAS.

PDE requires error-free materials; DRC will assume the ultimate responsibility for the quality and accuracy of Pennsylvania materials. We take great pride in the excellence of the state testing publications we produce on behalf of our department of education clients.

All document development, production, and printing tasks and activities, including editing, proofreading, and other quality control processes, will be incorporated into the PSSA, Keystone Exams, and CDT master schedules (see *Volume IV; Appendix O, Project Schedules and Hours by Task*). These schedules specify all the activities that lead up to quality products or services delivered to either PDE or Pennsylvania Local Education Agencies (LEAs). Company-wide, Microsoft Project schedules will be used to ensure all deliverables, including internal handoffs, are of highest quality, within budget, on time, and meet specifications and requirements. The Pennsylvania Project Director, Ms. Sand, and her staff will use the project schedules to track key milestones and

deliverables, as well as to identify schedule risks early so adjustments can be made before delivery dates become jeopardized.

After forms construction, Test Development editors and specialists implement quality control procedures to ensure accuracy of all Pennsylvania test forms. The Test Development Team will review test forms in IDEAS. Using original copies previously approved by PDE, they will make modifications, if necessary, to verify continuity and accuracy. Once stable versions of materials have been achieved (i.e., content, graphics, or illustrations are complete and accurate), final proofs will be submitted to the editing/proofreading team.

Quality Assurance Procedures during Form Development

DRC's Test Development Editorial Team will be responsible for coordinating word-for-word proofreading of all test forms. At least two editors will perform three, independent, word-for-word reviews. These specialists will proof and query potential issues in order to offset the possibility of misleading or technically problematic wording of items within test forms. The Editing team will conduct a final "three-way" proofreading (test booklet, answer document, and test directions) of forms and confirm any potential inaccuracy with DRC Test Development Specialists.

In addition, DRC Psychometric Services and Test Development Specialists review all test forms to confirm accuracy and continuity. They will continue to query any test item that is suspect from a content or psychometric standpoint. These content staff enlist the aid of external reviewers to take each of the tests to verify the correct answers and content standard alignment for the multiple-choice items. They record their answers to the items on each test to confirm the scoring keys. Psychometric Services and Test Development staff work with PDE to revise scoring keys whenever necessary and have these revisions verified and approved by the Software Quality Assurance Analyst and PDE. PDE will be provided final, clean copy for its review and approval to print.

Documentation of the above processes (including steps, timeline, and staff involved) can be provided to PDE upon request.

4.C.3.j. Item, Test Design, and Test Construction Consistent with Best Practices

All phases of the DRC item development and subsequent test development cycles, reflect the integration of universal design principles with sound measurement theory, current research, and best practices in assessment, as described in the 2014 *Standards for Educational and Psychological Testing*.

Utilizing the National Center for Educational Outcomes published guidelines (Thompson, et al., 2002) for universal design and the training we received from NCEO, we have incorporated these principles in both the development of items and the subsequent layout of test forms. All item developers, editors, graphic

artists, and publications experts are trained in applying universal design principles. Our current item writing and editing practices include the following:

- Using consistent naming and graphics conventions
- Replacing low-frequency words with simple, common words
- Avoiding irregularly-spelled words, words with ambiguous or multiple meanings, technical terms (unless defined and integral to meaning), and concepts with multiple names, symbols, or representations
- Ensuring clarity of noun-pronoun relationships
- Simplifying keys and legends

Our content and psychometric experts will work to develop equivalent operational forms and embedded field tests consistent with the professional standards and best practices of the assessment industry. All test forms must meet both the content specifications set forth in the test blueprints and guiding documents, and the psychometric standards for excellence. We understand that it is imperative that forms construction be accomplished with the utmost care and precision and that all forms reflect a range of valid content at the appropriate level of difficulty.

We understand that the development of standards-based assessments will involve the collaborative efforts of PDE and our test development and psychometric specialists. Prior to test form construction, we will discuss and review with PDE the guidelines and requirements of item development and form construction. These guidelines will document the steps we will take to ensure that Pennsylvania's tests are of high-quality, are legally defensible, and meet the requirements as required by the Commonwealth. Our goal is to establish a standard process that will provide PDE the assurances that the forms meet all required content, as well as psychometric considerations.

Operational tests will be selected on the basis of the test specifications by combining expert review with intensive test construction process. The test selection software tools utilized by our content and research experts allow us to incorporate the test specification data into the item selection process. The software will help select items according to the strand weighting in the specifications and appropriate item statistics. Once test selections have been made, content experts will review the selections to confirm appropriate alignment with the test specifications while our psychometric experts review the statistical summary information. We will also submit the draft selections to PDE for approval before we begin the page-production process.

DRC will maintain comparable content across test forms by adhering to strict test development rules specifying the proportions of items selected from each content strand. The use of standardized test construction software allows us to create forms with similar test characteristic functions and standard errors of

measurement curves, and our calibration and equating designs ensure that scale scores are comparable across different forms of each test.

Our test development and psychometric staff will work extensively with PDE in the construction of all test forms so that they support either pre-administration or post-administration equating, depending on the requirements of the testing program. For programs requiring pre-administration equating, all form construction activities will focus on ensuring test blueprints are met while concurrently matching test characteristic curves and test information functions to previous forms. For post-administration equating testing programs, the selection of an internal anchor set consisting of previously administered operational items is a critical step in the test development process. Each anchor set will be selected to match the test blueprint and the test difficulty of previous operational administrations and will be used to link each newly constructed assessment to the scale of measurement defined in prior test administrations. Once the anchor set has been selected, the remainder of the assessment is selected according to the same rigorous content and psychometric specifications.

After items have been selected and reviewed by our test development and psychometric specialists for both content excellence and technical quality, the pull list and test maps for each grade and subject will be submitted to PDE for approval. After approval of the pull lists, we will attend a face-to-face meeting with PDE to finalize and sequence the forms.

Our content specialists will also check to see that the items are in compliance with the guidelines provided by PDE, including alignment to standard. At every stage of the test development process, the match of the item to the standard must be reviewed and verified since establishing content validity is one of the most important aspects in the legal defensibility of a test. As a result, it is essential that an item selected for a form link directly to the content curriculum standard to which it is measuring. Our content specialists will also verify all items against their classification codes and item maps, both to evaluate the correctness of the classification and to ensure that the given task measures what it purports to measure. In addition, our content specialists will review each item for quality, making sure that the test items are in compliance with industry guidelines for clarity, style, accuracy, and appropriateness for Pennsylvania students.

Please note that for any programs that are delivered using both online and paper/pencil administrations, we can evaluate the comparability of scores resulting from the different administration modes. With testing time at a premium and the associated impact on administration and reporting schedules, the associated cost of implementing mode comparability studies using experimental designs are often impossible to implement in large-scale assessment programs. However, our experience is that mode comparability research can be effectively implemented using propensity score matching methods, wherein matched samples are constructed to form equivalent groups. If significant modality effects are observed, equating analyses can be used to effectively account for such

differences. Until the complete transition to online testing has been made in Pennsylvania, our content and psychometric experts can assist PDE in monitoring mode comparability.

4.C.3.k. Embedded Field Testing

It is important to understand that field testing is not an evaluation of student performance. Rather, field testing of items is required to assess individual test item performance. DRC strongly believes in embedded field testing of items for future operational use. Embedding field test items within the operational assessment allows students to try out items in as close to an actual administration experience as possible. This is in contrast to appending items at the end where fatigue and motivation impact student responses, or providing a standalone field test where participation and motivation may factor heavily into student responses. With true embedding, as DRC is proposing, teachers, students, and administrators have no prior knowledge about which items are field test items. As a result, student responses are more reliable.

Embedded field testing is required to occur on an annual basis to maintain the test design proposed in the RFP. (Note: The optional Civics & Government Keystone Exams program would require a standalone field test event in its first year since an operational test does not yet exist.)

The following are proposed test map plans for the recommended placement of the embedded field test items within operational forms.

Proposed Embedded Field Test Map for PSSA and Keystone Exams

| Operational Form | # of FT Units per Form | Description of Field Test Item Location |
|------------------------------|----------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------|
| PSSA Mathematics, Grades 3–8 | 10 Multiple-Choice 1 Open-Ended | Embedded in the second of three testing sections; testing section is a mix of operational and FT items |
| PSSA ELA, Grade 3 | 1 Passage 8 Multiple-Choice 2 Evidence-Based Selected-Response 1 Short Answer | Embedded in the third of four testing sections; testing section is a mix of equating and FT items |
| PSSA ELA, Grades 4–8 | 1 Passage 8 Multiple-Choice 2 Evidence-Based Selected-Response 1 Text-Dependent Analysis Prompt | Embedded in the third of four testing sections; testing section is a mix of equating and FT items |
| PSSA Science, Grade 4 | 8 Multiple-Choice 1 Open-Ended | Embedded in both sections of a two-section test; testing sections are a mix of operational and FT items |
| PSSA Science, Grade 8 | 6 Multiple-Choice 4 Scenario-based Multiple-Choice 1 Open-Ended | Embedded in both sections of a two-section test; testing sections are a mix of operational and FT items |

| Operational Form | # of FT Units per Form | Description of Field Test Item Location |
|---------------------|------------------------------------------------------------|------------------------------------------------------------------------------------------------------|
| Keystone Algebra I | 10 Multiple-Choice 2 Constructed-Response | Embedded in both modules of a two-module test; testing modules are a mix of operational and FT items |
| Keystone Biology | 16 Multiple-Choice 2 Constructed-Response | Embedded in both modules of a two-module test; testing modules are a mix of operational and FT items |
| Keystone Literature | 2 Passages 12 Multiple-Choice 2 Constructed-Response | Embedded in both modules of a two-module test; testing modules are a mix of operational and FT items |

Field Test Analysis

DRC is well versed in the execution of all analyses in support of embedded field test designs required to support the PSSA, Keystone Exams, and CDT testing programs. Our plans include use of the Rasch measurement model and linking all embedded field test items to a common scale of measurement using common item, non-equivalent groups designs. The end result of our field test analyses includes a robust pool of high-quality items with associated item statistics that can be used for subsequent form construction activities with great confidence regardless of whether pre-administration or post-administration equating methods are used. Detailed description of our field test analysis procedures can be found in *Subheading 4.H.1.a., Operational and Field Test Analysis*.

Should funding for the Civics & Government Keystone Exams be made available, DRC can readily implement a standalone field test to support the implementation of this exam. Our plans include the development of multiple field test forms with a set of common linking items to express all items on a common scale of measurement. The end result of these analyses would be a robust pool of high-quality items with associated statistics that would be used to construct operational test forms for this new subject area. Subsequent field testing for the Civics & Government assessment would be based on embedded field test designs currently maintained for operational testing programs.

4.C.3.I. Technical Support Staff for Content Consultation

Throughout our comprehensive partnership, DRC has worked with PDE to provide the knowledge and expertise to create a cohesive assessment system, providing the support necessary to plan and implement the innovative and world-class assessment designs envisioned by Pennsylvania's leaders. Our commitment to PDE in this partnership is unshakable. Our test development team is dedicated to providing world-class customer service to guide and support PDE to implement the Commonwealth's vision for the Pennsylvania assessments.

A critical part of the continuation of our partnership is standing with PDE during its transition to the Pennsylvania Core Standards (PCS). Based on our experience and partnership in Pennsylvania, DRC is firmly grounded with a solid

understanding of the PCS that form the foundation of the new Assessment Anchors and Eligible Content (AAEC) used on the operational PSSA beginning with the spring 2015 Mathematics and ELA assessments. Since 2003, we have worked closely with PDE and with local Pennsylvania educators as decisions about assessable anchors, eligible content, and cognitive complexity have been made, and we have provided guidance and support to PDE on the development of the new PCS-based AAEC. Not only is DRC fully prepared to continue implementation of the new PCS-based content blueprint, but we are also knowledgeable of, and sensitive to, the perspectives local educators across the Commonwealth bring to the PCS-based AAEC.

Throughout the transition to a PCS-based PSSA program, DRC has worked in close cooperation with PDE to present test designs and content blueprints that fulfill the requirement that the PCS articulate across curricular, instructional, and assessment practices, cohesively integrating the Voluntary Model Curriculum, the Learning Progressions, the Classroom Diagnostic Tools, the PSSA, and the Keystone Exams. DRC is knowledgeable of the Pennsylvania assessments, the assessment anchors, and the PCS. This places us in a unique position to respond quickly to provide technical support PDE may request regarding item alignment and other field test design issues.

In addition, DRC understands that all review meetings will be facilitated by PDE and DRC. As a result, DRC will provide the necessary number of content-area and test development experienced staff to support the completion of all facilitation tasks. We understand the importance of providing the Commonwealth of Pennsylvania with staff members who have experience facilitating item content review meetings and/or supporting the facilitation of item content review meetings in Pennsylvania. We believe that PDE will be pleased with the expertise of our staff. Collectively our content-area test development staff members have successfully provided co-facilitation support to PDE for the Item Content Review meetings, Item/Data Review Committee meetings, and the Bias, Fairness, and Sensitivity Committee meetings since 2004.

4.C.4. ITEM BANK

DRC is proud to have developed one of the most comprehensive item development, banking, and form construction software applications in the industry today. Our item-banking system, IDEAS (Item Development and Educational Assessment System, patent pending), was designed and built to provide **a single, consistent repository to house all information relating to test items and passages and test forms**. This approach allows our staff from Test Development, Psychometrics, Editing Services Group, Document/Graphics Design Group, and Printing Services to work seamlessly together through a common, user-friendly system.

IDEAS provides all of the functionality required to take an item from authoring, to review, to forms construction and publications/printing. **The flexibility of the data design allows for complete client customization of the data elements**

captured and associated with the items. These data elements can range from simple item characteristics, such as grade and content area, to the most complex item statistics, rubrics, and parameters.

Some of the functionality and key features of IDEAS are highlighted in the following figure.

Key Features of IDEAS

- **Highly secure**—Protected by DRC’s corporate-wide information technology security controls. Password assignment and the sign-in process authenticate users based on project roles. Authorized users can access only the areas pertinent to their roles. An audit trail displays and documents user changes.
- **Web-based**—Allows authorized users to access its capabilities from a variety of locations, including PDE offices.
- **Fully searchable database**—Easily manage, search, and retrieve all item and passage data. Authorized users have a range of search capabilities, including the ability to define and save their own custom searches.
- **Tracking individual items and passages**—Unique item and passage identifiers enable tracking throughout the item development forms development processes.
- **Tracking development progress**—The development of the item bank can be easily and accurately monitored to ensure content coverage across and within standards.
- **Documentation of item and passage history**—Updates to items and passages occurring at any stage, including external committee reviews, are recorded. An historical record of all changes/revisions is kept throughout the life of each item/passage.
- **Streamlined test form development and publishing**—Using approved and selected items and passages, the system automatically generates print-ready files. The single repository system allows DRC staff from all necessary areas to work seamlessly together.

IDEAS provides clear benefits to our assessment clients.

IDEAS Program Benefits

- **Remote accessibility**—Web-based system will allow authorized PDE staff to access IDEAS from department offices on a 24/7 basis. PDE will be able to search and view items and passages, and print item/passage cards. Items and passages flagged by DRC will indicate the need for PDE review and response. PDE staff will be able to input questions or revisions.
- **Enhanced item/passage accuracy**—An historical record of all changes and revisions to the items will ensure that items and passages used on tests accurately reflect the input of PDE and review committees.
- **Development progress reports**—PDE and DRC will have the ability to monitor the development of the item bank to ensure development blueprints and specifications are met. Fully customized reports will reflect the status of the item bank according to PDE-designated criteria.
- **Enhanced Test Form Accuracy and Efficiency**—The single-repository system streamlines the test form development, editing, publishing, and printing processes. Automatically generated, print-ready files ensure item and passage accuracy.

The figure below illustrates the system’s home page.

IDEAS Home Page Screen

The screenshot shows the IDEAS Home Page. At the top, there is a header with the DRC logo, the title 'Item Development and Educational Assessment System (IDEAS)', and the environment 'App Environment: Production'. Below the header is a navigation bar with 'Home Search Create Action' and 'Help Preferences Logout'. The main content area is divided into sections: 'Client/State Pages' with a grid of links for various states and 'DRC Pool'; 'Search Depot' with a search input field and a 'Search List' button; and 'Depot Saved Searches' with a table listing search terms and their counts.

| Depot Saved Searches | Count | Favorites |
|---------------------------------------------------|-------|----------------------|
| Item Image/XML text search | | View |
| Item usage status | | View |
| PA Bank Search | | View |
| PSSA Item Image Text Search | | View |
| Search CR Item Creation by Date | | View |
| Search Form Creation by Date2 | | View |
| Search Graphic Creation by Client | | View |
| Search Item Creation by Date | | View |
| Search Passage Creation by Date | | View |
| Search SR Item Creation by Date | | View |

Interoperability Standards

DRC will support APIP standards within the DRC IDEAS item banking system. All items for the Pennsylvania program will be stored in our item bank, DRC IDEAS, where they are combined into forms. These items and forms are stored and used in XML format. Items can be imported or exported from any system into DRC's systems using the APIP standard. In addition, new assessment content developed under this contract will be developed to conform to all required elements in the APIP v1.0 core standards.

During item writing, item writers will include with the item content any extra information that will make the content accessible to all students. This information will be stored with the item in DRC's item banking system. Items and passages will be tagged with the meta-data that indicates changes needed to the content, display, or input method to provide appropriate accommodations.

Please see *Subheading 4.F.1.a., Compliance with Industry Interoperability Standards* for more information on DRC's compliance with interoperability standards.

System Accessibility

IDEAS offers web-based access for appropriate users to access its capabilities from a variety of locations. Security of the system and residing data is of the utmost importance. Appropriate personnel are authenticated via unique logins and passwords. This authentication also becomes the basis for determining appropriate user-authority levels in the system. Persons allowed into the system are limited to only functions that are necessary to perform their jobs.

In order for authorized users to easily manage and retrieve the immense amount of data contained in IDEAS, the system provides a range of search capabilities. A number of pre-defined searches and reports allow for rapid access to the most commonly used information. Additionally, system users have the capability to define and save their own custom searches based on nearly any field contained in the database whether it relates to items, passages, or forms. This provides an unlimited set of possibilities to users who require the ability to look at data from any angle.

PDE staff will have secure, remote, 24/7 access to IDEAS to search and view items and passages, and print item cards. The system can also be used to facilitate discussion between DRC and PDE regarding items and passages. DRC staff members will be able to attach flags to items and passages; these flags will be readily viewable and searchable by PDE staff and will indicate the need for PDE review and response. PDE staff will have the capability to insert questions or proposed revisions as comments and associate them with individual items and/or passages. When items or passages need revision, PDE will be able to print the specific item cards, make edits, and send them to the appropriate DRC team

members. This method will provide for a collaborative and efficient item/passage review and revision process.

IDEAS Security

The system is protected by a password assignment and sign-in process that authenticates users based on each person's role on the project. The item bank has an audit trail feature that displays user changes to items and documents these changes. Authorized users will be provided access only to portions of the electronic item bank pertinent to their roles. For example, mathematics test development specialists may not be allowed to view science items, while others may be restricted to read-only access. Electronic item and form information stored in IDEAS remains secure until written authorization has been received from the appropriate PDE contact to securely delete such information.

Item Development

IDEAS will be used for all item and passage authoring for the Pennsylvania assessments. After an item is submitted, the appropriate style is applied to the item. The system then allows for editing of the item by appropriate DRC personnel and maintains the item exactly as it will be presented on the paper test form or online test screen.

DRC's test development team will ask each item writer and passage writer/finder to document specific information to define the content and characteristics (metadata) of each item and passage. This information will be provided on an item/passage template and will be uploaded electronically into our IDEAS item bank, where each item and passage is assigned a unique identifier. Item-level/passage-level associations will establish links as necessary to associated artwork, items/passages, and related items. These identifiers allow IDEAS to be used to track items electronically and securely throughout the item development process and subsequent forms development process. In addition, through the use of the IDEAS, DRC's Test Development team members can track the development progress of items and passages. DRC test development specialists will monitor the development of the item bank to ensure content coverage across and within standards to provide breadth and depth of content.

The IDEAS system will ensure that all updates and revisions to items occurring at any stage of the process, including external committee reviews, are recorded. This historical record will be available to PDE at any time.

The following figure illustrates an item authoring screen displaying a non-secure item owned by DRC.

IDEAS Item Authoring Screen

The screenshot displays the IDEAS Item Authoring Screen in a Microsoft Internet Explorer browser window. The page title is "Item Development and Educational Assessment System (IDEAS) - DRC Pool". The browser address bar shows the URL: <http://itemdevvis01/ADN/Item/Edit.aspx?itemid=501205>.

The main content area is titled "Item Details" and includes the following fields:

- Item ID: 501205
- Item Status: Author
- Content Area: SCIENCE
- Grade: 11
- Save #: 11

The "Item Characteristics" section contains the following fields:

- Item Type: Multiple Choice
- Subject: Chemistry
- Standard 1: [Empty]
- Standard 2: [Empty]
- Key: C
- Points: 1
- Est. Difficulty Level: Medium
- Achievement Level: [Empty]
- Cognitive Level: [Empty]
- Bloom's Level: 2
- Depth of Knowledge: 2
- Calculator: Neutral
- Item Description: [Empty]
- Focus: [Empty]
- Category 1: [Empty]
- Category 2: [Empty]
- State-Specific: False

The question area displays two atomic diagrams labeled "sodium" and "chlorine". The sodium diagram shows a nucleus with "P: 11" and three concentric electron shells. The chlorine diagram shows a nucleus with "P: 17" and three concentric electron shells. Below the diagrams is the question:

1. Which statement describes what happens to the electrons in sodium and chlorine when table salt (sodium chloride) is formed?

The options are:

- Sodium and chlorine electrons are shared.
- Sodium and chlorine electrons fuse together.
- Sodium loses an electron, and chlorine gains an electron.
- Sodium electrons gain energy, and chlorine electrons lose energy.

At the bottom of the screen are buttons for "Print", "Preview", "Open Editor", "Save", and "Cancel".

Form Building/Test Construction

All item/passage history is maintained in IDEAS. IDEAS allows for users with the proper authorization to review the entire "life history" of the item. After each administration of the item (including field testing), the statistics on the performance of the item are added to its history for use in future test construction. This allows access, in one place, for all information on that item.

The form building capability of IDEAS includes the production of summary test sheets/reports (e.g., test maps) that list all components of the item-set for the forms. These summary sheets display each item (i.e., the stem, options, associated graphics) and all item-level information needed for test construction.

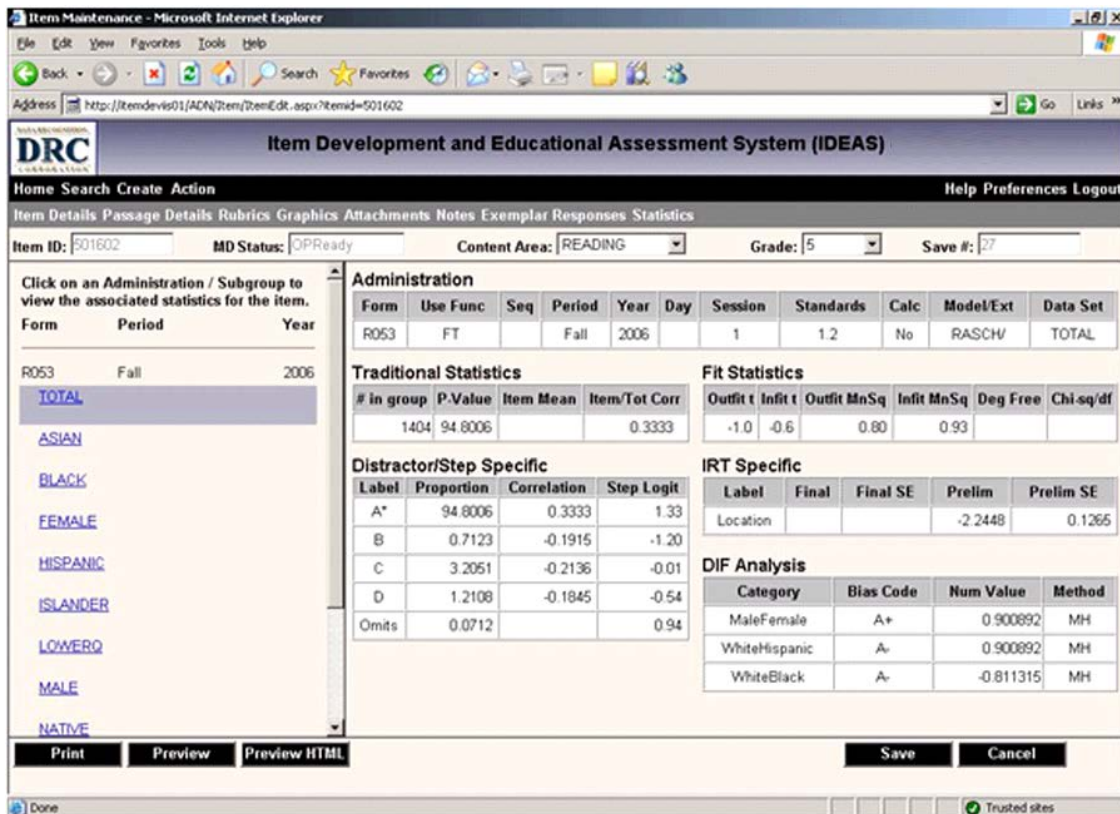
For paper-based tests, print-ready test forms are created directly from IDEAS. An automated function uses the test summary sheet to pull items/prompts/ passages directly from the bank and places them sequentially on a test form. Test Development and Document/Graphic Design Group staff then work jointly to add any other necessary components (demographics pages, test instructions, etc.) to the test form. Once all of the necessary components are in place, the system automatically generates print-ready files. Thus, the test publishing process is almost entirely automated, which markedly streamlines the overall workflow and provides for the highest quality and efficiency.

For computer-based tests, IDEAS, together with our online testing engine, DRC INSIGHT, allow for the creation, editing, and display of online test items. Using the IDEAS item bank, test developers can view how items will appear when presented to students through the DRC INSIGHT system. The online presentation can be viewed early in the development process, also allowing for quick format updates when necessary.

IDEAS does not allow an item with a status of *released*, *rejected*, or *retired* to be placed on a form. The system has safeguards in place so that released items are never included or moved back to the operational item pool.

The figure below illustrates the system’s item statistical display capabilities.

IDEAS Item Statistical Display



Item Bank Status and Reports

DRC acknowledges that PDE will require a report of the current status of the Pennsylvania item bank following each spring test administration. The report will include information summarizing the item status of all of the items in the item bank by content area, Assessment Anchor and Eligible Content (AAEC), DOK level, and PLD. The Item Bank Status and Reports (IBSR) will be provided on a date mutually agreed upon by PDE and DRC.

DRC recommends that the IBSR should be produced for PDE after the completion of data review following the test administration so that the report includes the status of the items that appeared on the most recent test administration. At each data review, committees of Pennsylvania educators will evaluate the performance of the most recent field test event, and items will be categorized as approved for operational use or rejected from further consideration.

An IBSR produced following the data review will allow PDE to digest the summary results of the completed test development cycle. Further, DRC recommends that the IBSR also should be produced in advance of the annual development of the operational test forms so that PDE can consider this information when approving both the core and the pool of field test items.

DRC’s Test Development group will create the IBSR for PDE based on information taken from the Pennsylvania item banking software, IDEAS. The report will be in Microsoft Excel format allowing PDE to use the tools and features of Excel to dynamically examine the status of the item bank. DRC will work with PDE to determine the exact layout and format of the IBSR. The following figure shows an initial mock-up of what the Pennsylvania IBSR might look like.

Mock-Up of the Proposed IBSR

| Do Not Duplicate | | | PA IBSR Mockup | | | Secure Material | | | |
|---------------------|---------------------|---------------|----------------|-------|-------|-----------------|-------|-------|-------|
| Mathematics—Grade 5 | | | DOK Level | | | PLD | | | |
| AAEC | Item Status | Status Totals | DOK 1 | DOK 2 | DOK 3 | PLD—BB | PLD—B | PLD—P | PLD—A |
| A-T.1.1.1 | EXTERNAL | 7 | 2 | 3 | 2 | 1 | 2 | 3 | 1 |
| | FTREADY | 7 | 2 | 3 | 2 | 1 | 3 | 2 | 1 |
| | Status Subtotal = | 14 | 4 | 6 | 4 | 2 | 5 | 5 | 2 |
| | OPREADY (used) | 15 | 4 | 6 | 5 | 2 | 5 | 5 | 3 |
| | OPREADY (not used) | 5 | 2 | 1 | 2 | 1 | 2 | 1 | 1 |
| | REJECTED | 1 | 0 | 0 | 1 | 0 | 1 | 0 | 0 |
| | RETIRED | 3 | 2 | 0 | 1 | 1 | 0 | 1 | 1 |
| | RELEASED | 6 | 2 | 2 | 2 | 1 | 2 | 2 | 1 |
| | Status Subtotal = | 30 | 10 | 9 | 11 | 5 | 10 | 9 | 6 |
| | DOK and PLD Total = | | 14 | 15 | 15 | 7 | 15 | 14 | 8 |
| Status TOTAL = | 44 | | | | | | | | |
| AAEC | Item Status | Status Totals | DOK 1 | DOK 2 | DOK 3 | PLD—BB | PLD—B | PLD—P | PLD—A |
| A-T.1.1.2 | EXTERNAL | 6 | 1 | 4 | 1 | 1 | 2 | 2 | 1 |
| | FTREADY | 6 | 2 | 2 | 2 | 2 | 1 | 2 | 1 |
| | Status Subtotal = | 12 | 3 | 6 | 3 | 3 | 3 | 4 | 2 |
| | OPREADY (used) | 15 | 4 | 6 | 5 | 3 | 4 | 5 | 3 |
| | OPREADY (not used) | 5 | 2 | 1 | 2 | 1 | 2 | 1 | 1 |
| | REJECTED | 1 | 0 | 0 | 1 | 0 | 0 | 1 | 0 |
| | RETIRED | 3 | 2 | 0 | 1 | 1 | 0 | 1 | 1 |
| | RELEASED | 6 | 2 | 2 | 2 | 1 | 2 | 2 | 1 |
| | Status Subtotal = | 30 | 10 | 9 | 11 | 6 | 8 | 10 | 6 |
| | DOK and PLD Total = | | 13 | 15 | 14 | 9 | 11 | 14 | 8 |
| Status TOTAL = | 42 | | | | | | | | |

Monitor the Item Bank

The results of each administration of each test form developed under this contract will be used to update the calibrated item bank for the assessments. As part of this process, DRC will monitor the item bank at prescribed times to identify the DOK and PLD levels of the items developed at each AAEC. This monitoring process will be an integral part of determining future item development orders for each content/course area.

The item bank will be monitored at prescribed times during the item and test development process at periods when understanding the status of the item bank will benefit a specific step in the item development process. Understanding the status of the bank will help PDE and DRC to make objective decisions about future plan and about the results of previous initiatives.

An IBSR produced following the data review but before the core items are selected will allow PDE to digest the summary results of the completed test development cycle.

Item Bank Status and Reports of New Items Following Item Review

Items must be provided in sufficient quantity under this contract so that enough items survive the new item content and new item bias reviews (including reviews for alignment to standard, PLD, DOK, and bias issues such as gender, race, culture, religion, etc.). DRC understands that PDE holds high standards for quality and that DRC will need to conduct the committee reviews in support of this high standard for quality.

As part of that process, DRC recommends that the IBSR should be produced in advance of the annual creation of the new field test item order so that DRC can consider this information when determining the scope and characteristics of the items that need to be developed for the next field test administration. By understanding the status of the entire item bank for a content area at a grade or course, DRC will understand the needs of the item bank respective to each AAEC. This knowledge will inform the nature of the item development process, leading to focused item review meetings with Pennsylvania educators approving items that are in demand.

User Manual and Reference Guide

DRC has developed a User Manual for the IDEAS system that guides users through the following steps:

- Section 1: Logging In
- Section 2: Changing Your Password
- Section 3: Navigating the Home Page
- Section 4: Working with Application Preferences

- Section 5: Logging Out
- Section 6: Searching IDEAS
- Section 7: Working with Items and Passages
- Section 8: Additional Information

DRC will work with PDE to update the User Manual to meet PDE's needs, and to develop a Quick Reference Guide that summarizes key content from the User Manual.

System Requirements

DRC will provide technical system documentation that includes usage, system requirements, use of third-party software, and other requirements as directed by PDE. We are very familiar with developing and documenting system specifications for DRC's systems.

Online Web-based Training

Please see *Section 6, Training* for details on DRC's web-based training for IDEAS.

4.C.5. PSSA ITEM AND TEST DEVELOPMENT PROCESS

PSSA tests contain items that perform different roles within the test design, including core, equating block (EB), and field test (FT) roles. These functions are specific and meet specific needs outlined in the PDE-approved test design. The test design also prescribes the specific number of items required to fulfill each role.

Core items fill both SR/MC and CR/OE core positions on the PSSA operational test and count towards determining students' test scores. These are required in specific quantities to provide results of student performance measured against Pennsylvania standards. Core items are previously field tested items that have been approved for operational use based on the performance observed during the field test event. Core items can be made core items directly from the most recent field test event, or core items can come from the item bank (having been previously banked following an earlier field test event.) Core positions can also be filled from previous core uses. If the core position is filled with an item that was used in a core position from the most recent administration, that core item is said to be a core-to-core link. The core-to-core linking items are used within the scaling and equating analyses to link performance on each newly administered PSSA to the reporting scale maintained for the testing program.

Equating block items are also required by the PSSA test design. The EB items are used to further strengthen the link between each newly administered PSSA and the reporting scale of measurement within the equating analyses. To limit item

exposure, overall test length, and student seat time, EB items are only used in MC positions. Also, EB items do not count in determining students’ overall test score.

Field test items are also required by the PSSA test design. For the purposes expressed in the RFP, FT items are to be embedded within the operational PSSA test forms. With the exception of some ELA items (which were already developed under standalone field test events in 2013 and 2014), all item types will appear embedded within an operational test form. FT items do not count in determining students’ overall test score.

Mathematics Test Development Design

As shown in the operational layout tables below, DRC will continue to develop the PSSA mathematics test to be three (3) sections as began in 2015. Due to the role of calculators on the assessment, the design for grade 3 varies from grades 4 through 8. Due to demands of the standards, calculators are not allowed on the grade 3 test. At grades 4 through 8, only a portion of the test is considered to be “non-calculator.” At all grades, the PCS-mathematics core can be described as the following (core linking values are approximate):

PCS-Mathematics Core

| | |
|-----------------------|-------------------------------|
| 60 core MC items | 60 (~16 core linking) points |
| 3 core 4 pt. OE items | 12 (~4-8 core linking) points |
| Total | 72 points |

Mathematics Operational Section Layout Plan for Grade 3

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR | OE/CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|---------|------------------|-----------------|-------------------------------------------------------------------------|-----------------|----------------------------|---------------------------------------------|
| 1 | Mathematics | 24 | 24–core items | 2 | 2–core items | 56 |
| 2 | Mathematics | 24 | 12–core items 2–equating block items 10–embedded field test items | 1 | 1–embedded field test item | 46 |
| 3 | Mathematics | 24 | 24–core items | 1 | 1–core item | 46 |

Mathematics Operational Section Layout Plan for Grades 4 through 8

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR | OE/CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|---------|------------------|-----------------|------------------------------------------------------------------------|-----------------|----------------------------|---------------------------------------------|
| 1 | Mathematics | 24 | 23–core items (includes 4 non-calc) 1–non-calc field test item | 2 | 2–core items | 56 |
| 2 | Mathematics | 24 | 13–core items 2–equating block items 9–embedded field test items | 1 | 1–embedded field test item | 46 |
| 3 | Mathematics | 24 | 24–core items | 1 | 1–core item | 46 |

Note that DRC understands that PDE treats the PCS-aligned Eligible Content for Mathematics as assessment limits for the purpose of item and test development rather than as the sole statement to which an item must align. Both open-ended and multiple-choice mathematics items can align to one or more Eligible Content, Descriptors, or Assessment Anchors, which allows for richer, more authentic assessment items.

ELA Test Development Design

As shown in the operational layout tables below, DRC will continue to develop the PSSA ELA test to be four (4) sections as began in 2015. Due to the different roles of short answer (SA) and text-dependent analysis (TDA) items, the design for grade 3 differs from the design of grades 4 through 8. SA items are used at grade 3 only, and TDA prompts are used at grades 4 through 8 only. At grade 3, the PCS-ELA core can be described as follows (core linking values are approximate).

ELA Test Development Design—Grade 3

| | |
|-----------------------------|--------------------------------|
| 20 core passage MC items | 20 (~8–10 core linking) points |
| 18 core standalone MC items | 18 (0 core linking) points |
| 2 core 2 pt. EBSR items | 4 (0 core linking) points |
| 2 core 3 pt. EBSR items | 6 (0 core linking) points |
| 2 core 3 pt. SA items | 6 (~0–3 core linking) points |
| 1 core 4 pt. Writing Prompt | 8 (weighted x2) |
| Total | 62 points |

ELA Operational Section Layout Plan for Grade 3

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR/WP/SA | OE/CR/WP/SA Item Breakdown | Estimated Number of Passages | Estimated Section Testing Time (in Minutes) |
|---------|----------------------|---------------------|-----------------------------------------------------------------|-----------------------|----------------------------------------|------------------------------|---------------------------------------------|
| 1 | Writing and Language | 20 MC | 18 core items 2 psychometric use | 1 | 1 core item 4 pt. WP | 0 | 60 |
| 2 | Reading | 8–12 MC 1–3 EBSR | 8–12 core MC 0–2 2 pt. EBSR 0–2 3 pt. EBSR | 1 | 1 core item 3 pt. SA | 2 | 34–50 |
| 3 | Reading | 14 MC 2 EBSR | 6 MC psychometric use 8 MC embedded FT 2 EBSR embedded FT | 1 | 1 embedded field test item 3 pt. SA | 2 | 48 |
| 4 | Reading | 8–12 MC 1–3 EBSR | 8–12 core MC 0–2 2 pt. EBSR 0–2 3 pt. EBSR | 1 | 1 core item 3 pt. SA | 2 | 34-50 |

At grades 4–8, the PCS-ELA core can be described as the following (core linking values are approximate):

ELA Test Development Design—Grades 4–8

| | |
|-----------------------------|--------------------------------|
| 23 core passage MC items | 23 (~5–10 core linking) points |
| 18 core standalone MC items | 18 (0 core linking) points |
| 3 core 2 pt. EBSR items | 6 (0 core linking) points |
| 3 core 3 pt. EBSR items | 9 (0 core linking) points |
| 1 core 4 pt. TDA | 16 (weighted x4) |
| 1 core 4 pt. Writing Prompt | 12 (weighted x3) |
| Total | 84 points |

ELA Operational Section Layout Plan for Grades 4–8

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR/WP/TDA | OE/CR/WP/TDA Item Breakdown | Estimated Number of Passages | Estimated Section Testing Time (in Minutes) |
|---------|-------------------------------------|----------------------|-----------------------------------------------------------------|------------------------|-----------------------------------------|------------------------------|---------------------------------------------|
| 1 | Writing and Language | 20 MC | 18 core items 2 MC psychometric use | 1 | 1 core item 4 pt. WP | 0 | 60 |
| 2 | Reading | 15–18 MC 4–5 EBSR | 15–18 core MC 2–3 2 pt. EBSR 2–3 3 pt. EBSR | 0 | N/A | 3 | 58–69 |
| 3 | Reading and Text-Dependent Analysis | 14 MC 2 EBSR | 6 MC psychometric use 8 MC embedded FT 2 EBSR embedded FT | 1 | 1 embedded field test item 4 pt. TDA | 2 | 73 |
| 4 | Reading and Text-Dependent Analysis | 5–8 MC 1–2 EBSR | 5–8 core MC 0–1 2 pt. EBSR 0–1 3 pt. EBSR | 1 | 1 core item 4 pt. TDA | 1 | 48–57 |

Science Test Development Design

As shown in the operational layout tables below, DRC will continue to develop the PSSA Science test to be two (2) sections. Due to the use of scenarios, the design for grade 4 differs from the design of grade 8. Scenarios are used at grade 8 only. At both grade 4 and grade 8, the PSSA Science core can be described as follows (core linking values are approximate).

Science Test Development Design—Grades 4 and 8

| | |
|-----------------------|------------------------------|
| 58 core MC items | 58 (~16 core linking) points |
| 5 core 2 pt. OE items | 10 (~4 core linking) points |
| Total | 68 points |

Science Operational Section Layout Plan for Grade 4

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR | OE/CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|---------|------------------|-----------------|-----------------------------------------------------------------------|-----------------|--------------------------------------------|---------------------------------------------|
| 1 | Science | 34 | 29 core items 1 equating block item 4 embedded field test items | 3 | 3 core items | 49 |
| 2 | Science | 34 | 29 core items 1 equating block item 4 embedded field test items | 3 | 2 core items 1 embedded field test item | 49 |

Science Operational Section Layout Plan for Grade 8

| Section | Content Emphasis | Number of MC/SR | MC/SR Item Breakdown | Number of OE/CR | OE/CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|---------|------------------|-----------------|---------------------------------------------------------------------------------------------------------------------|-----------------|--------------------------------------------|---------------------------------------------|
| 1 | Science | 35 | 27 core items 4 embedded field test scenario-based items 1 equating block item 3 embedded field test items | 3 | 3 core items | 56 |
| 2 | Science | 35 | 27 core items 4 core scenario-based items 1 equating block item 3 embedded field test items | 3 | 2 core items 1 embedded field test item | 56 |

DRC understands that the items that appear on the 2015 PSSA test onward will reflect the Pennsylvania Core Standards (PCS) for Mathematics and English language arts. For science, the PSSA test will continue to reflect the Pennsylvania Academic Standards. It is also important to note that the verbs and action statements within the stems of mathematics CR items can reflect the PCS directly from the statements contained in the Eligible Content, the Anchor Descriptor, or the Assessment Anchor.

DRC understands the per-form test designs contained in the RFP. Below is DRC’s proposal for implementing the PSSA test design for the mathematics and ELA assessments for 9 field test forms per grade, and science assessments for 12 field test forms per grade as specified in the RFP.

Mathematics Test Design for 9 Operational Forms

| Grade | Multiple-Choice | | | | Open-Ended | | | |
|------------|-----------------|-----------------------|---------------------------|-------------|----------------------|----------------------|---------------------------|-----------|
| | Total Core | Total Equating Block* | Total Embedded Field Test | Total | Total Core (4 point) | Total Equating Block | Total Embedded Field Test | Total |
| 3 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| 4 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| 5 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| 6 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| 7 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| 8 | 60 | 18 | 90 | 168 | 3 | 0 | 9 | 12 |
| All | 360 | 108 | 540 | 1008 | 18 | 0 | 54 | 72 |

*Not all equating block items will be unique on all forms.

English Language Arts Test Design for 9 Operational Forms

| Grade | Selected-Response | | | | | | | Constructed-Response | | | | | | |
|-------|------------------------------------|------------------|------------------|---------------|----------------------------------------|-------------|------------------|---------------------------------|-----------------|-------------|---------------------|-------------------------------|-------------|-------|
| | Passage-Based Multiple-choice (MC) | | | Standalone MC | Evidence-Based Selected-Response (ESR) | | Total | Passage-Based Short-Answer (SA) | | | Writing Prompt (WP) | Text-Dependent Analysis (TDA) | | Total |
| | Core | Equating Block* | Embedded FT | Core | Core | Embedded FT | | Core | Equating Block* | Embedded FT | Core | Core | Embedded FT | |
| 3 | 20 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 4 | 18 | 150 (16 pass) | 2 | 0 | 9 | 1 | 0 | 0 | 12 |
| 4 | 23 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 6 | 18 | 155 (16 pass) | 0 | 0 | 0 | 1 | 1 | 9 | 11 |
| 5 | 23 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 6 | 18 | 155 (16 pass) | 0 | 0 | 0 | 1 | 1 | 9 | 11 |
| 6 | 23 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 6 | 18 | 155 (16 pass) | 0 | 0 | 0 | 1 | 1 | 9 | 11 |
| 7 | 23 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 6 | 18 | 155 (16 pass) | 0 | 0 | 0 | 1 | 1 | 9 | 11 |
| 8 | 23 (4 pass) | 18 (3 pass) | 72 (9 pass) | 18 | 6 | 18 | 155 (16 pass) | 0 | 0 | 0 | 1 | 1 | 9 | 11 |
| Total | 135 (24 pass) | 108 (18 pass) | 432 (54 pass) | 108 | 34 | 108 | 925 (96 pass) | 2 | 0 | 9 | 6 | 5 | 45 | 67 |

*Not all equating block items will be unique on all forms

Science Test Design for 12 Operational Forms

| Grade | Multiple-Choice | | | | | | Open-Ended | | | |
|-------|-----------------|---------------------------|-----------------------|---------------------------|------------------------------------------|-------|----------------------|----------------------|---------------------------|-------|
| | Total Core | Total Core Scenario-Based | Total Equating Block* | Total Embedded Field Test | Total Scenario-Based Embedded Field Test | Total | Total Core (2 point) | Total Equating Block | Total Embedded Field Test | Total |
| 4 | 58 | 0 | 24 | 96 | 0 | 178 | 5 | 0 | 12 | 17 |
| 8 | 54 | 4 | 24 | 72 | 48 | 202 | 5 | 0 | 12 | 17 |
| Total | 112 | 4 | 48 | 168 | 48 | 380 | 10 | 0 | 24 | 34 |

*Not all equating block items will be unique on all forms

Item and Test Development Process

The item and test development process requires a cohesive development approach blending what may appear to be discrete processes into a single, seamless development cycle. Steps involving item writing, item editing, stimulus creation, item reviews (by PDE and by committee), test administrations, rangefinding, and data reviews must be understood as a whole to understand the relation of the parts. In the diagram that follows, DRC presents the primary item and test development cycle as a visual representation of the many steps involved in this complex and dynamic process. Additional information about these steps is contained in the sections that follow.

DRC's Item and Test Development Primary Cycle

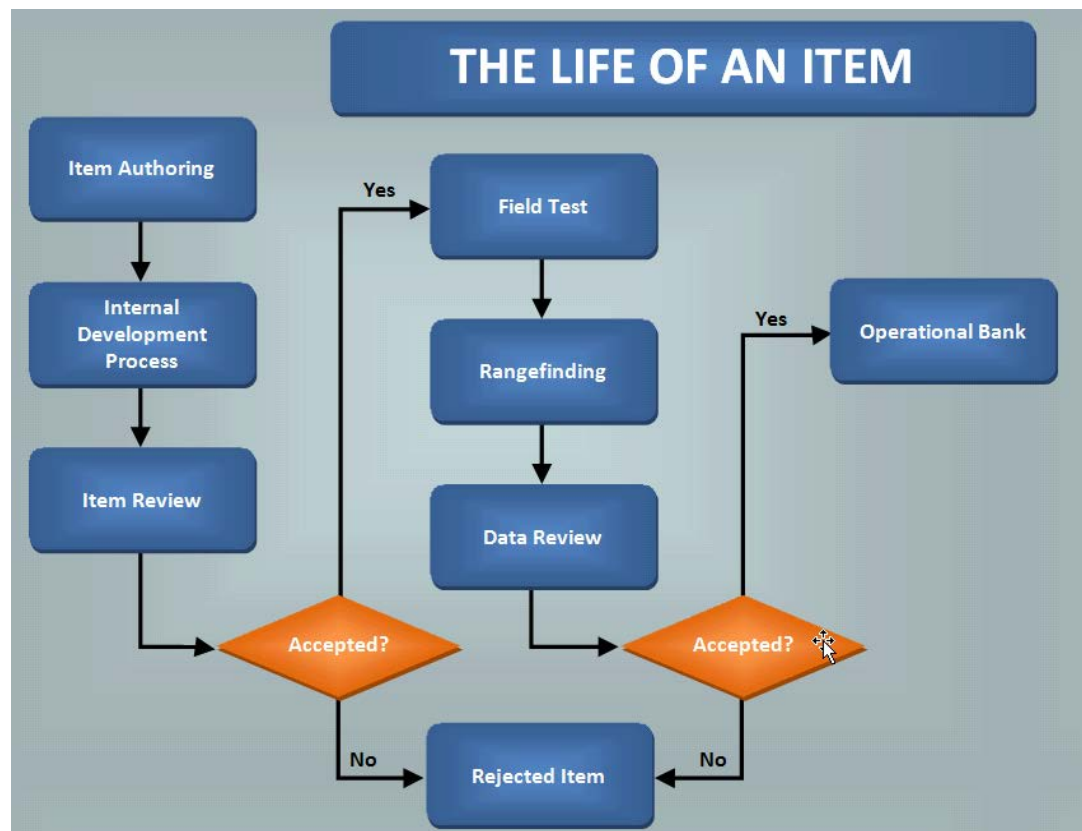


Item Development Process—Narrative Work Plan

This section presents our narrative work plan for the PSSA (the Keystone Exams program also mirrors these steps), including the tasks required for the development of items, passages, etc. Our model or work plan for item development follows the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 2014) since items are developed to reflect the range of cognitive ability inherent in the standards, resulting in reliable and instructionally valid tests. In addition, our item development work plan also adheres to the Principles of Universal Design, and it reflects that we clearly understand how items and tests must lend themselves to accessibility by diverse groups of students and function appropriately across a broad range of test administration accommodations.

The Life of an Item

The item development work plan is organized to mirror the life cycle of a test item as it moves from item authoring through review processes to its operational use. PDE and/or Pennsylvania educators will be active leaders and participants in each step of the process. The figure below provides a visual representation of the general life cycle of a test item.



The Work Plan for Developing Items

The work plan provides detail associated with each major task in the item development process from the initial meeting with PDE to confirm our understanding of the item development requirements of the program to the final approval of items, passages, etc., by PDE for potential field testing. The work plan outlined below and discussed on the following pages of our proposal will be revised on a yearly basis to meet the specific needs and requirements of the program and PDE staff. The item development work plans for the Keystone Exams and CDT follow many of the same steps as the PSSA development.

Work Plan Tasks

1. Meet with PDE for item development planning meeting
2. Select and train item writers
3. Develop items and passages, including graphics
4. Review and revise items prior to submission to PDE (internal editing checks)
5. Prepare items for review by PDE
6. Prepare all materials for new item review meetings
7. Support PDE with the new item review committee meeting processes
8. Prepare written summary reports of the new item review meetings
9. Revise items and conduct internal review process (Face-to-Face Review)
10. Select items for field testing; submit selections to PDE for approval

Work Plan Task Number 1—Item Development Planning Meeting

Prior to beginning the item development process, we propose to meet with PDE to confirm our team's understanding of the item development needs of the program for each year (e.g., number of items per a given standard or anchor, number of selected-response items and constructed-response items per each passage, types of scenarios), including the plan for the number of items to be embedded in field test item positions each spring. The meeting will also include a review of all steps in the PDE item approval process and include an overview of our item writing training materials, bias, fairness, and sensitivity guidelines, universal design guidelines, etc., in order to receive feedback from PDE. We will also receive feedback from PDE as to whether there will be any changes to style, item specifications, and target complexity levels.

Prior to meeting with PDE and prior to beginning the item development process for each year's cycle of development, DRC will analyze and update the bank of items, passages, scenarios, etc., to determine status of the bank. Prior to developing a plan for item development, we will review each item and the previous year's field tested items added to the existing PDE item bank for the following criteria:

- Match to Assessment Anchor and Eligible Content
- Cognitive level alignment
- Depth-of-knowledge alignment
- Performance Level Descriptors
- General technical quality, including adherence to industry standard quality guidelines, along with adherence to PDE’s guidelines
- Adherence to the psychometric guidelines of the Pennsylvania assessments
- Adherence to Principles of Universal Design
- Freedom from issues of bias, fairness, and sensitivity
- Other criteria as required by PDE

Based upon our analysis of the bank, we will generate a preliminary plan that will include an overview of the creation, review, and approval processes, as well as a projected schedule for development of items, scenarios, etc., including the format of items, scenarios, etc., to be developed for PDE review and subsequent committee reviews by Pennsylvania educators.

We will then provide the information to PDE with our recommendation as to how best to target the item writing development each year to meet the need for the number of items, passages, scenarios, etc., as required in the RFP.

Work Plan Task Number 2—Select and Train Item Writers

For all newly developed items, our item development team will prepare item writing training materials and train item writers. We welcome the opportunity for PDE staff to attend and monitor internal item-writing training should PDE request. Costs for attendance could be discussed upon contract award. After training, our item development team will assign writers to begin the process of writing items, passages, scenarios, etc.

Strong PSSA and Keystone Exams assessment systems are built upon sound assessment items that are instructionally sensitive and that align to the Pennsylvania standards (PCS and PAS)—all of which begin with the selection and training of knowledgeable and experienced item writers who have training in developing items that are developmentally appropriate and accessible to all students. DRC’s item development team is committed to providing PDE with items that provide the optimal alignment to Pennsylvania’s standards (PCS and PAS) that establish clear, focused expectations for grade-level performance by tightly defining the rigor required for grade-level proficiency. This commitment to excellence is reinforced at all steps in the item writer selection and training process. These assurances will also be met through the annual review and

refinement of the item specifications and adherence to our item and test development processes, which are designed to ensure alignment.

In the sections below, we outline our proposed approach to the development of items and passages for each subject. This includes additional information about the selection and training of item writers.

Work Plan Task Number 3—Develop Items and Passages, Including Graphics

For all newly developed items, item writers will develop items aligned to the appropriate Assessment Anchors and Eligible Content. Items will meet PDE-approved style guidelines and item specifications. Items, including all associated stimulus scenarios, graphics, and passages, will be entered into IDEAS, our item-banking system, following all PDE-approved item characteristic requirements. Distractor analysis; assessment anchor or academic standard code for what each item measures; depth-of-knowledge; estimated item difficulty; answer key for MC items and answer keys for EBSR items; scoring guidelines for any open-ended (OE), any text-dependent analysis (TDA), and writing prompt items; and any associated artwork or graphic will also be entered into the system.

Content Overview

For the PSSA, DRC will develop mathematics items for grades 3 through 8, ELA items for grades 3 through 8, and science items for grades 4 and 8. DRC's Small Diverse Business partner, Victory Productions, will participate in the development of standalone multiple-choice items in mathematics and science and passage-based multiple-choice items in ELA. All items will be developed to meet Pennsylvania specifications. Each item will have its associated metadata, including: a unique item number, content area, grade level, reporting category, assessment anchor, sub-anchor, eligible content, focus, item type, eligibility for the calculator section, Webb's depth of knowledge, PLD, estimated difficulty, and answer key for single-key multiple-choice items, keys for evidence-based selected-response items, and rubrics and scoring guides for constructed-response items, including short-answer and text-dependent analysis items and writing prompts. The trained content experts developing the items will ensure that items are grade-level appropriate. Items will be entered into IDEAS, our item-banking system.

Steps in the Mathematics Development Process

Training Activities

Both DRC and Victory Production believe that providing a comprehensive training program designed specifically for potential item writers to gain knowledge of the item writing process is a vital component in ensuring quality control in the item development process. Before the first item of a development cycle is written, all levels of the item and test development staff will participate in training. For the development of mathematics items, the training will be organized and conducted by **Dr. John Selisky, Director of Mathematics Content** and

Mr. Darren Slack, Mathematics Content Lead at DRC. The training will include a general overview of Pennsylvania items and style and any new development guidelines for the current cycle, based on decisions of PDE. This training is designed to provide an orientation to the task, specifications, and style *in advance of development*. The general overview will serve as a review to the majority of team members, because the PSSA and Keystone Exams development projects have had stability of personnel over the years. This initial training fits into a larger network of staff training achieved through ongoing feedback with PDE throughout the development process and immediate communication about any changes to development specifications. In addition, role-specific training is delivered as described below.

Training of Item Writers

DRC proposes the use of a combination of both in-house and contract item writers for PSSA and Keystone Exams mathematics item writing as well as Victory Productions for PSSA mathematics multiple-choice item writing. Item writers receive training in the understanding of the Pennsylvania anchors and eligible content, the expectations for alignment to the Pennsylvania anchors, the item specifications, the Pennsylvania style guide, best practices for writing technically sound items, searching for and documenting authentic data to use in items, and using IDEAS, the item-banking system. All writers will be trained at the start of the development cycle, even if they have worked on the project previously. Item writers and editors will receive a training manual at the start of each development cycle. In addition, the content lead will hold regular meetings with item writers to give feedback and discuss common issues that arise during the item-writing process.

During the training, examples of items will be provided. It has been the experience of DRC content-area item and test development staff that writers need to be aware of the reasons why items might be rejected. Providing sample items during the item writing training workshop will allow writers to have a better understanding of what makes a high-quality and technically sound test item.

The writers on the mathematics development team represent a mix of professionals, some of whom have expertise across the grades, and others who are specialists at particular grade spans. Assignments are made so that each assessable anchor reflects the thinking of multiple writers; that is, unless the item order calls for only one or two items in a particular eligible content, no single writer will develop all the items for an assessment anchor.

Item Writing

Once a writer has been trained and an item assignment has been received, the writers will follow the item writer/editor guidelines and Pennsylvania style guide when writing their items. The following fields of information are completed by the item writer within DRC's item-banking system, IDEAS (please refer to

Subheading 4.C.4. Item Bank in this section for more information regarding IDEAS).

Item Banking System Fields

- Alignment
- Depth of Knowledge
- Estimated difficulty
- Performance Level Descriptors
- Focus
- Calculator usage (determined by the anchor but flagged by the writer)
- Graphics flag (item contains graphics)
- Stem
- Answer choices
- Answer choice rationales
- Correct answer
- Exemplar response (for open-ended items)
- Source (if necessary)
- Writer notes (optional)

Using the item-authoring tools within IDEAS, the item writer will input the item's text, answer options, and distractor rationales directly into the system. The writer can enter expressions, formulas, equations, and symbols via a MathFlow™ plug-in that works seamlessly with IDEAS. For items requiring graphics, the writer enters a description of the graphic in a notes field and checks a box indicating that a graphic needs to be created. The writer may sketch out the idea for the graphic and send it to the desktop publisher via facsimile or via scanning-to-email technology within DRC's secure email system. In addition, all contract and vendor item writers will be required to sign a Confidentiality Statement in which they agree to treat all materials and communication related to item development as confidential and not to disclose the content of the materials or the communication about item development.

Special Note: Mathematics Constructed-Response Items

DRC understands that PDE desires that constructed-response items for mathematics and Algebra I present real-life and mathematical situations that necessitate that students use mathematical abilities solve problems. They are also unique in that they may also incorporate the use of tools (like graphing functions) and manipulatives (rulers, protractors, etc.) as part of the development of the

student response. DRC is committed to incorporating PDE's vision that mathematics constructed-response items may measure content from within an anchor (measuring two or more anchor descriptors within a single anchor) or across more than one anchor (measuring two or more anchor descriptors from more than one anchor). In addition, DRC proposes for PDE's consideration that Eligible Content may be viewed as the assessment limits for these items.

Steps in the English Language Arts Development Process

Training Activities

As in mathematics, all levels of the item and test development staff will participate in training before the development cycle begins. This training will be organized and conducted by **Ms. Anne Kirpes, DRC Reading Director; Ms. Kara Courtney, DRC ELA Director; Mr. Chris Scalercio, Keystone Exams Content Lead; and Mr. Paul Diorio, PSSA Content Lead**. The training will follow the same process as described in mathematics, but it will also include special consideration of the passage genre and how the assessable anchors and eligible content relate to each genre. In addition, the set of items developed for a passage must span assessment anchors and eligible content and depth-of-knowledge levels. In addition, Ms. Anne Kirpes and the DRC ELA Team have been instrumental in the creation of the Evidence-Based Selected Response and Text-Dependent Analysis item types for Pennsylvania, so the expertise of DRC's ELA Team will be critical in the development of these complex items, as they require analysis, evaluation, and judgment and must focus on ideas and concepts that are a critical part of and at the core of each passage.

Training of Item Writers

As with mathematics, DRC uses a combination of both in-house and contract item writers for PSSA and Keystone Exams item writing in addition to the expertise of Victory Productions for the development of multiple-choice items for the PSSA. DRC and Victory Productions employ writers who can develop items across grade level spans, and item writing assignments are based on the writer's grade-span expertise. All contract item writers sign a Confidentiality Statement in which they agree to treat all materials and communication related to item development as confidential and not to disclose the content of the materials or the communication about item development.

Item writers receive training in the understanding of the Pennsylvania anchors and eligible content, the expectations for alignment to the Pennsylvania anchors, the item specifications, the Pennsylvania style guide, depth-of-knowledge, the importance of avoiding cueing and overlap among items within a set of items for a given passage, and the use of IDEAS for item submission.

Item Writing

As with mathematics, passage-based ELA item writers will input items, stems, answer options, and distractor rationales directly into IDEAS, our item-banking

system. Other pertinent information associated with the item (e.g., depth of knowledge, estimated difficulty, focus) will also be entered.

Special Note: Text-Dependent Analysis Questions

DRC understands that unlike a standard writing prompt, PDE uses Text-Dependent analysis (TDA) questions in a unique way to require students to provide an analysis of a reading passage or passage set that the student has read during the test event. DRC will seek to provide PDE with the TDA prompts that are consistent with PDE's vision and requirements and, as such, will develop TDA prompts so that students must draw on basic writing skills while inferring and synthesizing information from the passage (making use of and referencing content from the passage to support the analysis) in order to develop a comprehensive, holistic essay response. DRC understands that the demand required of a student's reading and writing skills in response to a TDA coincides with the similar demands required for a student to be college and career ready. TDA prompts will be scored on four point scale, and, based on consultation and approval from PDE, the raw scores will be weighted when final scores are calculated as defined by the test design presented in the RFP.

Science Overview

DRC's science item and test development team will be responsible for overseeing the development of multiple-choice items, open-ended items with scoring guidelines, and grade 8 scenarios. Our team will deliver to PDE the required number of items, including scenarios for grade 8, each year. Overseeing the process will be **Mr. David Durette, Science Content Director**, who has been leading science content development for Pennsylvania for the over nine years. The DRC **Science Content Leads** assisting in the process will be **Mr. Joseph Schweiss** for the Keystone Exams and **Mr. Patrick Erikson** for the PSSA. The training will follow the same process as described in mathematics, but it will also include special consideration for the creation and use of scenarios at grade 8.

Science Scenarios

Scenarios will be developed for grade 8. At grade 8 each scenario is accompanied by a set of multiple-choice items. Each science scenario will contain a real-world topic or common theme that is assessed by a variety of items with diverse levels of difficulty and cognitive demands. DRC has proven experience in crafting science scenarios for the Pennsylvania science assessments to assess core science concepts aligned to the eligible content. The science scenarios will contain multiple types of displays (stimuli) such as quality graphics, authentic data, and experimental designs that are grade-level appropriate. These displays will be accessible to all students and model best practices in the classroom. In addition, the science scenarios will fully address the interdisciplinary nature of science and science content standards that will create stronger connections of core science concepts. The scenarios will be developed to provide for a measurement of both process and content skills.

Steps in the Science Development Process

Training Activities

As in the other content areas, all levels of the item and test development staff will participate in training before the development cycle begins. This training at DRC will be organized and conducted by **Mr. David Durette, Science Content Director**, and **Mr. Joseph Schweiss** and **Mr. Patrick Erikson, Science Content Leads**. The training will follow the same process as described in the other content areas, but it will also include special consideration of the development of science scenarios. In addition, the set of items developed for a scenario will span depth-of-knowledge levels. It is critical that item writers and editors acknowledge and maintain the depth-of-knowledge balance throughout the item writing and editing process.

Training of Item Writers

As with mathematics, DRC uses a combination of both in-house and contract item writers for the PSSA and Keystone Exams item writing in addition to the expertise of Victory Productions for the development of multiple-choice items for the PSSA. Each writer will also be asked to pay careful attention to the readability of each item and scenario and check to ensure that the focus is upon the concepts, not upon reading. The goal is for each writer to write items and scenarios that are, to the greatest degree possible, independent of the assessment of reading; however, writers will receive instruction concerning grade-appropriate *science* vocabulary.

Item Writing

As with mathematics and ELA, science item writers will input items, stems, answer options, and distractor rationales directly into IDEAS, our item-banking system. Other pertinent information associated with the item (e.g., depth of knowledge, estimated difficulty, focus) will also be entered.

Writer Qualifications

DRC and Victory Production's item and test development teams also propose to supplement our internal staff writers with writers who have experience writing items for the PSSA and Keystone Exams assessments and selected writers from across the country who have written for our companies in the past. Much like our internal staff, many of the external writers have past experience writing items for the PSSA and Keystone Exams assessments. All item writers from both DRC and Victory Productions are experienced writers, teachers, or former teachers who have a great deal of specialized knowledge in the subject area of their expertise. In selecting the pool of potential item writers for ELA, mathematics, or science, care will be taken to select the best writers—qualified individuals who possess both content expertise and good technical writing skills.

In order to select the best writers, a screening process is used. The qualifications we use to select item writers are highlighted below.

Item Writer Qualifications

- A bachelor's degree or higher in English language arts, mathematics, science, curriculum and instruction, and/or related field.
- In-depth understanding and knowledge of the special considerations involving the following: the writing of standards-based multiple-choice and/or evidence-based selected-response items, including writing distractor rationales for each answer option for mathematics and other assessments as requested by PDE; an understanding of depth-of-knowledge levels, estimated difficulty levels, grade-level appropriateness, readability, bias considerations, etc.; the development of constructed-response items, including developing item-specific scoring guidelines for each item; and the writing of unique, independent, items for passages that do not clue or clang.
- In-depth understanding and knowledge of the special considerations involving the construction of scenarios including an understanding of the scenario purpose, appropriate scenario scaffolding, composition theory and principles, as well as, difficulty levels, grade-level appropriateness, readability, scorability, bias considerations, etc. DRC understands that scenarios must be of the highest quality.
- Participation in the assessment-specific training workshop.
- Any other requirements as provided to us by PDE.

Applying the Principles of Universal Design to Graphics

DRC understands the challenges of creating graphics for items that are accessible to all audiences. A universally designed assessment appears clean and organized to the test taker. Our goal is transparency in process, so that the assessment is all-inclusive in its design without compromising the constructs of the material being assessed.

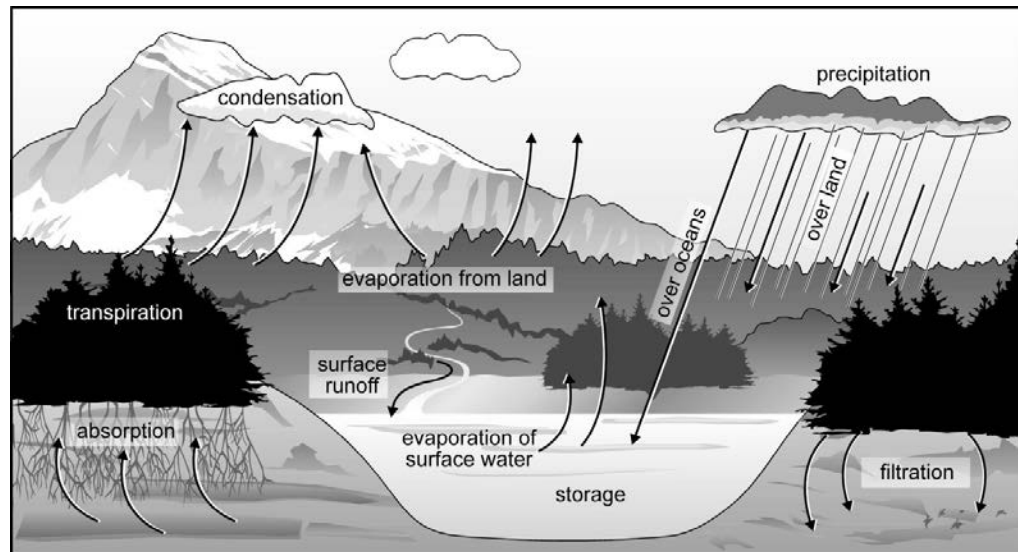
As items are developed, our item development team seeks to ensure the technical quality of all art/graphics produced by our dedicated staff of skilled graphic artists. Each graphic, table, and piece of artwork will depict all relevant or necessary information required by the passage, scenario, and/or item. Labels will be typeset, appropriate, consistent, and executed according to the established criteria as required by the PDE style guide and be of professional quality.

We are pleased to provide PDE with experienced graphic artists who have been developing graphics for Pennsylvania assessments since 2003. Our team of graphic artists has developed a process that integrates the creative aspects of item writing with the production of universally designed components that complement the item. During the item-writing stages of the process, the goal is to produce items that are fair and valid for all students. The desired outcome of this creative process is a link in which text and art are seamless.

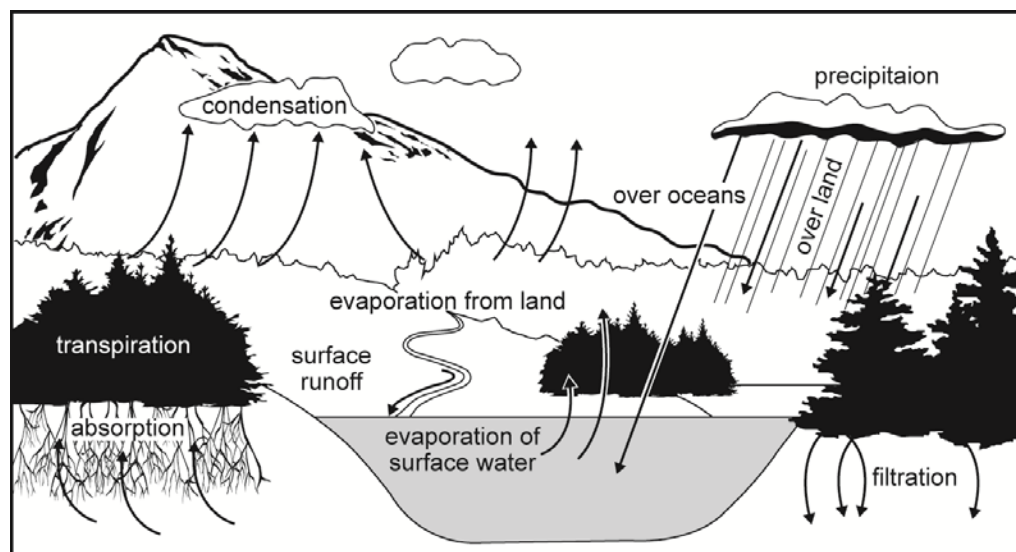
We understand that graphics are essential elements related to quality mathematics and science items and assessments. Our internal item and test development graphic artists work hand-in-hand with our item development team members and will join the creative process as soon as universal design constructs need to be applied to an item. This request will initiate an effort to determine the appropriate balance between art and words for presenting the item. A key consideration at this point is the complexity and scope of the graphics versus the reading load of the text. Complex graphics immediately present a Universal Design challenge to the graphic artist and content specialists. DRC's philosophy involves challenging the content specialists and the graphic artists to develop graphics that are as clear and precise as possible.

The following figures show an original graphic and how item writers, content specialists, and graphic artists might work to ensure that Universal Design is carefully considered for all PSSA, Keystone Exams, and CDT items. By showing examples of graphics that do not adequately consider the Principles of Universal Design during the item-writing training workshops, DRC will challenge our writers to provide feedback as to how graphics can be altered to adhere to the Principles of Universal Design, while maintaining alignment to the Pennsylvania's standards.

Example of an Original Graphic

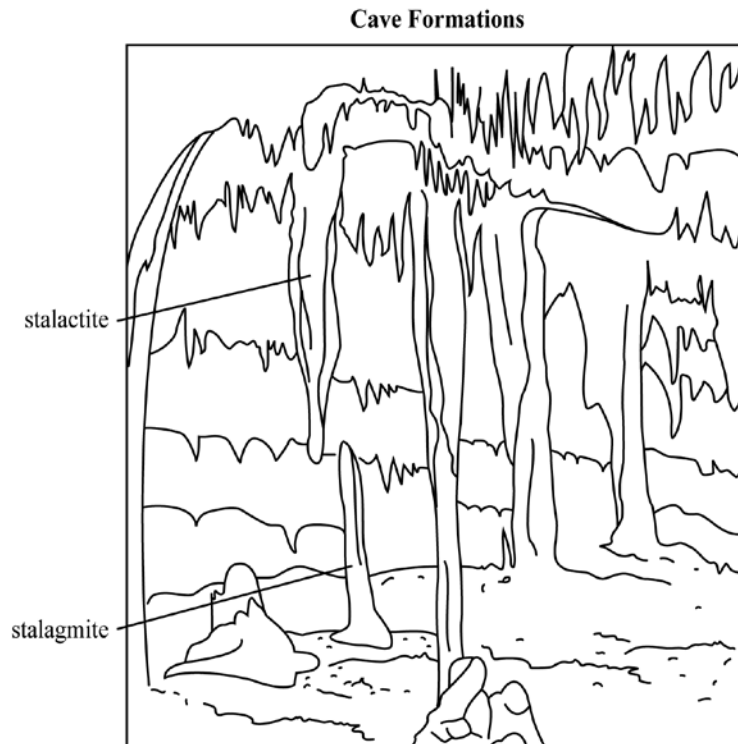


Example of Modified Graphic with Universal Design Principles Applied

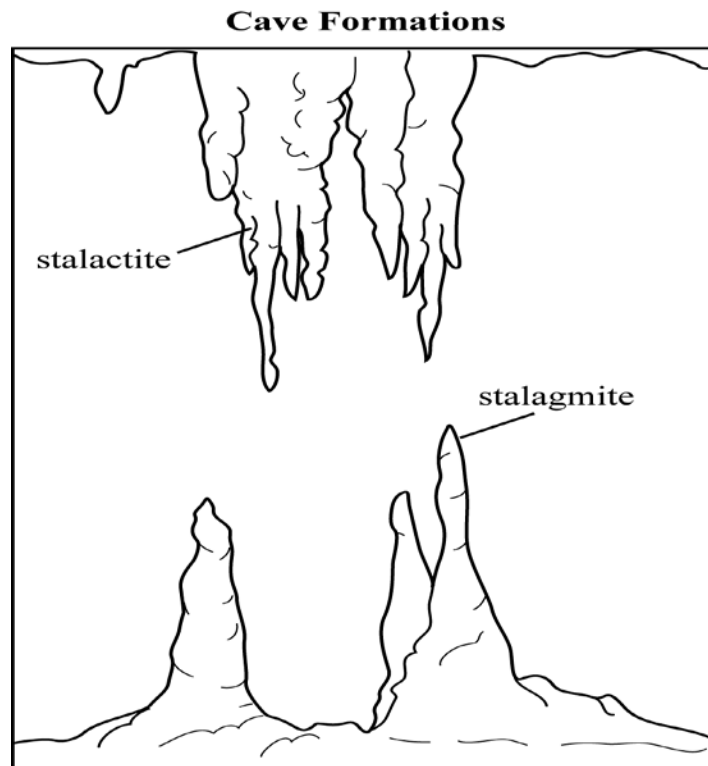


We will strive to create graphics as simple as possible. We will advise graphic artists to restrict the use of shading, shadows, and colors, as well as fields or indices that are not required for the specific item. This allows the student to focus more on the information needed to answer the question, rather than on reading the graphic. However, it is important to understand that even simple line drawings can fail to adhere to Principles of Universal Design. The figures that follow show an original graphic with simple lines and how item writers, content specialists, and graphic artists might work to ensure that Universal Design is carefully considered. Note that extraneous details in the graphic have been eliminated and that edits to this graphic highlight the cave formations while reducing the unnecessary background detail of the cave environment.

Example of an Original Graphic with Simple Lines



Example of Modified Line Drawing with Universal Design Principles Applied



Quality Assurance Procedures during Item Development

Effective training, as described above, is a critical component of producing high-quality items. However, rigorous processes and systems are also integral to our approach.

The training our test development team undergoes equips them with the knowledge to execute critical phases of item development with accuracy and specificity. In addition, redundancies have been built into our test development processes explicitly as part of our quality control checks. Multiple looks by different people, who have a sense of ownership in the product, ensure the integrity of the items' content, appearance, and style features.

The development schedules built by the test development managers, coordinator, and content leads are targeted toward an optimal mix of thoroughness and efficiency. The sharing of timely information, via both formalized, regular project meetings and ad hoc conversations, ensures that team members have the information they need to produce items of high quality. This includes ensuring that all development staff—writers, editors, content leads, item-banking experts, proofreaders—have a common set of resource materials, such as style guide and specifications. Development can then move forward in a coordinated way.

The item management system, IDEAS, has a number of features that will streamline development and reduce the risk of error. Content specialists work on Pennsylvania items in an environment where Pennsylvania “style sheets” have been configured. As a result, the content specialists can look at items in print views that are identical to the item cards brought to content review or, alternatively, that resemble how items will appear in a test booklet or computer screen. The system ensures that only one user can edit an item at a time by locking out multiple editors. The item management system also has built-in features for ease of processing, such as buttons for style including bold, italic, and underline. The system also has spell check as a standard feature. Assessment anchors and focus words are linked, so that the only focus words that are options for an item are those associated with the item's selected anchor. In preparation for PDE's review and once approved by PDE in preparation for external content reviews, items can be batched and item cards printed directly from IDEAS.

Security Procedures during Item Development

The maintenance of test security through the item development process is essential given the nature of high-stakes assessment. DRC recognizes the importance of security and take a series of steps to recognize and maintain security of test items through our physical plants, the maintenance of secure electronic environments, and secure file transfer.

At each item writing workshop, writers will be asked to sign a Confidentiality Letter specifying the confidentiality agreement and security regulations. The agreement will also outline the ownership regulations. DRC understands that all work developed under this contract will be the sole property of PDE and the

Commonwealth of Pennsylvania. DRC also understands that no confidential materials related to the project will be released without PDE's explicit approval. All contract item writers sign a statement in which they agree to treat all materials related to item development as confidential and not to disclose the content of the materials or the communication about item development.

Work Plan Task Number 4—Review and Revise Items Prior to Submission to PDE (Internal Editing Cycles)

Content-area item and test development specialists and content-editorial specialists will review items, passages, etc., for technical quality; match to anchor/standard; bias, fairness, and sensitivity; depth of knowledge; estimated difficulty; estimated PLD; adherence to the Principles of Universal Design; etc. Two additional editors will provide an independent review. The aim for this team approach is to conduct a multi-tiered internal review of all items, scenarios, etc., prior to submission for review by PDE and then with approval by PDE prior to submission for external committees to ensure that all items align with Pennsylvania standards and adhere to PDE's quality standards for high-quality items.

Our content development and editorial team, including two additional independent editors, will review all items, scenarios, etc., to ensure that they possess the following characteristics:

- Content alignment or congruence with the knowledge and skills specified in the anchors or standards.
- A range of estimated difficulty levels.
- A range of estimated PLDs.
- Appropriate grade-level vocabulary, subject matter, and assumed student knowledge.
- Freedom from issues or concerns for bias, sensitivity, or fairness.
- Accessibility, following the Principles of Universal Design.
- Correct grammar, usage, and structure/format.

As a part of our internal review of the items, DRC's item and test development team members and graphic specialists ensure that item art can be reproduced clearly and accurately when test booklets are printed or electronically displayed.

Test specifications will be reviewed to identify any potential display requirements that may present challenges in a print or electronic display environment. Display tolerances are impacted by line thickness, percent screening for shading, specialized fonts and symbols, photographs, color, and paper type. These are defined in the early stages of the item and test development process to help guide the delineation of style requirements and specifications.

Item art is produced using vector graphics that allow for scalar adjustments without the breakdown of image clarity that is common with lower quality bit-mapped formats. DRC’s multi-tiered quality assurance process makes certain converted item art is carefully compared to the original format throughout the item and test development and production process.

Displaying High-Quality Art

The display of high-quality art in tests does not end with art production and the application of Universal Design principles. The medium for display and the conversion or transformation of the artist’s work to this medium are also given careful consideration.

Work Plan Task Number 5—Prepare Items for Review by PDE

All newly developed items, with associated stimulus, scenarios, graphics, passages, and all item characteristics such as item code, estimated difficulty, depth-of-knowledge level, distractor analysis, focus, scoring guidelines, etc., will be prepared for review by PDE. We understand the importance of the review, and we will work with PDE to establish schedules and procedures that will facilitate PDE’s review of all items, scenarios, etc., prior to reviews by committees of Pennsylvania educators. For the review, PDE will have direct access to IDEAS, our item-banking system, and PDE may elect to review items electronically in “real time” using IDEAS. Alternatively, PDE may choose to review items provided on Item Cards in PDF format, which can be enabled to allow comments and/or revisions to be added directly to the file. Our item development team will work with PDE to meet PDE’s review process requests. Please see below for a discussion of IDEAS.

Work Plan Task Number 6—Prepare All Materials for New Item Reviews

It is our belief that the educators of Pennsylvania offer invaluable insight into the passages and items appropriate for their students, and we anticipate continued success with providing support to PDE in this process. After all newly developed proposed items, scenarios, etc., have been reviewed, revised per PDE’s request, and subsequently accepted by PDE, they will be prepared for presentation to separate grade-level review committees comprised of Pennsylvania educators. Only passages and items that are approved by PDE will be included in the final pool for review by the external committees of Pennsylvania educators.

For each grade-level or grade-range committee, items, passages, and scenarios, will be secured in binders, according to Assessment Anchor and Eligible Content for mathematics and science for non-scenario items, by stimulus-based science scenarios, and by passages for ELA. Items will typically be printed one per page and will include all information such as, but not limited to, what each item is measuring (Assessment Anchor and Eligible Content for mathematics, ELA, and science), focus, depth-of-knowledge level, answer key or scoring guideline, grade level, distractor rationale, and other information as requested by PDE.

Work Plan Task Number 7—Support PDE with the New Item Review Committee Meeting Processes

Committees of Pennsylvania educators will review all newly developed items (e.g., content-area appropriateness, curricular alignment of the items, cognitive demand and rigor alignment, PLD, bias and sensitivity, adherence to the Principles of Universal Design). In addition, scoring guidelines for open-ended (CR) items will also be reviewed. Our content-area and bias specialists will support PDE as facilitators and note takers. DRC understands that the New Item Review meetings will take place in Pennsylvania and will consist of Pennsylvania educators and other content matter experts and national bias experts as specified in the RFP.

Security Process for the External Committee Reviews

At the beginning of the all new item review meetings, each committee reviewer who is invited to attend will be asked to sign a Confidentiality Letter specifying the confidentiality agreement and security regulations. The agreement will also outline the ownership regulations. DRC acknowledges that all work developed under this contract will be the sole property of the Commonwealth of Pennsylvania. No confidential materials related to the project will be released without PDE's explicit approval.

During the review meeting, items, passages, scenarios, etc., will not be left unattended. In other words, DRC facilitators will monitor the security of all items, scenarios, and passages throughout the entire process. All materials sent to the meeting will be sent through a secured mailing process and have tracking documentation. DRC facilitators attending the meeting will oversee the delivery of all materials and the return of all materials. These same members will arrange for shredding bins should any materials need to be shredded. In addition, all materials provided to the external committees will be numbered so that secure materials are collected at the end of each day.

Work Plan Task Number 8—Prepare Written Summary Reports of the New Item Review Meetings

Committees will be asked to accept, accept with revisions, or reject passages and items. DRC may rewrite rejected items during the review process and re-present them to the Committees to maximize item acceptance and to provide an adequate number of items to populate test forms. As stated, DRC will record and document all edits and revisions suggested by committee members. Following the meeting, DRC's content-area and bias test development team members will prepare a final summary report of the results of the meeting. DRC proposes that the summary report will describe the process used during the New Item Review Committee meetings, number of items that were rejected, the number of items to be revised and/or were revised during the meetings, and any additional information as requested by PDE. We will work with PDE prior to the first New Item Review Committee meetings with Pennsylvania educators to determine the format for compiling the feedback and preparing the summary reports. In compiling the

feedback, any remaining suggested revisions to items will be reviewed with PDE, should any remain.

Work Plan Task Number 9—Revise Items and Conduct Internal Review Processes (Face-to-Face Review)

After the external New Item Review Committee reviews (Bias and Content) have been completed, DRC content specialists will meet face-to-face with PDE to update the status of the items, scenarios, etc., as accepted, accepted with revisions, or rejected. During this process, PDE will arbitrate the decisions made by the new item review and bias review committees. All PDE-requested and approved revisions will be made.

To ensure quality of the items, scenarios, etc., and to ensure that all revisions are made during each step in the process, DRC's test development editing team will be responsible for coordinating word-for-word proofreading. At least two editors will perform two independent word-for-word reviews of passages and items to ensure that all requested revisions have been made.

Work Plan Task Number 10—Select Items for Field Testing; Submit Selections to PDE for Approval

Once items have been revised per PDE request, DRC will provide PDE with an initial selection of items to be field tested. Initial test maps for recommended item placement of the embedded field test items will also be provided to PDE for review. Approved test construction guidelines and test layout design guidelines will be followed when providing the test maps. A Directory of Test Specifications (DOTS) will also be created to include answer keys, standards alignment, focus, etc.

Upon approval from PDE, the forms will be reviewed internally by our combined item and test development team members and quality control staff. Staff will conduct and monitor internal reviews and quality control processes following all steps in our quality assurance process.

Test Development Process—Construction of Test Forms

DRC agrees to support, provide technical assistance, and work cooperatively with PDE content and assessment specialists to select passages, scenarios, and prompts with associated content-specific items for the PSSA and Keystone Exams. DRC will construct forms that comply with the test blueprints contained in the Test Specifications in the RFP. As discussed above, and in more detail in sections that follow, DRC's test design includes a core (common) set of items, along with embedded field test and equating block items. Individual student scores will be based on their responses to the core (common) items only. DRC has extensive experience with this current test designs, and we helped PDE to determine the new PCS-based test design first used operationally in 2015. DRC worked with PDE as the previous design was formulated and then first implemented in 2004. DRC appreciates the complexities of the current design and we strongly support

maintaining these design elements to preserve the integrity of the reporting model at the school and district levels. We feel that the continuity is in the best interest of the program and the students of the Commonwealth.

DRC has successfully used and endorses an integrated team approach to test development, including content area specialists, psychometricians, and scoring specialists working as a unit in collaboration with client development teams. DRC experience has shown that, in the case of collaborative efforts between integrated teams of developers, the whole certainly becomes more than the sum of the parts.

All aspects specified in the RFP are included in the test construction plan presented below for PDE's consideration. It is understood that, simply because of the nature of the task, modifications to this plan may well be necessary and DRC is prepared to make adjustments and adaptations as required.

Forms Building

As a first step in building the PSSA and Keystone Exams, DRC will prepare all items in IDEAS that may be considered in the process. The form, format, extent, and organization of items will be determined in consultation with PDE. DRC acknowledges that PDE will expect an item to include statistical and meta-data along with scoring guidelines. Related graphics, tables, and charts will also be provided. The intent, with direction from PDE, is to organize test construction material and resources, including items with associated graphics and data, in as logical and user-friendly form as possible.

Following preparation of all necessary material and resources, forms construction will begin. Construction of the test forms themselves will be a collaborative effort between PDE and DRC's integrated development team of assessment specialists, psychometric services specialists and scoring specialists.

Before test forms are created, passages, items/performance tasks, scenarios and artwork must be carefully selected. Below, we have described the process used for item selection; however, we are open and ready to refine our process to best meet the needs of PDE.

Process for Selecting Items for Forms

1. Using the pool of items approved by Pennsylvania educator committees, DRC test development specialists will first select items to match the approved test blueprints.
2. DRC test development specialists will check to see that each item clearly aligns with anchor and /or content standards where applicable, and that each item meets psychometric guidelines for excellence.
3. DRC test development specialists will verify that each item meets technical quality for well-crafted items, including:
 - One clearly correct answer
 - Clear and concise wording
 - Grammatical correctness
 - Appropriate range of difficulty
 - Free of any offensive, inappropriate, or biased content
 - Meets the Principles of Universal Design and maximum accessibility.

Once DRC test development specialists receive PDE approval on the items to be placed in test forms, test form construction will begin. In constructing the forms, DRC content area test development specialists will follow the guidelines provided below.

Some Guidelines for Placing Items into Forms

- Forms will include adequate standards coverage, as required by test blueprints.
- No item in a form will “clue” another item on that same form.
- “Clang” will be avoided (i.e., distractors should be unique from one another).
- Forms will make use of contexts that reflect the diversity of the population of Pennsylvania, in terms of names, artwork ,and graphics.
- Forms will include a wide range of topics and a variety of questions.
- Correct answer distributions will be psychometrically sound.
- Forms will not contain any items that have been released to the public.
- PDE will review and give final approval of all test forms.

DRC psychometricians will examine the statistical quality of preliminary test forms, paying specific attention to:

- Similarity of Test Characteristic Curves for new test forms and previous operational forms.

- Similarity of Test Information Function for new test forms and previous operational forms.
- Similarity of Conditional Standard Error of Measurement for new test forms and previous operational forms.
- Range of p -values indicate that items are of appropriate difficulty.
- Rasch item difficulties indicate that items are of appropriate difficulty.
- Model/stat fit statistics indicate that the Rasch model difficulties are well estimated.
- Potential Item Bias should be minimized.
- Distribution of correct answers should vary according to standard psychometric practice.

Any items found to be suspect from a statistical standpoint will be reported to the content specialists for review and possible replacement. This process is repeated until a form satisfies both content and psychometric requirements specified by DRC and PDE. DRC believes that test form construction is a collaborative effort. Our test development specialists build a test form based on the content distribution described by the test specifications and blueprints determined by PDE. We pay particular attention to ensuring that potential problems related to developmental appropriateness, item cueing, or redundant content are eliminated. Earlier in this proposal, we have described DRC's data review process. DRC utilizes the process described below to construct forms.

Forms Construction Process

1. Test development content specialists review the approved *Pennsylvania's Assessment Anchors and Eligible Content*, test specifications, and test blueprints, including the number of items per reporting category.
2. Psychometricians provide test development content specialists with an overview of the psychometric guidelines for forms construction, ensuring that our process is approved by PDE.
3. Test development content specialists and measurement experts are trained in forms construction, with a focus upon requisite content validity and psychometric properties.
4. Test development content specialists receive all items and accompanying data and are trained to use the form-building software to build forms.
5. Test development content specialists review all items in the operational pool and make an initial selection of anchor items according to test blueprint guidelines and psychometric guidelines, such as item fit statistics and the stability over time of the proposed linking items.
6. Test development content specialists review linking item selections, following the guidelines for meeting psychometric and content technical quality.
7. Test development content specialists make an initial selection of items according to test blueprint and psychometric guidelines and review non-linking item selections for psychometric and content technical quality.
8. Test development content specialists create item-mapping charts for each test.
9. Items selected for forms construction, with item mapping charts, will be reviewed by DRC senior-level test development content specialists and measurement experts.
10. Final recommendations for items selected for forms construction will then be prepared for review by PDE along with non-anchor selections (equating block and field test) within forms.
11. Test development content specialists conduct face-to-face meetings with PDE staff to review the core and non-anchor selections and will work with PDE to make replacements, if needed.
12. Test development content specialists will make suggested replacements.
13. Final sign-off will occur between DRC and PDE.

DRC acknowledges that PDE will have final approval of the selection of items and test forms, and we agree to work cooperatively to ensure a smooth flow of information between PDE's assessment specialists and DRC's test development team. We proposed to facilitate this approval process by conducting face-to-face meetings with PDE to review the content of the proposed forms. DRC will provide PDE with PDF or hard copy versions of the mocked up forms. We commit to **quick turnaround of edits to ensure timelines are met** and that the PSSA and Keystone Exams programs remain on schedule.

Test Build for the PSSA and Keystone Exams

DRC's Test Development and Psychometric Services staff will work together to create test forms from items approved at the content and sensitivity review meetings and the specifications documents created at the annual planning meetings. Test forms will be constructed to represent the content in proportion to the standard coverage specified in the test blueprint. The equivalence of new forms will be established by ensuring that operational forms are constructed to have similar psychometric characteristics. Test characteristic curves will be evaluated to ensure that new test forms are similar in difficulty relative to previously administered forms. Conditional standard error of measurement curves will be used to ensure the quality of test scores is similar to previous administrations.

To facilitate the test construction process, DRC's item selection software takes the guesswork out of selecting items to support large scale assessment programs. It provides a wide range of tools for organizing, classifying, searching, ranking and querying items, passages and associated meta-data to support test construction. Our software has been used successfully throughout the selection of PSSA and Keystone Exams forms as well as the construction of the large item pools to support the CDT adaptive testing program.

Pools of items will be preliminarily screened for selection using the classical item statistics, such as p -values (average proportion correct), biserials, and distractor point biserials, as well as IRT statistics, such as item difficulty and model fit indices. DRC's software can make use of the following information from the item pool database:

- The content objective to which the item is assigned
- The association of the item with a passage or stimulus
- A bias rating indicating whether the item shows differential item functioning to a particular population
- The IRT item parameters
- A fit rating indicating how well the item fits the expectations based on the item response theory model used

DRC's Test Development staff first selects a working item pool focusing on items most appropriate to the target grade. The developer begins by specifying the number of items to be included in the test and a target number of items for each content objective. The developer can test various combinations of items to meet the content blueprint specifications while concurrently be focused on how well the selection matches the summary statistical targets for the test. The process is iterative, where Test Development and Psychometric staff work together to make sure that a test is selected that best meets all content and psychometric criteria.

Our test selection software tools facilitate the assembly of operational forms that match content and psychometric specifications that are defined by previous operational administration. In particular, tests are selected according to the test blueprints, test difficulty target (as defined by the test characteristic function and descriptive statistics) as well as measurement error target (as defined by the conditional standard error of measurement). Graphic displays that show the test characteristic functions and standard error of measurement curves for the two sets of selected items (the previous form and the current form being built) are reviewed throughout the test construction process. The similarity of standard error curves implies scores for students with proficiency levels around cut scores will have the same degree of error regardless of the form taken, an important attribute for a high-stakes examinations. Operational forms built to these specifications will result in score distributions that are similar across administrations. Consequently, the percent of students falling into the classification categories should be more stable across administrations, given a constant distribution of proficiency. If proficiency increases, we can have greater confidence that this shift reflects increase student knowledge, skills, and ability if tests are constructed in this manner.

As a final verification, our test building software shows both expected number correct and standard error of measurement as functions of scale score, as well as statistical and graphic summaries on bias, fit, and the average standard error of the test as finally selected. The test selected can be compared and contrasted against a reference test(s) from any prior administration to further ensure comparability of the new test form. Any faults in the final selection become immediately apparent as the final statistics are generated: whether the test is too easy or too difficult for the target grade, contains biased items, does not meet the requirements to match a parallel form, or does not adequately cover part of the range of student ability. If these problems are detected, our developers can return and revise the selection. The flexibility and graphic displays evaluated within our procedures is designed to encourage multiple attempts at fine-tuning the selection and developing the best possible combination of items to cover all aspects of the assessment requirements.

DRC Test Development Forms Construction Quality Check

After forms construction, Test Development editors and specialists implement quality control procedures to ensure accuracy of all PSSA and Keystone Exams test forms (print and online). The Test Development Team will review test forms in IDEAS. Using original copies previously approved by PDE, they will make modifications, if necessary, to verify continuity and accuracy. Once stable versions of materials have been achieved (i.e., content, graphics or illustrations are complete and accurate), final proofs will be submitted to the editing/proofreading team.

DRC's Test Development Editorial Team will be responsible for coordinating word-for-word proofreading of all test forms; at least two editors will perform two independent word-for-word reviews. These specialists will proof and will query

potential issues in order to offset the possibility of misleading or technically problematic wording of items within test forms. The Editing team will conduct a final “three-way” proofreading (test booklet, answer document, and test directions) of forms and confirm any potential inaccuracy with DRC Test Development Specialists.

In addition, DRC Psychometric Services and Test Development Specialists will also review all test forms to confirm accuracy and continuity; they will continue to query any test item that is suspect from a content standpoint. These content staff will enlist the aid of external reviewers to take each of the tests to verify the correct answers and content standard alignment for the multiple-choice items. They will record their answers to the items on each test to confirm the scoring keys. Psychometric Services and Test Development staff will work with PDE to revise scoring keys whenever necessary and will have these revisions verified and approved by the Software Quality Assurance Analyst and PDE. PDE will be provided final, clean copy for its review and approval to print.

PSSA Online Form Development Considerations

DRC will follow the same test construction plan for both modes of delivery—print and online. The development of computer-based tests requires the same level of quality review as applied to the paper/pencil tests. Once the paper/pencil test is approved, DRC’s Test Development specialists will prepare the test forms for use in an online testing environment, adding the necessary online components, scripting audio, confirming online layout and presentation, and use checklists and cold-reads to review the items and forms to make sure that the items and forms remain parallel to their paper/pencil counterparts.

More information on online testing can be found in *Subheading 4.F., Expanding the Utilization of Online Assessments and Technology Requirements*.

4.C.6. KEYSTONE EXAMS ITEM AND TEST DEVELOPMENT PROCESS

DRC understands that the Keystone Exams are presented online or in printed form with a separate test book and answer book. The test book contains MC items. The answer book contains scannable pages for MC responses, CR response spaces, and demographic data collection areas. The Keystone Exams contain items that perform different roles within the test design, including core (C), core overlap (CO), and field test (FT) roles. These functions are precise and meet the detailed needs outlined in the PDE-approved test design. The test design also prescribes the specific number of items required to fulfill each role.

DRC will work to develop core items to fill both MC and CR core positions on the Keystone operational exam. These are required in certain quantities to provide results of student performance measured against Pennsylvania Standards. Core items are previously field tested items that have been approved for operational use based on the performance analyzed from the field test event. Core items can be pulled directly from the most recent field test event, or core items can come from

the item bank (having been previously banked following an earlier field test event.)

DRC understands that Core positions can also be filled from previous core uses. For the Keystone Exams, this role includes the limitation that the core items cannot appear in back-to-back administration years and must therefore be used no closer than every other year apart. This use is referred to as a biennial Core Overlap. DRC acknowledges that PDE desires to see a 50% Core Overlap usage rate allowing a two-year lag between the overlap events to ensure that students retaking the Keystone Exams are not likely see the same set of items.

Note: The Keystone Exams are pre-equated, so unlike the PSSA, DRC understands there are no traditional “core-linking” positions within the test design.

DRC acknowledges that Field Test items are also required by the Keystone Exams design. For the purposes expressed in the RFP, FT items are to be embedded within the operational Keystone Exams design for Spring administrations, only. The field test event in Spring is used to populate the three administrations in the following year—that is, the Spring field test populates the Spring, Summer, and Winter cores for the year following the Spring field test event.

Per the RFP, the field test positions the Summer and Winter retest events (and for Breach forms), will be filled with placeholder items rather than field test items. By adding placeholder items where field test items appear, the overall exam length will be identical between administration events.

The Keystone Exams are presented in both online and paper/pencil modes, and the paper/pencil version is printed using a combination of a test booklet and an answer booklet. The test booklet contains stimulus information (like passages) and the MC item text. The answer booklet contains the response bubbles corresponding to the test booklet MC items, and it contains the CR items and their corresponding response spaces.

For an individual Keystone Exam, there is the same number of items in both modules; each module measures unique content as expressed in the corresponding assessment anchors groupings in each module (there is essentially no overlap of content between the two modules). For more information on modules, see *Subheadings 4.B.2.a* and *4.B.2.b* in this proposal.

Algebra I Exam Development Design

As shown in the operational layout tables below, DRC will develop the Keystone Algebra I Exam to be two (2) sections (known as modules). The PCS-aligned Algebra I core can be described as follows (core overlap values are approximate).

PCS-Aligned Algebra I Core

| | |
|-----------------------|------------------------------|
| 36 core MC items | 36 (~18 core overlap) points |
| 6 core 4 pt. CR items | 24 (~12 core overlap) points |
| Total | 60 points |

Algebra I Operational Section Layout Plan for Spring

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|--------------------------------------------------|-----------------|-----------------------------------------------|------------------------------------------------------|
| 1 | 23 | 18–core items 5– embedded field test items | 4 | 3–core items 1–embedded field test item | 60 |
| 2 | 23 | 18–core items 5– embedded field test items | 4 | 3–core items 1–embedded field test item | 60 |

Algebra I Operational Section Layout Plan for Summer, Winter, and Breach

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|--------------------------------------|-----------------|---------------------------------------|------------------------------------------------------|
| 1 | 23 | 18–core items 5–placeholder items | 4 | 3–core items 1–placeholder item | 60 |
| 2 | 23 | 18–core items 5–placeholder items | 4 | 3–core items 1–placeholder item | 60 |

Biology Exam Development Design

As shown in the operational layout tables below, DRC will develop the Keystone Biology Exam to be two (2) sections (known as modules). Items will be evenly divided between the two modules. The Keystone Exams Biology Exam has two reporting categories: Module I (A), Cells and Cell Processes, and Module (B) 2, Continuity and Unity of Life. Both modules have four Assessment Anchors. Module A has 16 Eligible Content and Module B has 22 Eligible Content.

PAS-Aligned Biology Core

| | |
|-----------------------|------------------------------|
| 48 core MC items | 48 (~24 core overlap) points |
| 6 core 3 pt. CR items | 18 (~9 core overlap) points |
| Total | 66 points |

Biology Operational Section Layout Plan for Spring

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|-------------------------------------------------|-----------------|--------------------------------------------|------------------------------------------------------|
| 1 | 32 | 24–core items 8–embedded field test items | 4 | 3–core items 1–embedded field test item | 55 |
| 2 | 32 | 24–core items 8–embedded field test items | 4 | 3–core items 1–embedded field test item | 55 |

Biology Operational Section Layout Plan for Summer, Winter, and Breach

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|--------------------------------------|-----------------|------------------------------------|------------------------------------------------------|
| 1 | 32 | 24–core items 8–placeholder items | 4 | 3–core items 1–placeholder item | 55 |
| 2 | 32 | 24–core items 8–placeholder items | 4 | 3–core items 1–placeholder item | 55 |

Literature Test Development Design

As shown in the operational layout tables below, DRC will develop the Keystone Literature Exam to be two (2) sections (known as modules). Items and passages are evenly divided between the two modules. The Keystone Exams Literature Exam has two reporting categories: Module I, Fiction, and Module 2, Nonfiction. Both modules have two Assessment Anchors. Module I has 25 Eligible Content, and Module 2 has 33 Eligible Content. The items are currently designed to measure student’s comprehension of the content contained in the literature

passages. The Pennsylvania Standards-Literature core can be described as follows (core overlap values are approximate).

PS-Literature Core

| | |
|--------------------------|------------------------------|
| 34 core passage MC items | 34 (~17 core overlap) points |
| 6 core 3 pt. SA items | 18 (~9 core overlap) points |
| Total | 71 points |

Literature Operational Section Layout Plan for Spring

| Section/ Module | Number of MC | MC Item Breakdown | Number of OE | OE Item Breakdown | Estimated Number of Passages | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|-------------------------------------------|-----------------|------------------------------------|------------------------------------|------------------------------------------------------|
| 1 | 23 | 17–core MC 6–embedded field test MC | 4 | 3–core items OE 1–field test OE | 3 | 55 |
| 2 | 23 | 17–core MC 6–embedded field test MC | 4 | 3–core items OE 1–field test OE | 3 | 55 |

Literature Operational Section Layout Plan for Summer, Winter, and Beach

| Section/ Module | Number of MC | MC Item Breakdown | Number of OE | OE Item Breakdown | Estimated Number of Passages | Estimated Section Testing Time (in Minutes) |
|--------------------|-----------------|-----------------------------------|-----------------|-------------------------------------|------------------------------------|------------------------------------------------------|
| 1 | 23 | 17–core MC 6–placeholder MC | 4 | 3–core items OE 1–placeholder OE | 3 | 55 |
| 2 | 23 | 17–core MC 6–placeholder MC | 4 | 3–core items OE 1–placeholder OE | 3 | 55 |

The items that appear on the Keystone test reflect the Pennsylvania Standards for Algebra I and Literature. For Biology, the Exam will continue to reflect the Pennsylvania Academic Standards. It is also important to note that the verbs and action statements within the stems of Algebra I CR items can reflect the Pennsylvania Core Standards directly from the statements contained in the Eligible Content, the Anchor Descriptor, or the Assessment Anchor.

DRC understands the per-form test designs contained in the RFP. Below is DRC’s proposal for implementing the Keystone Exams designs for the Algebra I, Biology, and Literature assessments for 20 operational forms per course as specified in the RFP.

**Keystone Exams Test Design for 20 Operational Forms
from 2016 Onward for Spring**

| Exam | Multiple-Choice | | | | Open-Ended | | | |
|------------|-----------------|--------------------|---------------------------|-------|------------|--------------------|---------------------------|-------|
| | Total Core | Total Core Overlap | Total Embedded Field Test | Total | Total Core | Total Core Overlap | Total Embedded Field Test | Total |
| Algebra I | 18 | 18 | 200 | 236 | 3 | 3 | 40 | 46 |
| Biology | 24 | 24 | 320 | 368 | 3 | 3 | 40 | 46 |
| Literature | 17 | 17 | 240 | 274 | 3 | 3 | 40 | 46 |

**Keystone Exams Test Design for 20 Operational Forms from
2016 Onward for Summer, Winter, and Breach**

| Exam | Multiple-Choice | | | | Open-Ended | | | |
|------------|-----------------|--------------------|-------------------|-------|------------|--------------------|-------------------|-------|
| | Total Core | Total Core Overlap | Total Placeholder | Total | Total Core | Total Core Overlap | Total Placeholder | Total |
| Algebra I | 18 | 18 | 10 | 46 | 3 | 3 | 1 | 7 |
| Biology | 24 | 24 | 16 | 64 | 3 | 3 | 1 | 7 |
| Literature | 17 | 17 | 12 | 46 | 3 | 3 | 1 | 7 |

Item and Test Development Process

The item and test development process for the Keystone Exams generally follows the same processes as the PSSA, including all work plan activities shown under *Subheading 4.C.5*.

Item Development Work Plan Tasks Detailed under Subheading 4.C.5

1. Meet with PDE: item development planning meeting
2. Select and train item writers
3. Develop items and passages, including graphics
4. Review and revise items prior to submission to PDE (internal editing checks)
5. Prepare items for review by PDE
6. Prepare all materials for new item review meetings
7. Support PDE with the new item review committee meeting processes
8. Prepare written summary reports of the new item review meetings
9. Revise items and conduct internal review process (Face-to-Face Review)
10. Select items for field testing; submit selections to PDE for approval

Process for Selecting Items for Forms under Subheading 4.C.5

1. Using the pool of items approved by Pennsylvania educator committees, DRC test development specialists will first select items to match the approved test blueprints.
2. DRC test development specialists will check to see that each item clearly aligns with anchor and /or content standards where applicable, and that each item meets psychometric guidelines for excellence.
3. DRC test development specialists will verify that each item meets technical quality for well-crafted items, including:
 - One clearly correct answer
 - Clear and concise wording
 - Grammatical correctness
 - Appropriate range of difficulty
 - Free of any offensive, inappropriate, or biased content
 - Meets the Principles of Universal Design and maximum accessibility

DRC recognizes that there are important exceptions observed as part of the Keystone Exams item and test development process.

Unique Test Development Considerations for Keystone Exams

As stated earlier in this section, PDE has designed the Keystone Exams so that they do not use traditional core-linking positions, but instead use a biennial core-overlap. Therefore during Step 1 of the process for selecting items for the cores (above), rather than selecting core-linking items, DRC will use core overlap positions to complete the content blueprint.

As stated earlier in this section, another consideration unique to the Keystone Exams is that FT items are only to be embedded within the Spring administrations. Therefore, there is only one data review and one group of newly approved items added to the Keystone Exams item pool on an annual basis that is then available to populate the three administrations in the following year—that is, DRC understands PDE’s requirement that the Spring field test needs to populate the Spring, Summer, and Winter cores for the year following the Spring field test event (plus Breach, as required and necessary). Since there is just one pool to pick from to create the non-overlap portion of the core for three administrations, DRC will work to select core items for all three cores at the same time in order to utilize the item pool in a manner in which the resulting cores have statistical characteristics that are equitable.

For a detailed description of the item and test development discussion, please see the extensive information provided under the subsections contained in *Subheading 4.C.6.*

4.C.7. CDT ITEM AND TEST DEVELOPMENT PROCESS

PDE plans to refresh the CDT item pools. In year 3 (2017-2018), approximately 4,500 items will be developed in the content areas of Reading, Writing, Mathematics, Science, Algebra I, Literature, and Biology. These items will be added to the existing pool of items.

Previously, DRC has worked with PDE on multiple CDT item development efforts and corresponding field test administrations. These include the initial item development and standalone field tests to build the first CDT item pools, the embedded field tests to supplement the pools with items aligned to the Pennsylvania Core Standards, the standalone and embedded field tests to expand the CDT availability to students in grades three through five, and upcoming embedded field tests to enhance the item pools in Reading/Literature, Writing/English Composition, Mathematics, Algebra I, Science, Biology and to add evidence-based selected-response (EBSR) items to the pool for grades 3–8 Reading. DRC proposes to follow a process similar to that currently followed for both PSSA and the Keystone Exams to refresh the CDT item pools. The following steps will be performed:

Thorough review of the existing item pools. While the total number of new items to be developed and field tested is known, the distribution of those items across grades, courses, and content codes must be determined. Additionally, the number of evidence-based selected-response Reading items to be developed is also undecided. Toward that end, DRC psychometric and test development staff will review the existing item pools along with item exposure rates. Areas of need for new item development will be identified. DRC will share results of the item pool review with PDE before beginning new item development to ensure that PDE is in agreement with the item development plan.

Item review by PDE staff. Prior to review by Pennsylvania educators, all new items will be submitted to PDE staff for review. DRC will work with PDE staff to determine the preferred format for the presentation of items and collection of feedback for the review. PDE staff will be able to choose to review items within IDEAS or to receive a PDF showing all of the items ordered by grade/course and/or eligible content code. If a PDF is selected, feedback can be recorded using comments on a PDF enabled for mark-up in Adobe Reader or using a separate spreadsheet. These decisions can be made on a content-by-content basis according to the preferences of each staff member reviewing test items.

New Item Content and Bias, Fairness, and Sensitivity review by Pennsylvania educators. Prior to field testing, all new items will be submitted to Pennsylvania educators for review. DRC will work with PDE staff to identify the expectations for participants (i.e., the number of educators needed for each content area and grade span), and PDE staff will identify educators to be invited as well as alternates to fill those committees.

One committee, comprised of both Pennsylvania educators and national experts, will meet to review all newly-developed items across content areas for issues of bias, fairness, and sensitivity. The procedures followed for this review will be similar to those described in *Subheading 4.C.5* for PSSA and *Subheading 4.C.6* the Keystone Exams.

Additional committees of Pennsylvania educators will convene simultaneously for the purpose of conducting the New Item Content Review. These committees will participate in a large-group training session during which they will be provided with an overview of the assessment program, including its purpose and how the purpose of the CDT differs from that of other assessment programs in Pennsylvania. Following this overview, training in the review of items will include: standard alignment to the PCS- and PAS-aligned AAECs; rigor alignment regarding grade or course appropriateness, depth of knowledge, item difficulty, and freedom from source-of-challenge issues; technical design considerations such as plausible yet clearly incorrect distractors, a single correct answer, and the use of graphics as necessary; adherence to the Principles of Universal Design; and freedom from issues of bias, fairness, and sensitivity. Following the general training session, educators will break out into content area committees and will receive additional content-specific training from DRC and PDE staff.

Upon completion of this training, and prior to being provided access to any confidential materials, all committee members will be asked to sign a Confidentiality Agreement specifying the confidentiality and security regulations. See also section 4.C.1.g Arrangements for Content, Bias, and Data Review Committee Meetings for additional details about the Confidentiality Agreement and details about the process for ensuring the security of all confidential assessment materials. After the training, the committees of Pennsylvania educators will review all newly developed items (e.g., alignment, grade-level

appropriateness, cognitive demand and rigor alignment, bias and sensitivity, correct keys, alignment to the performance-level descriptors, adherence to the Principles of Universal Design). DRC content-area specialists will support PDE as facilitators and note takers. After the Bias, Fairness, and Sensitivity Committee and New Item Review Committee reviews have been completed, DRC content specialists will meet with PDE to update the status of items, passages, etc., as accepted, accepted with revisions, or rejected. All PDE-requested and approved revisions will be made. We acknowledge that PDE has the prerogative to overrule any of the recommendations made by any review committee.

Preparation of items for field testing. Following the Bias, Fairness, and Sensitivity and New Item review meetings and reconciliation of decisions by PDE, all items will be prepared for field testing. This will include incorporating any edits or modifications made to items (including revisions to item attributes such as Assessment Anchor and Eligible Content or Depth of Knowledge alignment as well as edits to the item stem or answer choices) as a result of feedback gathered at the item review meetings.

Embedded field testing. Given that items will be developed to refresh the existing item pools, DRC proposes to embed field test items in the operational CDT in year 4 (2018-2019) rather than administer standalone field tests. Using existing DRC INSIGHT functionality, each student will be assigned a small number of field test items. DRC will work with PDE to determine the appropriate number of field test items. Considerations will include the number of expected testers, the number of items to be field tested, and the additional test time required for field test items. Students will not know which items are operational and which are field test. Field test items will not count in calculation of scores nor will they be used by the adaptive item selection routine.

Item analyses. Following the embedded field test, traditional item analyses will be performed. Please see the *Subheading 4.H.1., Psychometric Analyses*.

Item calibration. Following the embedded field test, the Rasch item difficulty for each field test item will be estimated. In order to put the new items on the existing CDT scales, a joint item calibration of operational and field test items will be performed where the operational items are anchored to their current banked values. Please see *Subheading 4.h.1., Psychometric Analyses* for more detailed information.

Item review with data by Pennsylvania educators. Some items will be flagged for committee review based on their field test statistics. These items will be brought before a committee of Pennsylvania educators for review based on their statistics. Committee members will be trained with regard to the statistical indices used in item evaluation. Then each of the flagged items will be reviewed and a recommendation will be made as to whether or not the item may be used as an operational CDT item.

Update of CDT item pools. After the item review with data, the CDT item pools will be updated to include the recently field tested items that are approved for operational use and to remove items that are either over-exposed or to be released.

Review/revise CAT configurations. DRC psychometrics staff will use the DRC INSIGHT simulation tool to determine if any changes are needed to the CAT configurations based on the updated CDT item pools.

These steps will be completed based on a schedule that will allow the CDT item pools to be refreshed for the 2019–2020 school year. If PDE is interested in removing items from the pool due to overexposure and creating Online Item Samplers using those items, DRC would be happy to discuss options and provide examples of products developed for other clients. Additional suggestions for utilizing released CDT items can be found in *Appendix U, Classroom Diagnostic Tools: Possible Report Enhancements*.

Given our past experience with CDT item development and field tests, we are confident that DRC will meet PDE’s needs related to replenishing the CDT item pools.

4.C.8. CONSTRUCTION OF TEST FORMS

4.C.8.a. Test Forms Comply with Test Designs

As discussed in *Subheadings 4.B.1., PSSA Test Design and Blueprints* and *4.B.2., Keystone Exams Test Design and Blueprints*. DRC supports PDE’s vision for the test designs and test blueprints for the PSSA and Keystone Exams, and as described under *Subheadings 4.C.5., PSSA Item and Test Development Process* and *4.C.6., Keystone Exams Item and Test Development Process*. DRC has presented a comprehensive plan for developing accurate and consistent items and tests.

DRC’s Test Development and Psychometric Services staff will work together to create test forms from items approved at the content and sensitivity review meetings and the specifications documents created at the annual planning meetings. Test forms will be constructed to represent the content in proportion to the standard coverage specified in the test blueprint as shown in *Subheadings 4.B.1., PSSA Test Design and Blueprints* and *4.B.2., Keystone Exams Test Design and Blueprints*. During the core selection process, the alignment reflected in the core selections will be tabulated and the aggregate results will be compared to the expectations established by the blueprint, taking into account PLD, DOK, difficulty, and key distribution as well. Reports on the core map detailing the exact alignment of these key areas will demonstrate that the test forms being constructed are in compliance with the PDE approved blueprint for each test and exam.

DRC will diligently examine all available items in PDE’s bank of items in order to meet blueprint expectations, and alignment of individual items will be

reconfirmed during the core pull process. Our content experts will provide PDE with guidance as PDE participates in this process, and we will provide PDE with organized and convenient access to all available items within PDE's item pool so that PDE has the maximum available options to meet all blueprint and test design requirements.

4.C.8.b. and 4.C.8.c. Construct Spiraled/Scrambled Forms to Maintain Security

DRC thoroughly appreciates PDE's concerns with security and we have incorporated scrambling of operational test forms that is efficient in terms of test assembly while being an effective deterrent against answer copying. In particular, our test assembly plan includes the following characteristics:

- selection of a core form that meets all content blueprints and psychometric specifications
- division of the core operational form into non-overlapping blocks of MC items (recall that OE items are not included in the scrambling)
- items within blocks are scrambled following general psychometric and content guidelines
- scrambled blocks are combined to create multiple scrambled versions of each operational form. Note that the combination of blocks is determined optimally such that the patterns of correct responses over item differs substantially across versions
- for the Spring Keystone Exams and PSSA, seven scrambled forms are produced for each content area. If the number of field test forms is greater than the number of scrambled versions of the operational form, one or more versions of the form is repeated as needed
- both online and paper based forms use the block scrambling method described above

In collaboration with PDE and the Technical Advisory Committee (TAC), DRC developed the scrambling plan to address the test security concerns that have become more prevalent in large-scale assessment. The scrambling of the operational forms has been a successful modification to PSSA and Keystone Exams testing programs. The scrambling plans were built to address test security without dramatically disrupting the test assembly and test administration process. Moreover, based on an extensive evaluation by our psychometricians, the scrambling of operational test forms implemented according to our plans have not negatively impacted the reliability and validity of the student test scores. The scrambling plans were built to be flexible and can be readily adapted as the needs of the testing program evolve.

4.C.8.d. Ensuring Field Test Items and Passages are Embedded and Not Easily Identifiable

As described extensively in *Subheadings 4.C.5* and *4.C.6*, DRC proposes following specific form development steps to ensure consistent and reliable form development. DRC proposes the creation of test mapping charts for each test and exam. These maps will lay out the exact location of each item and item role in each form. These maps will be based upon the approved test design which details the exact number of core items and non-core items by item type. There will be no visual indicators placed within any student- or educator-facing materials that will identify the field test positions, so the transition from core, to field test, and back to core will appear seamless to students and educators.

For the print and online forms, DRC proposes the use of our item banking software to track each item's role within the test design by item sequence (either as field test, core, or other role), and we will pass this information only to authorized individuals performing specific actions that require the need to know which positions fulfill specific roles.

4.C.8.e. and 4.C.8.f. Plans for Construction of Multiple Equivalent Forms

DRC's Test Development and Psychometric Services staff will work together to create test forms from items approved at the content and bias review meetings and the specifications documents created at the annual planning meetings. Test forms will be constructed to represent the content in proportion to the standard coverage specified in the test blueprint. The equivalence of new forms will be established by ensuring that operational forms are constructed to have similar test characteristic curves and similar standard error curves.

To facilitate the test construction process, DRC item selection software takes the guesswork out of selecting items to support large scale assessment programs. It provides a wide range of tools for organizing, classifying, searching, ranking, and querying items, passages and associated meta-data to support test construction. Our software has been used successfully throughout the selection of PSSA and Keystone Exams forms as well as the construction of the large item pools to support the CDT adaptive testing program.

Pools of items will be preliminarily screened for selection using the classical item statistics, such as p -values (average proportion correct), biserials, and distractor point biserials, as well as IRT item difficulties. DRC's software can make use of the following information from the item pool database:

- the content objective to which the item is assigned
- the association of the item with a passage or stimulus
- a bias rating indicating whether the item shows evidence of differential item functioning for a particular population

- the IRT item parameters
- and a fit rating indicating how well the item fits the expectations based on the item response theory model used

DRC's Test Development staff first selects a working item pool focusing on items most appropriate to the target grade. The test developer begins by specifying the number of items to be included in the test and a target number of items for each content objective. The test developer can test various combinations of items to meet the content blueprint specifications while concurrently be focused on how well the selection matches the summary statistical targets for the test. The process is iterative, where Test Development and Psychometric staff work together to make sure that a test is selected that best meets all content and psychometric criteria.

Our test selection software tools facilitate the assembly of operational forms that match content and psychometric specifications that that are defined by previous operational administrations. In particular, tests are selected according to the test blueprints, test difficulty targets (as defined by the test characteristic function as well as descriptive statistics) as well as measurement error targets (as defined by the standard error of measurement). Graphic displays that show the test characteristic functions and standard error of measurement for the two sets of selected items are reviewed throughout the test construction process. The similarity of standard error curves implies scores for students with proficiency levels around cut scores will have the same degree of error regardless of the form taken, an important attribute for a high-stakes examinations. Operational forms built to these specifications will result in score distributions that are similar across administrations. Consequently, the percent of students falling into the classification categories should be more stable across administrations, given a constant distribution of proficiency. If proficiency increases, we can have greater confidence that this shift reflects increased student knowledge, skills, and ability if tests are constructed in this manner.

As a final verification, our test building software shows both expected number correct and standard error of measurement as functions of scale score, as well as statistical and graphic summaries on differential item functioning, fit, and the average standard error of the test as finally selected. The test selected can be compared and contrasted against a reference test(s) from any prior administration to insure comparability of the new test form. Any faults in the final selection become immediately apparent as the final statistics are generated: whether the test is too easy or too difficult for the target grade, contains biased items, does not meet the requirements to match a parallel form, or does not adequately cover part of the range of student ability. If these problems are detected, our developer can return and revise the selection. The flexibility and graphic displays of the program encourages multiple attempts at fine-tuning the selection and developing the best possible combination of items to cover all aspects of the assessment requirements.

4.C.8.g. Develop Sufficient Quantities of Items for all Forms, Including Breach Forms

As detailed under *Subheading 4.C.2.a*, DRC has proposed an item development plan to meet the needs of the test designs detailed in this RFP (including having at least 100% coverage in the number of items required for use on an operational form), and DRC has proposed the volume of items that need to be field tested on an annual basis in order to meet the yield required to populate the annual PSSA cores and the three annual Keystone Exams cores required by this RFP. The proposed plan will require the creation, review, approval, and field testing of over 100 passages/scenario and over 2,200 items annually to populate over 200 print forms across the PSSA and Keystone Exams programs.

We have proposed specific numbers of items for specific item types so that the test blueprints can be met as specified in the RFP. As necessary, PDE also desires to cycle breach forms into the operational cycle, and then, in turn, to replace the breach with newly developed items. Below is a sample breach implementation cycle for this concept. DRC proposes working closely with PDE to implement a breach plan that meets PDE's requirements.

Sample Breach Implementation Cycle

| Admin | Spring 2016 | Spring 2017 | Spring 2018 | Spring 2019 | Spring 2020 |
|-------------------|----------------------|---------------------------------------------|----------------------|------------------------|----------------------|
| Breach | Existing Breach Form | Breach 1 Built from left-over items in bank | Breach 1 | Breach 1 | Breach 2 built |
| Core | Existing Core | Core 1 | Core 2 | Core 3 | Breach 1 as Core 4 |
| Field Test | New Field Test Items | Used to build Core 2 | Used to build Core 3 | Used to build Breach 2 | Used to build Core 5 |

Although Breach forms will be developed in advance of test administration, per the RFP, DRC understands that the Breach forms will not be printed in advance of the administration.

4.D. Production, Printing, and Packaging/Shipping of Assessment Materials

4.D.1. ONLINE ORDERING AND TRACKING SYSTEM

eDIRECT Web Portal

DRC eDIRECT is a configurable, secure, web-based system that seamlessly integrates the tools and resources needed by test coordinators, test administrators, and other agency personnel to coordinate and administer assessments, access program communications and resources, and monitor student performance. eDIRECT will serve as a portal for the Pennsylvania assessment program, streamlining access to all required sub-systems through a single secure login for each user. Access is tiered according to the user's role and assigned permissions. It is through the eDIRECT portal that LEAs will order testing materials.

Online Ordering

Each year, prior to the test window for each assessment component, DRC will work with PDE and LEAs to verify student enrollment counts by grade (and subject for PSSA) and provide LEAs an opportunity to update their contact and shipping information. LEAs will be required to select a Wave 1 or Wave 2 testing window for the Winter Keystone Exams. LEAs will also be able to order Braille, Large Print, and Spanish translation test materials for schools as needed. LEAs will also use the portal to acknowledge receipt of materials, report material discrepancies, and order additional material.

DRC proposes using our online **Enrollment System** to collect and update school enrollment information. This **web-based solution has been successfully utilized for multiple administrations of the PSSA, and Keystone Exams**, as well as by our other large-scale assessment clients, and is known for its convenience, accessibility, and ease of use. The online Enrollment System is accessible via eDIRECT. Please see *Subheading 4.D.1., Online Ordering and Tracking System* for detailed information on DRC's online assessment management system.

DRC will work with PDE to establish a schedule for enrollment collection. DRC will assign eDIRECT permissions to the appropriate District Assessment Coordinators (DACs) and will send a broadcast email to inform them of the enrollment window and provide general instructions for accessing the functionality within eDIRECT. In addition, DRC Customer Service Representatives will be available to answer any questions regarding the online enrollment system.

For the PSSA, DRC will pre-populate the enrollment system with estimated test material quantities from previous administrations. Assessment Coordinators will access the system to confirm or modify the quantities for their specific schools/testing sites. DRC will implement integrated quality checks to ensure final enrollment counts are closely aligned with the projected enrollment counts to

help guard against inflated material quantities. Schools that intend to participate in a Keystone Exam administration will need to provide the initial enrollments in the online enrollment system.

DRC will use the information collected through the Enrollment System to establish a master database of enrollment data, grade configurations for PSSA, and LEA and school/testing site addresses and current contacts (e.g., Assessment Coordinator, Technical Coordinator, Reporting Contact), which will be shared with PDE. From this database, DRC will determine final material print quantities, as well as the address and personnel to whose attention secure testing materials will be shipped. DRC will apply a 10% overage for printed test materials.

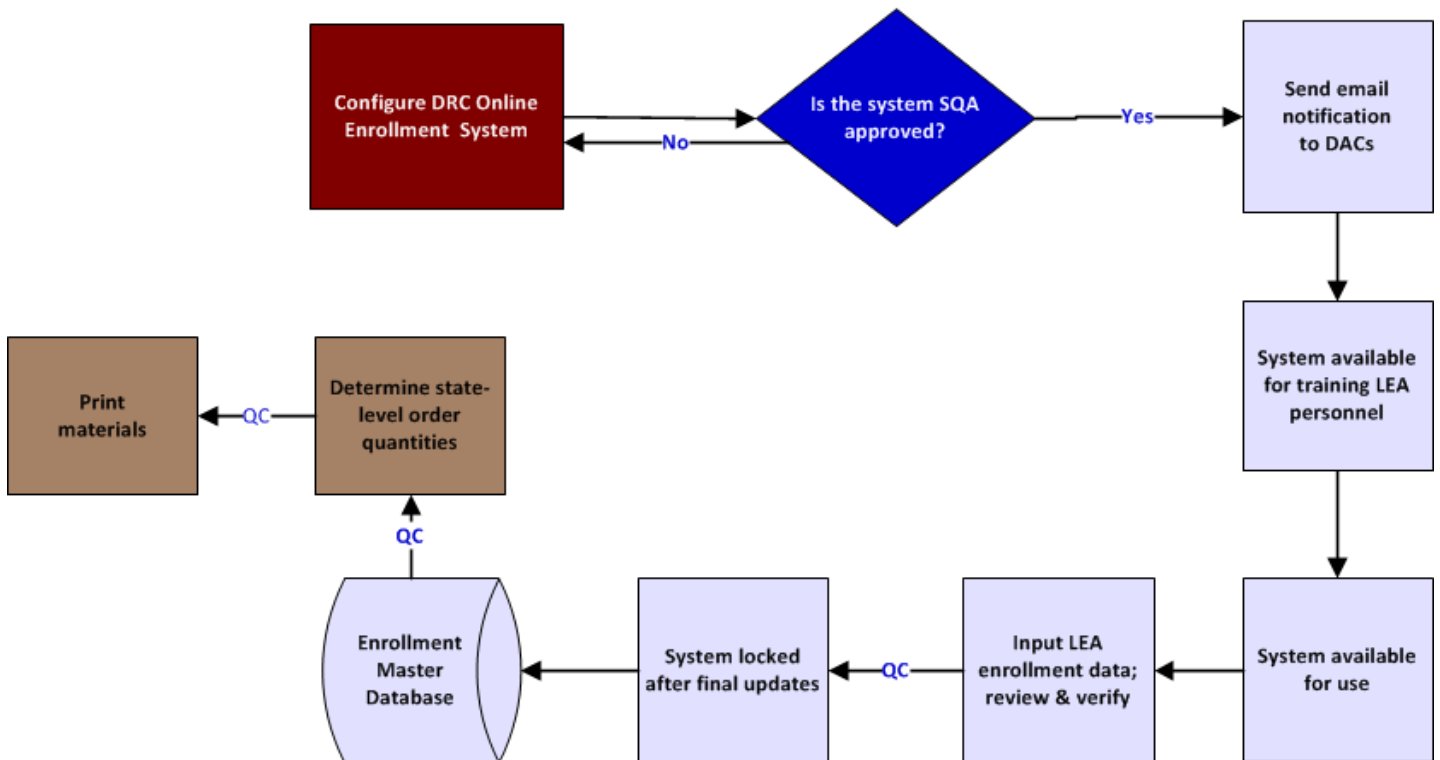
We are confident that our proven process, coupled with our flexible online system, will continue to meet PDE's requirements and provide LEAs with a **straightforward, user-friendly enrollment process**. This system provides PDE and LEA personnel with many advantages:

Advantages of DRC's Enrollment Process

- Access through eDIRECT via a secure, single-sign on process.
- Review a list of materials by school (and grade for PSSA) available for order for each test administration.
- Input or modify order quantities for regular and accommodated testing materials.
- Submit all orders electronically.
- Confirm or update enrollment quantities throughout the window.
- PDE-access to summary level orders.

DRC's proposed enrollment process is outlined in the figure that follows. Sample screenshots of the online system are provided at the end of this subheading.

DRC Enrollment Process



District Assessment Coordinators will use the Enrollment System to submit, review, and update material quantities for each school/testing site participating in the assessment. The following figure displays a sample of the system’s enrollment entry screen for the current PSSA assessment. The system will also allow updates to LEA Assessment Coordinator names, addresses, email addresses, telephone numbers, and fax numbers.

Online Enrollment System—Enrollment Entry Screen

CLOSE MENU

General Information >

Minimum Browser Requirements

Security Agreement

Documents

Announcements

Manage Users >


Enrollments >

Students >

Materials >

Reporting Tools >

Test Setup >



Enrollment

Enrollment System is currently locked for selected Administration.

* Indicates required fields

Administration
2014 Spring PSSA

District
Sample District - 412

School
Sample School 1 - 0

Show Enrollments

Enter Enrollments Summary Status

Enrollment Data for School 412345678-012345678 has been completed. You may continue making changes through the end of the enrollment window.

[Instructions](#)

Contacts & Addresses *

School Testing Coordinator: Test Coordinator
Phone: 123-456-7777
Email: testcoordinator@pauser.com
Shipping Materials: 3456 Testing Blvd
Harrisburg, PA 12345

School Technical Coordinator: Technology Coordinator
Phone: 222-345-6789
Email: technologycoordinator@pauser.com
Technical Correspondence: 9999 Technology Drive
Harrisburg, PA 12345

School Reporting Contact: Reporting Contact
Phone: 111-222-3333
Email: reportingcontact@pauser.com
Mailing Reports: 1234 Any Street
Harrisburg, PA 12345

Update Contacts & Addresses

Enrollment for School 412345678-012345678 (2014 Spring PSSA)

| Assessment | Number of Students Testing | | | Accommodated Materials | | |
|-----------------------------|----------------------------|--------------|---------|------------------------|--------------------|----------------------|
| | Online | Paper/Pencil | Spanish | Large Print | Braille Contracted | Braille Uncontracted |
| Grade 3 Reading/Mathematics | | | | | | |
| Grade 4 Reading/Mathematics | 54 | 65 | 1 | 1 | 0 | 0 |
| Grade 4 Science | 54 | 65 | | | | |
| Grade 5 Reading/Mathematics | 55 | 63 | | | | |
| Grade 5 Writing | 55 | 63 | | | | |
| Grade 6 Reading/Mathematics | | | | | | |
| Grade 7 Reading/Mathematics | | | | | | |
| Grade 8 Reading/Mathematics | | | | | | |
| Grade 8 Science | | | | | | |
| Grade 8 Writing | | | | | | |

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Home

Additional Materials Ordering

DRC maintains its superior customer service reputation by making sure orders for additional materials, including additional accommodated materials, are shipped promptly. Should a school’s enrollment change between the submission of its enrollment and the time of testing, Assessment Coordinators can request additional testing materials, including any accommodated materials (excluding Braille), via eDIRECT. Braille orders must be placed by calling a Customer Service Representative or by email. DRC’s toll-free number and email address will be listed in all correspondence, as well as the Handbook for Assessment Coordinators. Please see *Subheading 4.M., Customer Service* for more information on DRC’s Pennsylvania Customer Service function and process.

Similar to the Enrollment System, permissions to the eDIRECT Additional Materials system will be assigned to all District Assessment Coordinators. Accordingly, the DACs (or their designees) will be able to place, confirm, and track their orders in an easy-to-use system. The eDIRECT system allows the Project Management Team to verify orders placed by the field and automatically send orders to DRC’s Order Fulfillment System, which instructs our Logistics Department to send the requested materials to the testing site. This proprietary system allows flexibility of delivery locations and methods and is linked to DRC’s Operations Materials Management System (Ops MMS) for overall tracking of secure materials.

Additional Materials Ordering Screen on eDIRECT

Client Entry

[Instructions](#)

Administration: 2015 Spring Keystone Exams District: School:

Additional Materials Entry

| Additional Materials Description | Request Qty | Shipping Qty |
|--------------------------------------------------------------------|----------------------|----------------------|
| Algebra I Booklet(s) | <input type="text"/> | <input type="text"/> |
| Algebra I Directions for Administration Manual | <input type="text"/> | <input type="text"/> |
| Algebra I Large-Print Booklet(s) | <input type="text"/> | <input type="text"/> |
| Algebra I Online Directions for Administration Manual | <input type="text"/> | <input type="text"/> |
| Algebra I Spanish Booklet(s) | <input type="text"/> | <input type="text"/> |
| Algebra I Spanish Translation Directions for Administration Manual | <input type="text"/> | <input type="text"/> |
| Biology Booklet(s) | <input type="text"/> | <input type="text"/> |
| Biology Directions for Administration Manual | <input type="text"/> | <input type="text"/> |
| Biology Large-Print Booklet(s) | <input type="text"/> | <input type="text"/> |
| Biology Online Directions for Administration Manual | <input type="text"/> | <input type="text"/> |

Submit Add Items Cancel

Requests for additional materials received before 3:00 p.m. Central Time will be processed on the same business day. DRC will ship orders via secure, traceable 3-day ground delivery, unless 2-day or overnight is warranted to ensure materials arrive before testing. Records of orders for additional materials will be maintained by the Pennsylvania Project Management Team along with the records of original shipments and will be made available to PDE for review, if desired. Date of shipment, addressee, document or material shipped, shipping weight, and method of shipment will be indicated so that proper documentation will be available should questions arise regarding the shipment and/or receipt of materials. District Assessment Coordinators will also be required to account for additional secure test materials using the Materials Accountability Form processes via eDIRECT.

Tracking System

DRC uses only trackable delivery and collection methods. Delivery of materials will be scheduled during regular weekday school hours, 9:00 a.m. to 3:00 p.m. Eastern Time, or by appointment with school/district officials. All shipments from DRC will prompt email notifications to test coordinators that materials are in transit to them. DRC's shipping contractor for Pennsylvania, Advanced Shipping Technologies (AST), has successfully provided email notifications to the Pittsburgh and Philadelphia school districts and will expand that notification process to all other LEAs that receive materials directly from AST. For shipments that are handled by United Parcel Service (UPS), for instance additional materials shipments, the same carrier-generated email notifications that have been successfully used in the past will continue to notify those LEAs of the materials in transit.

All shipments will be designated as "inside delivery required." Signatures of receipt will provide proof of delivery. DRC and LEAs will be able to track all shipments via real-time updates on the tracking management system of AST and its partner carriers. This state-of-the-art tracking system can be accessed via smart phone or other mobile devices and allows for signature updates at the time of actual delivery. We will collaborate with PDE to determine the level of visibility that should be available to the LEAs, and we will be able to provide PDE access to these online tracking systems, if desired.

Please see *Subheading 4.D.5* for additional information on security procedures used during the shipment and collection of Pennsylvania assessment materials.

4.D.2. TEST BOOKS

DRC will produce, print, and package all test booklets and answer documents needed for the PSSA and Keystone Exams assessments for each administration included in this contract. Separate test booklets and answer documents are needed for PSSA and Keystone Exams, except for grade 3 PSSA, which will require consumable test booklets for ELA and mathematics. For this contract, DRC and our subcontracting partners will be printing the standard test forms as well as the

accommodated forms. DRC will require any third-party subcontractors who have access to secure materials to sign a PDE-approved confidentiality statement.

A list of the non-accommodated test booklets and answer documents to be printed for the PSSA and Keystone Exams is presented as follows. Please also see *Volume IV; Appendix G, Materials List*, for our Material List, which includes production specifications such as number of pages, etc. Sample student materials produced by DRC are included in *Volume III; Appendix C, Sample Student Materials* (confidential).

PSSA Consumable Test Booklets

- Mathematics Grade 3
- ELA Grade 3

PSSA Test Booklets and Answer Documents

- Mathematics Grade 4
- Mathematics Grade 5
- Mathematics Grade 6
- Mathematics Grade 7
- Mathematics Grade 8
- ELA Grade 4
- ELA Grade 5
- ELA Grade 6
- ELA Grade 7
- ELA Grade 8
- Science Grade 4
- Science Grade 8

Keystone Exams Test Booklets and Answer Documents

- Algebra I
- Biology
- Literature

The **test booklets** will be customized to show the PSSA or Keystone Exams name, the Pennsylvania logo, the form number, the content area, and a place for the student name on the cover. The grades 4–8 PSSA mathematics test booklets will be formatted to allow students to seal the portion of Section 1 reserved for

non-calculator items. All test booklets will be color-coded by grade and content area. The color scheme for the test booklets will be duplicated across all correlating answer documents and the administration manual for each grade's content area.

A separate customized, form-specific, image-scannable **answer document** for each grade's content areas (except for grade 3) will be created in collaboration with PDE. DRC's custom-designed answer documents will feature clear directions to help students easily navigate between the test booklet and answer document. In particular, DRC recommends that the test booklet clearly indicate the exact location where students should respond to an open-ended question in the answer document, along with instructions after the student response area directing students to return to the appropriate page in the test booklet.

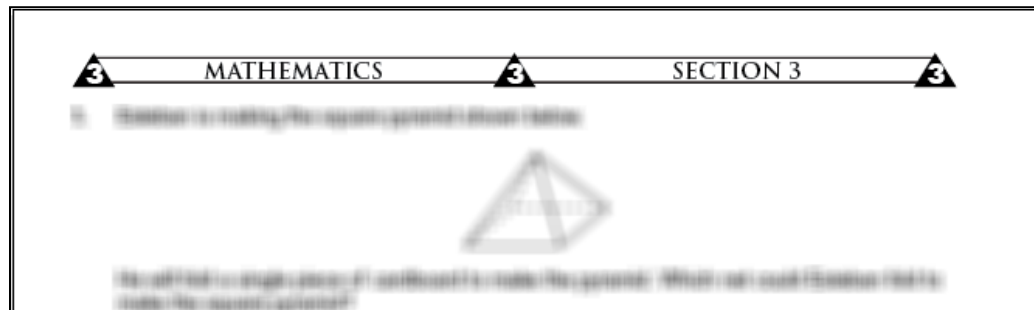
The ELA tests will contain separate sections for Writing and Reading. Consistent with PDE's practice for the current ELA assessment, the writing prompt in the ELA test booklet will be covered with a seal that the students can easily remove at the time of testing. DRC's custom-designed zipper seals will be affixed to each ELA test booklet to provide PDE with an enhanced measure of test security associated with writing prompts.

In addition to recording answers, the answer documents will be used to collect **student demographic data**, as specified by PDE. Incorporated into each answer document will be a specially created section for adhering pre-printed student labels that contain student identification and demographic information. To accommodate those students who are enrolled after precoding has been completed, pre-printed district/school labels will be provided and student identification and demographic information will be handcoded into the demographic section. The consumable test booklets for grade 3 will be designed as scannable documents and will contain grids for collecting student demographic information and space for the application of a student precode label.

DRC will collaborate with PDE to determine design, layout, and location of the demographic sections. DRC's Project Management Team will meet with PDE on an annual basis to determine if changes to the demographic sections are needed.

The test booklets and answer documents will mirror each other in terms of item numbering and section layout. The beginning and ending of test sections will be clearly identified in the test booklets and answer documents. Additionally, as approved by PDE, DRC plans to incorporate new graphics into the headers in 2016 to provide additional visual aids for students and test administrators to help ensure that students are referencing the matching section between the test booklet and answer booklet documents. For example, as shown in the figure below, the number 3 will appear within a triangle in the Section 3 header of the test booklet and answer document. The section number (3) is represented numerically as the numeral 3, a three-sided shape (triangle), and three appearances.

Example of New Section Headers



Note: Graphic is blurred to maintain item security and/or student confidentiality.

Test instructions will include the page number and item number where the items are found in the answer document. (For example: *Turn to page 3 in your answer document to complete questions 20–29.*) After the student response area in the answer document, a prompt will be provided to cue the student to return to the appropriate page in the test booklet. (For example: *Now turn to page 8 of your test booklet.*) DRC has successfully used such visual aids and prompts in Pennsylvania and in other states to help students navigate from test booklets to the appropriate sections of answer documents. Students will be able to easily match the page number and item number to the instruction given in the test booklets and answer documents. This will help ensure that students respond to the correct items in the correct sections of the answer documents.

Test booklets and answer documents, including design, layout, use of graphics, and format of directions, will be developed according to Universal Design principles and procedures to minimize examinee confusion and ensure access by the broadest population of students. Additionally, clear, straightforward test instructions will also be provided in the administration manuals.

DRC will ensure that printing of the PSSA and Keystone Exams test material adheres to strict quality control procedures. Printed test booklets will be paired with form-matching answer documents and shrink-wrapped in packages of 17 with range sheets identifying the grade, content area, and sequential security barcode numbers of the booklets enclosed. DRC will generate a unique security barcode that will be printed on each test booklet and answer document. The barcode will ensure that each booklet is unequivocally associated with only one record in a master database. This packaging method and the use of Security Checklists (displaying the full range of secure materials within the shrink-wrapped packs) ensure that only essential district personnel and the student need to handle an individual booklet for testing.

Printed booklets and documents will be subjected to strict quality assurance inspections to ensure accuracy. The format and precision of the printed information will be closely examined by DRC's Software Quality Assurance Analysts to make certain the information is correct. DRC is confident that our use of barcoding technology will maintain an accurate account of all test booklets and

answer documents. The barcodes will allow us to maximize the capabilities of our Operations Materials Management System (Ops MMS), which is a proprietary and innovative system that utilizes barcode technology. Ops MMS provides an accurate, efficient, real-time method for tracking secure materials throughout every stage of administration, including packaging, distribution, and collection; materials receipt and check-in; processing, scanning, and editing; scoring; data validation; and data conversion for reporting. The security barcodes are also used to create school security checklists, packing lists, and Missing Materials Reports.

Writer's Checklist and Formula Sheets

DRC will provide the **Writer's Checklist** for the mode-specific writing prompts as one-page, separate handouts rather than included in the printed ELA test booklets. The Writer's Checklists will be grade-specific so that students are provided with a checklist for the mode to which they'll be required to respond. The checklists will be provided as separate sheets that are supplied to districts and schools with the other testing materials. DRC will also include the Writer's Checklists in appropriate printed materials, such as the Directions for Administration, as directed by PDE. We will supply the checklists in a format that can be posted online. Prior to publication, DRC will employ a series of quality control steps designed to ensure that the Writer's Checklists are free of error. DRC will be prepared to update the Writer's Checklists on an annual basis.

DRC's Test Development Team, in collaboration with PDE, will review the existing **mathematical formula sheets**. The formula sheets will be revised, per PDE feedback each year of the program, if needed. DRC will make all PDE-approved revisions to the mathematical formula sheets and oversee the publication process. The mathematical formula sheets will be provided as a separate handout (one-page, front and back), rather than included in the printed test booklets. Similar to the Writer's Checklists, DRC will include the formula sheets in appropriate printed materials, such as the Directions for Administration, as directed by PDE. We will supply mathematical formula sheets in a format that can be posted online. Prior to publication, DRC will employ a series of quality control steps designed to ensure that the mathematical formula sheets are free of error.

Spanish Translation Materials

DRC has extensive experience providing non-English versions of testing materials for Pennsylvania and other state clients. Based on these experiences, we understand the challenges associated with this level of effort. DRC understands that a Spanish translation form is required for each grade of PSSA mathematics and PSSA science, and is required for all three annual operational administrations of the Algebra I and Biology Keystone Exams (including the embedded field test items). One form per administration per grade of mathematics and science and one form per administration per course of Algebra I and Biology will be translated from its original English into the Spanish language.

DRC understands that although no online versions of the Spanish translations will be required, Spanish translation materials (forms and manuals) will be typeset and printed as unique documents. DRC acknowledges the quantity and page-length estimates provided in the RFP. Actual quantities to be produced and provided to LEAs and schools will be collected during the online enrollment process. Please refer to *Volume IV; Appendix G, Material Lists*, which includes detailed specifications for all printed material to be produced.

With the exception of grade 3, the English/Spanish versions of the test will be printed so that the original English is presented on the right side of the booklet, with the Spanish translation presented on the left side. Due to the nature of the scannable booklet used at grade 3, DRC proposes that the translated Spanish should be presented as the primary text, while the original English should be presented in an inter-linear format within the primary text. We will also provide Spanish-translation Directions for Administration Manuals that contain test taking directions in Spanish. For the constructed-response items within these translated materials, DRC understands that highly qualified Spanish-speaking mathematics and science readers are to score the responses in the original Spanish response.

Spanish Translation Methodology: Overview

DRC will employ three layers within the translation process to ensure accuracy and consistency in the translation—an initial external translation, an internal translation processing, and an external translation verification. Two key components within this Spanish translation process are:

- Developing and maintaining a Pennsylvania program-based Spanish style guide and Pennsylvania program-based Spanish glossaries, and
- Utilizing reviewers with strong subject area background in the material being tested.

To guide initial translation efforts, DRC provides its translation vendors with an **English-to-Spanish Translation Glossary** and a **Translation Guide**. This glossary contains terms that, due to the nature of the differences in the two languages and the diversity of Spanish dialects, require clarification in order to maintain consistent contextual word choice, ensuring parallel terminologies, avoiding idiomatic phrasing, and incorporating universal Spanish language (based on *Real Academia Española*, an organization that sets grammar and vocabulary usage rules for all Spanish-speaking countries) as opposed to regional dialectical influences. The Translation Guide outlines the decision-making process DRC employs when translating items and passages. In addition, when DRC's Spanish Team reviews the materials produced by the Spanish translation vendor, DRC uses the same Spanish Translation Glossary to guide the editing decisions. The Spanish glossary is continually updated to reflect any additional decision points in preparation for the next test administration.

Translators must be accustomed to rendering translations that are accessible to the widest possible audience, and the selection of Spanish-speaking reviewers who have content area expertise ensures that the translation is natural and not idiomatic. It will be especially important to identify the variety of the dialects spoken by students in Pennsylvania for this part of the process, and we will rely on PDE to provide advice based on the Commonwealth's demographics. (When there is a conflict between usage norms, we propose to select the option that is the closest to the *Real Academia Española* usage.) Reviewers will focus on content comparably to ensure the equivalence of the original and translated assessments. This step will provide evidence that the Spanish versions of the tests are equivalent to the English language versions and that the same content area knowledge is being assessed in the Spanish versions. In order to ensure that the English and target-language versions of the assessments are equivalent, an iterative process of review and revision will be used.

Spanish Translation Methodology: Primary Spanish Teams

All levels of the Spanish translation effort for the mathematics and science assessments will be organized and conducted by **DRC's Spanish Project Lead, Ms. Maria Eiffler**. Having one person ultimately providing guidance and oversight to the project will ensure that all translations are consistent and equivalent, both to the English versions and to each other. Victory Productions will provide the initial Spanish translation services, and Language Services Consultants (LSC) will perform a translation verification process. Both Victory Productions and LSC are Small Diverse Businesses.

Spanish Translation Methodology: Initial External Translation

For each administration, DRC will initiate the translation tasks as soon as the respective content and grade test forms have been approved as final. DRC's partner, Victory Productions, will perform the initial translation of the testing materials. Victory Productions will be responsible for the initial translation, review, and revision of all PSSA and Keystone Exams items and relevant materials.

Once Victory Productions receives the finalized English versions of the assessments, the materials will be forwarded to Spanish translators. Victory Productions' translators and reviewers are professional translators, and all translators used in this project will be experienced in translating test items. DRC also requires that the translators Victory Productions selects for the PSSA and Keystone Exams have a good command of the content area of the tests to which they are assigned. This specialization helps to ensure that the translations will faithfully render the intention of the original English items in all of the content areas covered by this contract.

Each translator will first conduct a linguistic bias review to determine if there are any stimuli, stems, or options that cannot be translated into the target language. Each translator will also review the test for cultural bias in the content or context

of items. In addition to documenting these issues as they arise, the translators' comments will be relayed to DRC's Spanish Team for a decision on these matters. In some cases, it is possible that DRC may wish to propose a substitute for an item for which the translation from English is problematic. The translator will also determine if any clarification of meaning in the English version is needed. Other issues may arise in each language, such as whether to use the informal *tú* or formal *usted* form of the second person when addressing the examinee in Spanish language versions of the tests. Such decisions will be made at this initial phase, jointly with DRC's Spanish Team, before any translation has begun. Once the linguistic and cultural bias review is complete and all issues have been resolved with DRC, the English assessments will be translated.

During the translation, reviewers will focus on appropriate register for the age level of the examinee, the accuracy of the translation, and whether the wording of anything can be improved to make it more accessible, while at the same time remaining faithful to the original document. Reviewers will also check the translation to ensure that multiple-choice items follow appropriate item writing guidelines, and that formulaic expressions are translated consistently throughout the document and across tests in the same language. Reviewers will verify that universally understandable terms are used and that appropriate glosses (alternate wordings) have been inserted in parentheses where necessary.

External reviewers are instructed to address a number of issues when reviewing a translation, including the following:

- Are the stimulus and the item translated correctly?
- Are there inappropriate omissions in the translation?
- Are there inappropriate additions in the translation?
- Is there any wording that may not be comprehensible to speakers of a particular dialect? If so, the reviewer will enter an alternate wording in parentheses.
- Are standard item writing guidelines followed in the translated version?
- Are any options less or more attractive than in the English version? If so, the reviewer will suggest an alternate wording.
- Is the content of any item culturally insensitive or offensive? Is a substitute item required? Why?
- Is the wording of any item culturally insensitive or offensive?
- Is the language of the translation at the same register as the original?
- Is the language of the translation at an appropriate register for the grade level of the examinee?

Following review, the suggested revisions will be sent back to the translation manager and the translator. These two professionals will work together to implement all appropriate revisions. When completed, the verified materials, along with any recommendations, will be passed back to DRC for processing.

Spanish Translation Methodology: Translation Verification

Once Victory Productions has completed the initial translation of the entire set of materials, all translated material and the original English version are then sent to Language Services Consultants (LSC) for a **third-party verification** of the translation. LSC's review will help to ensure the equivalence of the original and translated assessments. When completed, the verified materials, along with any recommendations or questions, are passed back to DRC for processing.

Once Language Services Consultants (LSC) has adjudicated the initial translation completed by Victory Productions, the translated text is returned to DRC for final processing and typesetting. DRC has a Spanish translation team comprised of native Spanish-speaking translators and native English-speakers with formal education in Spanish. DRC's Spanish Team is supported by all content areas and their respective content leads in order to maintain the integrity of each translated item or passage. DRC conducts a minimum of five separate reads during the final preparation of the translated material. These reads include editorial reviews of items and forms and are used to polish language and eliminate any typographical errors.

An initial reading of items and passages is conducted individually by each member of the team. The team then reads, discusses, and edits the items as a group before sending the material to be entered into the item bank that houses Pennsylvania's test items (IDEAS). As part of the discussion and editing process, DRC's Spanish Team may also conduct an informational investigation, validating concepts within the translation related to specialized topics. Once the data entry is completed, DRC's Spanish Team confirms that the correct edits have been made and the items are read once again. After all newly-translated items have been edited and approved in this round of review, a PDF of the entire test form is produced. The Spanish Team then conducts a group review of the complete test form, coinciding with an independent review outside the team, making any edits that are necessary. Within each review, checks are performed to ensure accuracy of semantics, lexicon, syntax, and grammar.

Internal reviewers are instructed to address a number of issues when reviewing a translation, including the following:

- Are the stimulus and the item translated correctly?
- Are there inappropriate omissions in the translation?
- Are there inappropriate additions in the translation?

- Is there any wording that may not be comprehensible to speakers of a particular dialect? If so, the reviewer will enter an alternate wording in parentheses.
- Are standard item writing guidelines followed in the translated version?
- Are any options less or more attractive than in the English version? If so, the reviewer will suggest an alternate wording.
- Is the content of any item culturally insensitive or offensive? Is a substitute item required? Why?
- Is the wording of any item culturally insensitive or offensive?
- Is the language of the translation at the same register as the original?
- Is the language of the translation at an appropriate register for the grade level of the examinee?

Spanish Translation Methodology: Translation Finalization

After the three layers of the translation process have been completed, DRC's Spanish Team will adjudicate any final adjustments to the test form. Once the PDF is approved, the test form is sent to an independent Spanish consultant for one last proofread before being approved to print. During formal reviews of PDFs and printer's proofs, the Pennsylvania Spanish Form Review Checklist is used to ensure the form is free from error or defect. This checklist lays out all steps that are necessary to complete a form review, including specialized steps that are exclusive to translated forms. The checklist promotes verification that all words, text, numbers, and characters contained in an English item or passage are accounted for in the Spanish variation. This includes a comparison of the content of the English and the Spanish and verification that all answer options are unique.

Large Print and Braille Versions for the PSSA and Keystone Exams

Large Print Versions

DRC has full in-house capability to develop, produce, reformat, and print Large Print test materials. We have extensive experience providing Large Print materials for many state assessment clients, including Alaska, Louisiana, Idaho, South Carolina, and Pennsylvania.

DRC's Document/Graphics Design Group and Printing Department will provide Large Print materials formatted to meet the needs of the PSSA and the Keystone Exams. One form per test/grade per administration will be selected from which the Large Print versions will be produced. We will work with PDE as the Large Print versions are formatted to ensure all specifications for the Large Print versions are met. The Large Print materials will be provided to PDE for review and approval prior to production. Supplemental instructions regarding transferring of student responses to the test booklets/answer documents will be provided to test administrators. DRC acknowledges that approximately 100 Large Print

versions for each grade and content area of the PSSA and approximately 70 Large Print versions for the Algebra I, Biology, and Literature Keystone Exams were required during the 2013–2014 administration. Using quantity requirements provided through the enrollment process and/or by PDE, DRC will ensure sufficient quantities of Large Print versions of test materials are available for each administration.

Braille Versions

Each year, DRC will work with staff from American Printing House for the Blind (APH) to produce Unified English Braille versions of each PSSA test and the Keystone Exams in Algebra I, Biology, and Literature (one form per test/grade per administration). APH will ensure that all tests are modified correctly and that they are accurate. APH has produced Braille versions of tests and educational materials for numerous publishers and testing organizations. DRC has used their services for other assessment programs for several years with excellent results. Both contracted and uncontracted Braille will be available, and codes accepted by the Braille Authority of North America (BANA) will be followed.

Supplemental instructions regarding transferring of student responses to the test booklets/answer documents will be provided to test administrators. DRC acknowledges that approximately seven Braille versions for each grade and content area of the PSSA and approximately eight Braille versions for the Algebra I, Biology, and Literature Keystone Exams were required during previous administrations. Braille versions will be ordered during the enrollment process, and DRC will ensure that a sufficient number of copies are available for any last minute orders.

DRC will also provide support for refreshable Braille for online versions of the PSSA tests and Keystone Exams. More information regarding our solution for refreshable Braille can be found in *Subheading 4.F.3., Tools and Accommodations; Online Accommodations.*

4.D.3. STUDENT SPECIFIC DEMOGRAPHIC LABELS

Pre-ID Data

DRC will produce labels with student specific demographics embedded in the labels and send them to schools along with the shipments of test books and answer books for all student taking paper/pencil tests. DRC is accustomed to receiving Pennsylvania Information Management System (PIMS) data from PDE. In fact, in 2008, DRC worked closely with PDE and its partners to define the required data elements, schedules, and procedures needed for a successful transition to data collection through PIMS. With an understanding of the need for data integrity and the importance of longitudinal reporting and tracking, DRC played a significant role in assisting PDE to develop the data-collection protocols for PIMS, to ensure the appropriate level of student demographic information is collected, and to support the use of the data in the state assessments.

Over the years, DRC has successfully utilized student demographic information from PIMS, including first and last names, birthdates, etc. This information has been easily loaded into DRC's database system and used in DRC's student Pre-ID process for paper and pencil and computer-based testing, all while maintaining the accuracy of PAsecureID numbers and associated data. In addition, many of DRC's other state assessment clients use similar student identification systems.

We understand that PDE will provide DRC with an electronic data file from PIMS that will contain all necessary student identification information required for reporting. DRC will receive a complete PIMS student file from PDE that includes all students participating in the PSSA and the Keystone Exams. Prior to reporting, DRC will receive a second PIMS file that contains updated data. The updated data will be incorporated into our database for use during reporting. Currently, the PIMS reporting file for the Spring Keystone Exams is also used to identify the grade 11 population for accountability reporting. DRC has worked closely with PDE to establish the requirements for all PIMS files, and we are fully prepared to use that experience when PDE makes the determination that the PIMS reporting file for the PSSA should be used to identify the grades 3–8 student population for accountability reporting.

The exchange of data between entities is a critical and essential component in the continued success of Pennsylvania's assessment programs. We recognize the importance of this function and have embedded quality checks throughout the process. Detailed standards during the data transfer process will be followed, and quality inspections will be performed by DRC's Software Quality Assurance (SQA) Analysts to ensure the data is transferred accurately. DRC will perform detailed validation on the data files received. DRC will work with PDE to confirm these procedures and will modify the process as appropriate. Any data issues that affect the accuracy of reporting a student's results will be presented to PDE for resolution. Please refer to *Subheadings 4.1.2., Data Documentation through Subheading 4.1.7., PSSA and Keystone Exams Data Files Process*, for more information on DRC's data management procedures.

For the PSSA, Pre-ID labels will be automatically generated for all students based on a PSSA Precode file received from PIMS in December each year. DRC will continue to produce Pre-ID labels for all students eligible for the PSSA, without the requirement to create paper/pencil test sessions in eDIRECT, until the online participation has increased enough to warrant a process change. For the Keystone Exams, Pre-ID labels will be generated based on separate PIMS files for each administration and paper/pencil test sessions created in eDIRECT. Student information obtained from the PIMS data files will be used to pre-populate DRC's Test Setup application in eDIRECT for LEAs to view the student data and to create paper/pencil and online test sessions, as necessary. Student names and demographic information will be automatically loaded to ensure accuracy.

For online testing, a test ticket is created for those students placed in an online test session in eDIRECT during the Test Setup window. Using eDIRECT, LEAs will

be able to verify PIMS data associated with students before placing them into paper/pencil or computer-based sessions. eDIRECT allows LEAs to view student information associated with their sites only. DRC's eDIRECT Test Setup application also does not allow users to update the student demographic information obtained from PIMS, following the strict PDE requirement that all PIMS-generated data must remain intact in any outside systems. If student data is incorrect, LEAs will have the opportunity to test the student without a Pre-ID label for paper/pencil tests, or as a new student loaded to eDIRECT for online testing. More information on our online assessment management system, eDIRECT, is provided in *Subheading 4.D.1., Online Ordering and Tracking System*, and *Subheading 4.F.7.c. Online Enrollment and Test Setup*.

Please see below for more information on Pre-ID labels. DRC's proposed solution for computer-based testing for the Pennsylvania assessments, DRC INSIGHT, is presented in *Subheading 4.F.1. Expanding Online Testing*, while specific information on test tickets is provided in *Subheading 4.F.7.c., Online Enrollment and Test Setup; Student Test Login Tickets*. DRC's proposed enrollment process is discussed in *Subheading 4.D.1., Online Ordering and Tracking System*.

Security of Pre-ID Information

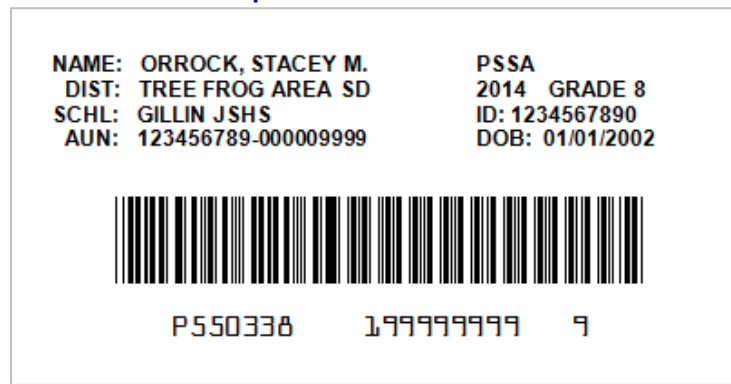
DRC will incorporate rigorous quality assurance activities throughout the process to ensure the highest level of data quality, integrity, and security. All Pennsylvania Pre-ID data will be accurately stored in a secure database environment. DRC enforces strict security measures to prohibit unauthorized personnel from gaining access to assessment and client data, including personally identifiable information (PII), through either deliberate or unintentional action. DRC utilizes robust security measures that protect our facilities and computing environment (including hardware, data, and networks). DRC will ensure that all student data remains confidential and secure. Please see *Subheading 4.E.7., Test Security* for more information on DRC's stringent security measures.

Pre-ID Labels

Using PIMS data, DRC will produce and distribute student Pre-ID labels for paper and pencil tests for PSSA and the Keystone Exams. The information presented on the label will include student last name, first name, middle initial, AUN, school name, district name, assessment name, PAsecureID, date of birth, and unique barcode number.

The Pre-ID barcode will ensure that each student response document returned to DRC can be unequivocally associated with only one record in our master Pre-ID database. The following figure displays an example of the type of information printed onto student Pre-ID labels.

Sample Student Pre-ID Label



Printing of the Pre-ID labels will take place at DRC's in-house printing facility. Requirements and printed materials will be subjected to strict quality assurance inspections to ensure accuracy. The format and precision of the printed information will be closely examined by DRC's SQA Analysts to make certain the information is correct.

Upon return of the student answer documents at DRC for scoring, the barcode numbers on student Pre-ID labels affixed to answer documents will be scanned and validated against the Pre-ID database. The barcode corresponds to the Pre-ID number and is human- and machine-readable. The unique number will link the student responses with their demographic information through the reporting of results.

Student Mobility

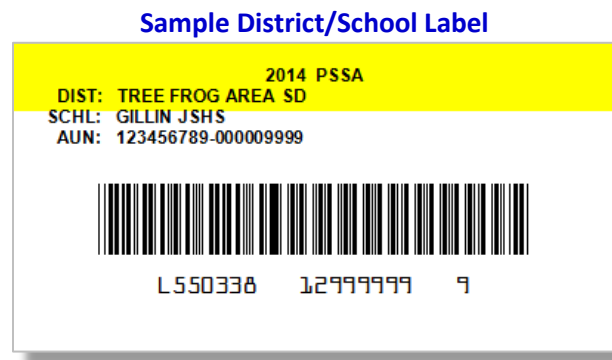
Our system and processes **are uniquely designed to address student mobility**. For paper and pencil tests, students who are not included in the PIMs data files and in DRC's Pre-ID database at the time of test administration, such as new or transfer students, can be hand-coded by LEAs onto test booklets/answer documents during test administration, using procedures provided in the Handbook for Assessment Coordinators and Directions for Administration Manuals (DFAs). To accommodate new students who will test online, the eDIRECT Test Setup functionality allows LEAs to take ownership of a student who was previously uploaded to another LEA and add them to an online test session.

For the purpose of identifying new students testing via paper and pencil, DRC will also provide district/school labels and additional answer documents for each school. These labels will then be affixed to answer documents for students who do not have Pre-ID labels. Each district/school label will also contain a unique barcode number that will be used to associate the answer document with a specific district and school. Student identification and demographic information will then be hand-coded into the demographic section of the answer document. For these students, identification and demographic information will be incorporated into DRC's master database at the time of scanning. Hand-coded information is verified through our editing process to ensure 100% accuracy

(please refer to *Subheading 4.E.1., Scanning/Imaging and Scoring* for more information on scanning and editing). Each student included in the master Pre-ID database or from hand-coded answer documents will be accounted for and included in the scored student file, ensuring a high rate of accuracy and accountability.

District/school labels will be collated with the student Pre-ID labels in district and school order; District Assessment Coordinators will be able to order additional district/school labels and test booklets/answer documents through DRC's online assessment management system, eDIRECT (for more information on eDIRECT please see *Subheading 4.D.1., Online Ordering and Tracking System* and *Subheading 4.F.7., Date Integration and Collection*).

A sample district/school label is depicted in the following figure.



DRC has many options to offer for updating and maintaining student demographic data. We look forward to customizing a solution that best meets PDE's needs, and we welcome the opportunity to further discuss other Pre-ID options.

4.D.4. SUPPORT MATERIALS FOR TEST ADMINISTRATION

DRC will develop, print, and deliver support materials (manuals, guides, ancillaries) for the PSSA, the Keystone Exams, and the CDT assessments. DRC will also provide the support materials in PDF format suitable for posting to the web. The support materials will be mocked up, typeset, and submitted using similar developmental and proofreading steps as described above for the Pennsylvania test booklets. During the development process and prior to printing, a four-way match between the test booklets, answer documents (or integrated test booklets), Directions for Administration Manuals, and Handbooks for Assessment Coordinators will be performed by DRC Project Management and Test Development staff to ensure accuracy of all instructions. Manual proofs will be free of typographical and formatting errors before they are submitted to PDE for review.

DRC understands that testing is an enormous undertaking for all school staff at a very busy time of year, so we constantly strive to make our test support materials

useful and easy to understand. DRC has extensive background and experience in writing and editing effective manuals and other support material, including those currently used for the PSSA, Keystone Exams, and CDT. DRC will work with PDE to continue designing manuals and support material for the Pennsylvania assessments that are clear, concise, and user-friendly, making it easier for district and school administrators to have a successful testing season. Please refer to *Volume IV; Appendix G* for our Material List, which includes detailed specifications for all program material to be produced.

4.D.4.a. PSSA Support Materials and 4.D.4.b. Keystone Exams Support Materials

Directions for Administration (DFA) Manuals for Paper and Online Tests

DRC anticipates developing the following Directions for Administration (DFA) Manuals for each administration included under this contract:

PSSA Directions for Administration Manuals

| Content/Grade | Paper/Pencil Version | Computer-Based Version | English/Spanish Version |
|----------------------|-----------------------------|-------------------------------|--------------------------------|
| Mathematics Grade 3 | X | X | X |
| Mathematics Grade 4 | X | X | X |
| Mathematics Grade 5 | X | X | X |
| Mathematics Grade 6 | X | X | X |
| Mathematics Grade 7 | X | X | X |
| Mathematics Grade 8 | X | X | X |
| ELA Grade 3 | X | X | |
| ELA Grade 4 | X | X | |
| ELA Grade 5 | X | X | |
| ELA Grade 6 | X | X | |
| ELA Grade 7 | X | X | |
| ELA Grade 8 | X | X | |
| Science Grade 4 | X | X | X |
| Science Grade 8 | X | X | X |

Keystone Exams Directions for Administration Manuals

| Content/Grade | Paper/Pencil Version | Computer-Based Version | English/Spanish Version |
|----------------------|-----------------------------|-------------------------------|--------------------------------|
| Winter Algebra I | X | X | X |
| Spring Algebra I | X | X | X |
| Summer Algebra I | X | X | X |
| Winter Biology | X | X | X |
| Spring Biology | X | X | X |
| Summer Biology | X | X | X |
| Winter Literature | X | X | |
| Spring Literature | X | X | |
| Summer Literature | X | X | |

The manuals will include information pertaining to the handling and security of the test booklets and answer documents and general information about how to administer the assessments, as well as specific test instructions for each test. The test administration manuals will contain easy-to-follow directions written in narrative format to be read directly to the students. DRC staff will work closely with PDE to establish and update policies and procedures for each administration of the PSSA and Keystone Exams.

As with all materials, PDE will review the content and format of the manuals and will have final approval. After incorporating any PDE edits and revisions, DRC will print and package the Directions for Administration Manuals. Hardcopies of the manuals will be distributed to local educational agencies (LEAs) and schools in appropriate quantities based on enrollment information at a rate of one manual for every 15 students; they will be shipped to arrive no later than four weeks before the testing window. All the Directions for Administration Manuals will also be provided in PDF format for use online. A sample Directions for Administration Manual is included in *Volume III; Appendix D, Sample Teacher and Administrator Materials*.

Handbook for Assessment Coordinators

DRC will work collaboratively with PDE to develop and update the Handbook for Assessment Coordinators for each administration of the PSSA and Keystone Exams covered under this contract on an annual basis. Throughout the handbook,

graphic illustrations will be used where appropriate to clarify testing procedures. The handbooks will be made as user-friendly as possible. DRC successfully produces the Handbook for Assessment Coordinators for the current PSSA and Keystone Exams programs, in addition to similar handbooks for many of our other state assessment clients. We take pride in producing clear, easy-to-understand, aesthetically pleasing, and error-free support materials, such as the handbooks.

DRC will collaborate with PDE to develop a Handbook for Assessment Coordinators that provides the following information:

- Delivery and inventory procedures for test materials
- Handling secure and non-secure testing materials
- Conducting standardized administrations of the tests
- Providing appropriate test accommodations for special population students
- Coding and identifying test materials for accurate scoring

For the PSSA, we propose that one version of the Handbook for Assessment Coordinators be produced to include all grades and tests. For the Keystone Exams, one version of the Handbook for Assessment Coordinators will be produced for each administration, covering all content areas. For the PSSA and the Keystone Exams, the handbooks will include information on both paper/pencil and computer-based tests and will include information on the English/Spanish tests and accommodated test forms.

PSSA and Keystone Exams Handbook for Assessment Coordinators

- PSSA Handbook for Assessment Coordinators will include mathematics, ELA, and science for grades 3–8
- Summer Keystone Exams Handbook for Assessment Coordinators will include Algebra I, Biology, and Literature
- Winter Keystone Exams Handbook for Assessment Coordinators will include Algebra I, Biology, and Literature
- Spring Keystone Exams Handbook for Assessment Coordinators will include Algebra I, Biology, and Literature

The handbooks for the PSSA and Keystone Exams will be mocked up, typeset, and reviewed using similar development and proofreading steps as those used for the test booklets/answer documents. PDE will have the opportunity to revise and approve the handbooks prior to printing. After incorporating any PDE edits and revisions, DRC will print and distribute the handbooks in appropriate quantities using enrollment information and/or quantities required by PDE. The handbooks will be shipped in the first shipment with the non-secure testing materials at least four weeks prior to the testing window. Handbooks will also be provided electronically in downloadable PDF format for use online. *Volume III; Appendix D, Sample Teacher and Administrator Materials*, contains a sample Handbook for Assessment Coordinators.

4.D.4.c. CDT Support Materials

DRC will develop and provide the following materials that will support the administration of the CDT:

- CDT User Guide
- CDT Technology User Guide
- CDT Interactive Report User Guide
- Quick Start Guide
- iPad and Chromebooks Technology User Guide

The CDT manuals and support materials will not be printed but will be provided as PDF documents to be posted online. DRC currently produces these materials in support of the CDT as part of our existing contract.

DRC will work collaboratively with PDE to update the CDT guides on an annual basis. Throughout the guides, graphic illustrations will be used where appropriate to make them as user-friendly as possible. The development process for the CDT guides will follow an iterative review process similar to that previously described for the Pennsylvania test booklets. During the development process, DRC Project

Management and Test Development staff will review the CDT guides and perform a cross-check with the CDT online experience to ensure accuracy of all instructions. Samples of materials produced for the CDT by DRC are included in *Volume III; Appendix D, Sample Teacher and Administrator Materials; CDT Interactive Map User Guide*.

4.D.4.d. Assessment Update Bulletins

DRC will produce and distribute up to six editions of the Assessment Updates annually. The multi-page (1–4 pages) Assessment Update newsletter will be distributed electronically to all school and LEA Assessment Coordinators and other school personnel, as directed by PDE. The Assessment Updates will be co-authored by DRC’s Project Management Team and PDE.

The Assessment Updates will contain useful and relevant assessment information. Some possible topics for Assessment Update newsletters include:

- Enrollment System information
- Upcoming key dates
- Training opportunities and technology announcements

For past administrations of the PSSA, Keystone Exams, and CDT, DRC has posted the final Assessment Updates on eDIRECT in a way that makes them accessible to the general public or eDIRECT users who have password-protected accounts. DRC promotes the availability of the Assessment Updates in a broadcast email that is sent to all district and school users in our eDIRECT database. We believe this “blanket” correspondence and access to the Assessment Updates without an eDIRECT account provide the best opportunity to reach the broadest testing audience, given our knowledge that some districts do not supply their School Assessment Coordinators (SAs) with eDIRECT accounts. DRC would also be pleased to discuss the details of a multimedia distribution plan for the Assessment Updates to gauge PDE’s interest and gather additional requirements. *Volume III; Appendix D, Sample Teacher and Administrator Materials*, contains a sample Assessment Update.

4.D.4.e. Ancillary Materials

DRC will work collaboratively with PDE to develop ancillary materials that effectively communicate consistent messages to the intended users. DRC will ensure that each proof is free of typographical and formatting errors before submission to PDE for review and approval. Any changes after PDE sign-off will require PDE approval. DRC successfully produces similar types of materials for many of our other state assessment clients. We take pride in producing clear, easy-to-understand, aesthetically pleasing, and error-free informational and interpretive materials.

4.D.4.e.i. Item and Scoring Samplers (PSSA and Keystone Exams)

DRC will develop Item and Scoring Samplers for the PSSA and Keystone Exams each year. The Item Samplers will include released items for each content area and grade level. They will also include answer keys for the multiple-choice items, along with distractor analysis for the multiple-choice answer choices and scoring guidelines for constructed-response items and writing prompts. DRC understands that PDE desires that 20% of PSSA items and 20% of one form of the Keystone Exams items will be released each year and that some of these items will be used in the Item and Scoring Samplers.

In addition, the samplers will include authentic exemplars of students' written responses to constructed-response items or writing prompts. DRC has a staff of experienced handscoring personnel well versed in selecting sample student responses for state release. DRC is aware that annotations for a public audience must be written differently than training annotations. In conjunction with our Test Development staff, our handscoring staff has provided this service for the Pennsylvania assessments for the past several years, as well as for many of our other clients, including the states of Kentucky, Louisiana, North Carolina, and South Carolina.

DRC will prepare the Item and Scoring Samplers for electronic posting on PDE's website. Prior to publication, DRC will employ a series of quality control steps designed to ensure that Item Samplers are free of errors. Please also refer to *Volume IV; Appendix G* for our Material List, which includes detailed specifications for all program material to be produced. Samples of the Item and Scoring Samplers are located in *Volume III; Appendix D, Sample Teacher and Administrator Materials*.

Additional information about the Item and Scoring Samplers can be found in *Subheading 4.C.2., Test Items*. In addition, DRC understands PDE's requirement to produce and deliver Unified English Braille and Video Sign Language (VSL) versions of the Item and Scoring Samplers.

DRC already has experience in the production of Braille Item and Scoring Samplers for the Pennsylvania Department of Education and successfully collaborated with PDE and the American Printing House for the Blind (APH) to produce PSSA Braille samplers in 2010. Those PSSA samplers have the items, student responses, and annotations translated into a Braille format. Our experience and success with this process provides PDE with assurance that all future Braille translations of the PSSA and Keystone Item and Scoring Samplers produced under DRC's guidance will be of the highest quality and will meet PDE's requirements and expectation for the final product.

DRC also has a distinct advantage as the **most qualified vendor to produce a Video Sign Language (VSL) Item and Scoring Sampler**. The online PSSA VSL accommodation was taken from a new concept to an available test accommodation by collaboration between DRC, PDE, and DRC's video

production vendor. DRC has extensive knowledge in the unique requirements for scripting test items for sign language translation and fully understands all of the critical elements involved in managing the production of high-quality sign language videos. We will update the item numbers on the sign language videos from the released operational items to match the presentation of the non-accommodated item samplers to produce VSL samplers that are of the same quality as the live administration of the online assessment. Because students do not currently respond to the summative assessment in recorded sign language, the VSL samplers will include videos for the items only. DRC will make the VSL Item and Scoring Samplers available for download from eDIRECT and will work with PDE to determine other appropriate avenues for access to the VSL samplers (e.g., PDE's website or PaTTAN's website).

4.D.4.f. Other Formats

All of the test support materials described in the preceding text will be provided in electronic format for PDE use. This includes any PowerPoint presentations developed by DRC for administration training workshops, in support of PDE. If requested, DRC will also prepare and provide reference materials (e.g., sample demographic pages). The format delivered to PDE will be appropriate for development of presentation slides, publications, and Internet website use (including Adobe[®] Acrobat[®] PDF and Microsoft[®] Word[®] formats).

4.D.5. PACKAGING, SHIPPING, DELIVERY, AND RETURN OF MATERIALS

Since 1992, DRC has managed all aspects of packaging and secure distribution and collection of test and ancillary materials for Pennsylvania assessments. We understand the preferences and logistical requirements of PDE and the Commonwealth's schools and districts, including the unique challenges facing some of the larger districts, such as Philadelphia and Pittsburgh. We are committed to continuing to provide accurate materials assembly, packaging, distribution, and collection under the new contract. *Volume IV; Appendix E, Organization and Security Forms* contains samples of Pennsylvania organization and security forms related to distribution and collection of secure materials.

DRC has also fulfilled similar packaging and shipping requirements for numerous large-scale assessment programs, including Alabama, Alaska, Louisiana, Michigan, Minnesota, Nebraska, Ohio, Oklahoma, South Carolina, and Washington. Annually, DRC packages and distributes over **27 million secure materials**.

Our **ISO 9001:2008 certified distribution, logistics, and materials processing processes** underscore the importance DRC places on quality; we take all necessary precautions to ensure accurate, on-schedule packaging and delivery of all assessment materials.

4.D.5.a. Packaging

DRC will use our proprietary Operations Materials Management System (Ops MMS), which utilizes advanced barcode technology to provide an accurate and efficient method for packaging materials. Systematic quality controls facilitate the tracking of secure materials throughout the packaging and distribution phases. Using scanners to “scan out” order-specific materials, Ops MMS provides the flexibility to package secure documents already pre-assigned at a site-specific level, or to use barcode scanning to assign secure ranges at the point of packaging. All requirements provided by site-specific packing lists must be satisfied by these scans in order to complete the packaging process. These systematic controls ensure that the accurate quantity, material type, and security range are pulled and packaged for the appropriate site.

DRC’s proprietary Operations Materials Management System (Ops MMS) ensures:

- Accurate, efficient packaging
- Secure tracking of barcoded documents in all phases
- 100% accounting of all returned secure materials

Through Ops MMS, DRC can view data on the items scanned into any box and compare this data to the physical box contents. Random boxes of packaged material are pulled, opened, and verified for accuracy against the contents listed in the system. All data generated during packaging will be made available to our Project Management Team, providing an adaptable tool for monitoring shipments and satisfying client concerns.

All test materials, including a packing list and other shipping materials, will be packaged by school and shipped to the district or non-district testing sites, such as charter schools, full-time Career and Technology Centers, alternative education programs, approved private schools, and Intermediate Units.

Secure test materials will be spiraled together by form designation to ensure equal forms distribution at the classroom level and shrink-wrapped in packs of 17 coordinating test booklets and answer documents, except for grade 3 tests, which will only use consumable test booklets. Additional materials will be spiraled and assembled using the same method, but will be bundled in packs of 7 sets. Single packs containing a standard print test booklet and answer document (only test booklets for grade 3), will be produced and distributed with Braille and Large Print test booklets.

Assembly and Packaging Accuracy

DRC will ensure that all assessment materials are assembled correctly prior to shipping using the following approach:

- **Scope of Work Agreement Adherence:** Based on requirements and specifications stipulated in the contract and gathered through discussions with PDE, detailed Scope of Work Agreements (SOWAs) will be established by the Pennsylvania Project Director, working in conjunction with experienced Project Management and Operations staff. These SOWAs will ensure that all staff understand and adhere to materials assembly and distribution requirements. The SOWAs will be available for PDE review at each step of the process.
- **Assembly and Packaging Process Review:** The Pennsylvania Project Management Team will conduct a “walk-through” prior to each shipment to ensure that all assembly and distribution procedures are followed precisely.
- **Barcode Technology Assignment of Items:** DRC Operations staff will use our Ops MMS system to assign items to the appropriate site for shipment. Barcode technology is used to provide an automated quality check between items requested for a site and items being shipped to a site based on the following:
 - Project
 - Site (school, district, or other testing location)
 - Grade (if applicable)
 - Subject
 - Form
 - Material type
 - Quantity
- **Discrepancy Resolution:** Should any discrepancies occur between the materials being requested for a site and the materials being packaged for a site, the discrepancy will be resolved before the order is completed and shipped.
- **Packing List and Content Verification:** A packing list will be produced for each box and placed inside. DRC Operations staff will double check all box contents against the packing list prior to the box being sealed for shipment.
- **Shipment Lot Quality Checks:** DRC Operations staff will perform lot acceptance sampling on every shipment. Two to three LEAs will be selected from each page of the shipping/distribution roster and examined for correct and complete packaging and labeling. This sampling represents a minimum of 10% of all shipping sites.

4.D.5.b. Shipping

As we have for previous Pennsylvania assessment administrations, DRC will continue to ship all testing materials directly to LEA/district offices or, for large districts with 10 or more schools, materials will be automatically shipped directly to the schools. For district shipments, all materials will be packaged by school to help facilitate internal district distribution to schools. Districts with fewer than 10 schools will have the ability to choose direct materials distribution to schools; however, schools/districts will be required to pay DRC directly for this additional service. Please note, costs for this option have not been included in DRC's *Cost Submittal*.

Each site will receive at least two shipments. The first shipment will contain non-secure materials, including the Assessment Coordinator's Handbook, Directions for Administration Manuals, and School and District Assessment Coordinator Packets, with copies of all forms and special instructions, and will be shipped to arrive at each site no later than four weeks prior to the start of the testing window. The second shipment will contain all secure testing materials, including test booklets and answer documents, as well as Pre-ID labels; these materials will be shipped to arrive no later than two weeks before the testing window.

The on-time delivery of high-quality products and services is a company-wide commitment at DRC. We have implemented company-wide use of Microsoft® Project as a tool to track progress toward meeting the deliverables of our assessment programs. Using MS Project, our Pennsylvania Project Director, Ms. Shaundra Sand, and her team will be responsible for maintaining project schedules and ensuring the accurate and timely delivery of testing materials to Pennsylvania schools and districts.

Shipping Accuracy

DRC will ensure that materials are packaged appropriately and shipped to the correct locations using the following approach:

- **Ongoing Monitoring**—The Sr. Director of Materials Operations and Logistics will monitor the materials assembly area and coordinate shipping processes, reporting any irregularities to the Pennsylvania Project Management Team.
- **Secondary Checks**—Our Operations staff will perform secondary checks on all packing lists before boxes are sealed for shipping.
- **Address Accuracy**—All district and school shipping labels will be quality checked to prevent materials from going to the incorrect location. Site labels on each box will be compared to the shipping address label and matched for accuracy. At the time of shipping, our proprietary materials management system, Ops MMS, interacts with our databases to utilize accurate, current shipping information, eliminating the potential for error associated with incorrect addresses.

- **Reliable and Traceable Distribution**—DRC only uses secure and reliable shipping vendors, such as Advanced Shipping Technologies (AST) and United Parcel Service (UPS), that are highly experienced in delivering large-scale assessment materials. Our shipping vendors provide us with cost-effective, online traceable, and timely materials distribution.
- **Shipment Monitoring**—Ops MMS integrates with shipper systems, allowing the Pennsylvania Project Director and our Sr. Director of Materials Operations and Logistics to track materials from the point of shipment from DRC’s warehouse facility to receipt at the LEA testing site.

4.D.5.c. Materials Delivery

DRC will be responsible for all distribution and retrieval costs and guarantees that all test materials will be delivered in a timely and accurate manner. Test materials will be packaged by school and shipped directly to LEA/district offices, except for large districts with 10 or more schools. For these schools, and other schools/districts that choose ship-to-school delivery option, materials will be distributed directly to schools. DRC will work with PDE to review and approve all materials packaging, distribution, and collection procedures. Because of DRC’s history of providing assessment administration and operation services for Pennsylvania assessments, District and School Assessment Coordinators and Assessment Administrators will continue to experience procedures consistent between contracts and across all assessment components.

Over the years, DRC has successfully met Pennsylvania’s high-volume materials shipping and collection needs, including district and school-level distribution requirements. Additionally, the majority of DRC’s large-scale assessment clients incorporate customized return plans that include a combination of returns from both school sites and districts. DRC is confident in our ability to continue to provide excellence in materials distribution and collection.

For most shipments, DRC uses a standard 11" box with a minimum of 275 pounds bursting weight. Box size will vary to accommodate specific shipping demands, but will be small enough for easy handling. All fully packed boxes will weigh less than 30 pounds. Each shipping box will be pre-printed with DRC’s return address and affixed with a large, brightly colored label stating “PENNSYLVANIA TESTING MATERIALS—OPEN AND INVENTORY IMMEDIATELY. ITEMS ARE SECURE.” We encourage districts to re-use these boxes for the return shipment, but we will send additional boxes to districts who request them. Return labels containing school and district information will be included to simplify the return process. For large districts with 10 or more buildings, testing materials will be shipped directly to the schools.

Distribution quantities for test booklets and answer documents will be based on quantity information obtained through the enrollment system via DRC’s eDIRECT system; in addition, quantities will include a 10% overage and will be rounded up to the nearest pack size (i.e., packs of 17). DRC will ensure that a

sufficient number of copies are available at our facilities for any additional orders; LEAs can request additional materials via eDIRECT. DRC will also provide packing lists, distribution rosters, and all required shipping labels and forms. Please see the *Subheading 4.D.1., Online Ordering and Tracking System* for more information on enrollment, additional materials, and eDIRECT.

DRC works only with secure, bonded shipping vendors that provide online tracing and tracking services. For the Pennsylvania assessments, DRC will use **Advanced Shipping Technologies (AST)**, a Pittsburgh-based Small Diverse Business (SDB), as the primary vendor for the coordinated effort to distribute and collect all Pennsylvania assessment materials. AST, along with its secure, bonded shipping affiliates, will be used to distribute materials to all LEAs across the Commonwealth. AST has handled shipments to the Pittsburgh School District for many years and most recently successfully handled all 2015 PSSA and Spring Keystone shipments to the Philadelphia School District as well. AST will manage all aspects of the return materials from the LEAs and will broker collection services with **United Parcel Service (UPS)** providing the districts and schools the flexibility and familiarity with a carrier that has been the primary source of return shipments for more than a decade. AST will coordinate the transfer of all secure materials to their Pennsylvania hubs and will transport all materials in bulk, directly back to DRC for processing. This value-added service means that the secure, used test materials have fewer points of custody on their trip back to DRC.

Over many years, DRC has established a successful working relationship with both vendors and is exceptionally confident in their ability to meet all Pennsylvania shipping requirements. Both AST and UPS are highly experienced in delivering testing materials for Pennsylvania assessments and understand the unique shipping needs associated large-scale assessment programs. The proven track record of AST and its expansive network of secure, bonded shipping affiliates ensure PDE continued success for the timely and accurate shipment of all Pennsylvania assessment materials.

Delivery of materials will be scheduled during regular weekday school hours, 9:00 a.m. to 3:00 p.m. Eastern Time, or by appointment with school/district officials. All shipments from DRC will prompt email notifications to test coordinators that materials are in transit to them. AST has successfully provided email notifications to the Pittsburgh and Philadelphia school districts and will expand that notification process to all other LEAs that receive materials directly from AST. For shipments that are handled by UPS, the same carrier-generated email notifications that have been successfully used in the past will continue to notify those LEAs of the materials in transit.

All shipments will be designated as “inside delivery required.” Signatures of receipt will provide proof of delivery. DRC and LEAs will be able to track all shipments via real-time updates on the tracking management system of AST and its partner carriers. This state-of-the-art tracking system can be accessed via smart phone or other mobile devices and allows for signature updates at the time of

actual delivery. We will collaborate with PDE to determine the level of visibility that should be available to the LEAs, and we will be able to provide PDE access to these online tracking systems, if desired.

When LEAs receive their shipments of secure materials, they must inventory the boxed materials. After inventorying, District Assessment Coordinators and School Assessment Coordinators (for ship-to-school sites) will be asked to complete a Materials Receipt Notice (acknowledgement of delivery and confirmation of delivery date) via eDIRECT. Completion of this form verifies that districts and schools received and inventoried their testing materials. Additional secure test materials and secure accommodated materials will be accounted for using the Materials Accountability Form.

Each District Assessment Coordinator and School Assessment Coordinator (for ship-to-school sites), must also complete a Materials Accountability Form via eDIRECT to report the numbers of materials returned for each listed material on the form; any discrepancies or additional materials must also be documented on the form. Any materials not returned to DRC or not accounted for on the Materials Accountability Form will be reported to PDE via a Missing Materials Report. Missing or late-returned secure materials will be considered a breach of test security. Sites that only test online and do not order paper-based accommodated materials will not be required to complete the Materials Receipt Notice or Materials Accountability Form.

LEA, school, and PDE personnel will have the complete support of DRC's courteous, professional, "live" Customer Service Team to assist with package tracking, resolution of delivery issues, and other test administration issues. Our Customer Service Team is organized such that only staff trained on the Pennsylvania programs will respond to calls. DRC's toll-free number and email address will be prominently listed in the Directions for Administration Manual, the Handbooks for Assessment Coordinators, and other correspondence with schools and districts. Please see *Subheading 4.M., Customer Service* for more information on DRC's Pennsylvania Customer Service function and process.

4.D.5.d. Materials Collections and Return Shipping

Materials Collection

For ship-to-school sites, DRC will collect testing materials directly from those schools. We will also continue to offer materials return flexibility for ship-to-district sites. These districts are provided with the option to have materials picked up at the district or from schools. This flexibility is an added advantage for ship-to-district sites that want to limit the amount of handling involved in the packing and return of secure materials.

For ship-to-school sites, School Assessment Coordinators will have final responsibility for the assembly of testing materials, the return of all secure materials from individual administrators, and the preparation of school materials

for collection. For ship-to-district sites, District Assessment Coordinators will retain responsibility for materials accounting, assembly, and return. In cases where districts elect to have materials collected directly from schools, the District Assessment Coordinator will transfer responsibility for materials accountability and return to the School Assessment Coordinator. Regardless, DRC's return system fully enables both District and School Assessment Coordinators to account for all secure documents. Directions for Administration Manuals and Assessment Coordinator's Handbooks will contain explicit instructions for maintaining security and handling and packaging materials for collection. District and School Assessment Coordinators will be encouraged to **call DRC's toll-free customer service number** should questions occur during packaging.

After test administration, each District/School Assessment Coordinator will verify the return of all secure test materials from all classrooms using the School Security Checklist, which School Assessment Coordinators will keep for their records. Assessment Coordinators will also be required to account for secure test materials using the Materials Accountability Form via eDIRECT.

Materials Return Shipment

DRC will provide all district- and school-specific return shipping labels, forms, and envelopes, and will be responsible for all costs associated with the return of materials. All return labels will clearly display school and district names and other information required by PDE. DRC encourages districts to re-use their original shipment boxes for the return shipment, but we will send additional boxes to districts that request them. DRC's materials return process is simple and straightforward. DRC's return procedures also offer many advantages to district and school test coordinators:

- DRC's receipt processes require little document preparation by schools and districts.
- Unlike many testing companies, we do not require special packaging or return procedures for accommodated materials.
- Our Ops MMS system enables 100% accuracy in accounting for returned barcoded materials regardless of how materials are packaged or bundled.
- In the Assessment Coordinator's Handbook, we provide a clear, well-documented return process, increasing the accuracy and decreasing the turnaround time of return shipments.
- We offer excellent support from our Pennsylvania Customer Service staff, which has a history of providing superior service to Pennsylvania districts and schools.

For the return of material, DRC will use UPS Return Service (UPS RS) for the collection of Pennsylvania testing materials. To expedite the return process, Assessment Coordinators can call UPS directly to schedule the pickup. DRC will

present clear instructions for contacting UPS and will provide toll-free numbers and/or a tracking website addresses. UPS uses an online tracking system that provides the status of each shipment picked up from a district or a school.

Upon receipt at DRC, all returned boxes will be scanned in through our automated Box Receipt System. Received materials will be compared against the shipper's manifest and testing site counts to identify any discrepancies, which will be forwarded immediately to Project Management for resolution.

Receipt Control

DRC achieves accurate and efficient secure materials receipt processes that require a **minimal amount of document preparation on the part of schools and districts**. Ops MMS, allows us to accomplish this goal. Its advanced automation and barcode scanners provide fast and accurate data collection with **no dependence on materials/document order**. This will translate into **time saved for Pennsylvania Assessment Coordinators** during materials return.

Captured data are organized into user-friendly reports from the start of the secure materials check-in process, providing valuable insight into suspected material shortfalls as early as possible, and mitigating potential consequences of delay. DRC processes up to 250,000 received materials per day (box receipt, separating and sorting, and scanning secure barcodes).

As evidenced by our ISO 9001:2008 certification, DRC maintains stringent quality control procedures during the document receipt process. Log-in procedures, developed specifically for the each Pennsylvania assessment component by DRC's Project Director, Assessment Administration Manager, and Document Processing Manager, and approved by PDE, will provide our clerical personnel with step-by-step instructions, sorting rules, priority/special processing procedures, etc., to be followed during the log-in process for assessment materials.

Ops MMS provides efficient and accurate control of all barcoded materials, including scannable documents that are shipped from and returned to DRC for each test administration. The system allows us to track documents through all processing steps: Box Receipt, Materials Receipt, and Quality Control Rescan.

The Box Receipt process is used to check in all boxes coming back from our clients. This flexible, automated process helps reduce the processing time. By scanning box labels, the Box Receipt process can be used to flag and drive priority, late return, or special handling processing. Barcodes are pre-printed on box return labels used to return materials to DRC. During Box Receipt, the return label barcodes will be scanned to account for the box as well as to facilitate priority specific processing that may be needed.

The Material Receipt process uses project-specific processing and sorting rules that are systematically applied to increase sorting accuracy and efficiency. The

process will begin by hand scanning the DRC box return label on each box, allowing the box to be associated with its contents as the material barcodes are subsequently scanned. Each box is then opened and security codes, and Pre-IDs if applicable, are hand-scanned to link each document to the original box. DRC ensures that each secure document is pre-printed with a unique security code. These secure material barcodes are assigned to sites in the order fulfillment process, and will ensure that each Pennsylvania student response document returned to DRC for processing and scoring will be unequivocally associated with only one record in a master database, and is correctly associated with its district/LEA and school. The system, based on project-specific business requirements, also guides DRC Processing staff to place the scanned materials in the correct staging location.

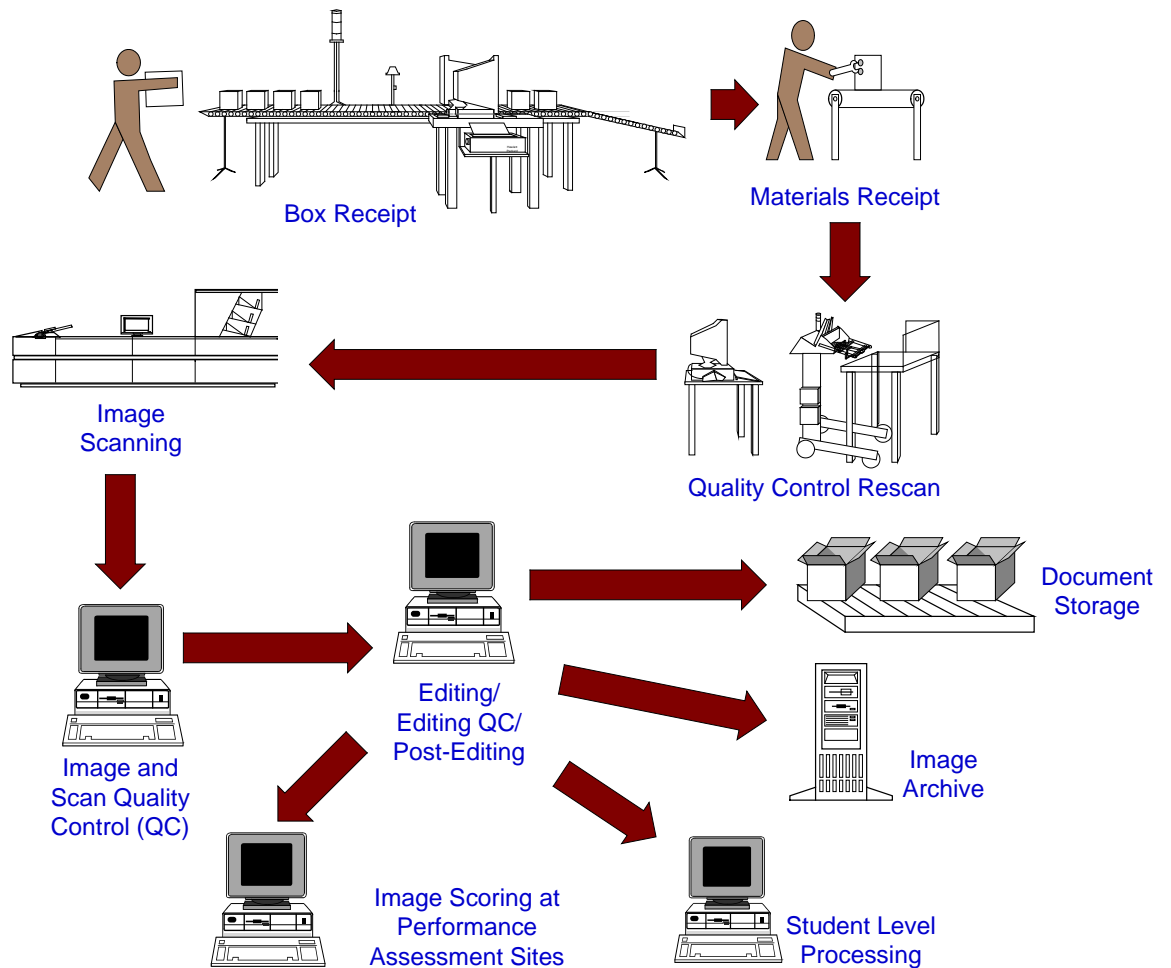
During the next phase, Quality Control Rescan, using streamfeeder automation, materials will be matched against scan information obtained during the Materials Receipt process. These materials will then be staged for further scanning and scoring processing. Non-scannable materials also go through a similar scanning process to verify scan counts and final labeling before being sent to storage.

Given that materials processing occurs immediately upon receipt of Pennsylvania assessment materials, DRC Operations staff can provide real-time feedback to the Pennsylvania Project Management Team on actual receipts versus expected receipts for LEAs. In turn, Project Management will be able to contact any LEA regarding what appears to be an anticipated materials receipt “shortfall” as soon as the materials for the entire LEA are checked in (please see the next subheading for more information on DRC’s Missing Materials process). Secure materials issues can thus be identified and resolved well in advance of any reporting.

Ops MMS also provides a flexible platform for which project management can intercept material at the district, school, box, or individual booklet level if needed. **Our processing system offers a tremendous advantage to PDE by providing quality control measures that are specifically related to potential test security issues.** Problems can be caught early and resolved in a timely manner.

The figure below illustrates the overall workflow from receipt of materials through all processing of materials and the presentation of scanned images for scoring.

Scannable Document Processing Workflow



Missing Materials Report

DRC recognizes that the security of the test is of the utmost importance to PDE. To that end DRC proposes to implement several processes that will help ensure the security of the test booklets and answer documents. Because each test booklet and answer document has its own unique test security number on it, after booklet check-in for the entire project is complete, DRC will provide PDE with a report containing missing documents by security number, as well by grade and school, and other criteria required by PDE. Materials receipt information for each LEA will also be compared with the Materials Receipt Notice and Materials Accountability Forms and any other materials discrepancy information submitted by LEAs via eDIRECT.

DRC will provide a preliminary Missing Materials Report to PDE within 45 days from the end of each testing window. After school staff have located missing materials or confirmed that secure materials are not in the school, DRC will

produce the final Missing Materials Report, which will be submitted to PDE within 90 days after the end of each assessment's testing window.

This report will be produced for each district and for each school within the district, along with a consolidated statewide report. Any materials not returned to DRC will be listed by security number, type of document, grade, subject, etc., depending on PDE requirements. The report will list the number of materials not returned and the LEA(s) to which they were originally sent, as well as summarize any problems noted during materials return/check-in, based on PDE requirements. In addition, DRC will provide PDE with complete documentation of the steps that were taken by DRC and the schools to locate any missing secure materials.

These reports will assist DRC and PDE in improving the instructions in the Directions for Administration Manuals and Assessment Coordinator's Handbooks, as well as information shared in the online administration procedural training sessions. The Missing Materials Reports also provide important documentation for instances of suspected test security breaches.

4.E. Test Administration

4.E.1. NUMBER OF STUDENTS TESTED

As the current vendor for the PSSA, Keystone Exams, and the CDT, DRC has experience with delivering and administering assessments for all tested students in Pennsylvania. For the PSSA, there are approximately 150,000 students per grade/subject. For ELA and Mathematics, the total testing population is 900,000 per year. For science, since only students in grades 4 and 8 are tested, the total quantity is 300,000 per year. There are approximately 150,000 first time testers taking each Keystone Exam per year, spread across the three administrations.

Since the CDT is a voluntary tool, the quantity of testers in each subject is more variable. However, based on the significant increases in tests administered since its inception, DRC assumes that CDT quantities will continue to increase in to the new contract. DRC's proposal assumes unlimited use of the system by Pennsylvania students and educators.

In addition to the public schools participating in the Pennsylvania assessments, DRC acknowledges that many non-public and private schools also participate, via both paper/pencil and online testing. DRC is pleased to continue our seamless process to accommodate online participation, by utilizing local student IDs issued by private or non-public schools. Since the non-public and private schools are not in PIMS, their students are not included in the Pre-ID files DRC receives from PIMS and their student records are not pre-populated within the eDIRECT test setup functionality. As a solution, DRC allows the local ID to replace the PAsecureID in DRC's administration and reporting systems. Subsequently, DRC provides the capability for private or non-public schools to add students to eDIRECT via file upload or manual input by utilizing the local ID rather than the PAsecureID. Utilizing the local ID enables the non-public or private schools to move students into a test session for a current test administration and it allows the site to track students over time. The solution has benefitted many non-public schools that already use online testing and it is a viable means for non-public schools to continue participating in all of the Pennsylvania assessments (including CDT) as online testing increases.

DRC is accustomed to receiving Pennsylvania Information Management System (PIMS) data from PDE and fully understands that such data is the prime source of student demographic and program information for federal and state accountability requirements. DRC has worked extensively with the field and PDE's Accountability and Data Quality divisions to increase the number of assessment records matched to PIMS. In fact, in 2014, over 98% of the student records used for accountability reporting was matched to PIMS. DRC is confident that the processes we have in place will allow us to continue to increase the use of PIMS data, and we fully understand that such data must be housed, used, and disclosed only in accordance with federal and state privacy laws. Please see *Subheading 4.C.2., Student Specific Demographic Labels* for more information on the use of

PIMS data, PAsecureID and unique student identifiers, producing Pre-ID student labels, and security of student data.

4.E.2. TESTING DATES

DRC is prepared for and committed to the accurate, on-time delivery of all tasks and deliverables that are necessary to ensure all administrations of the PSSA, Keystone Exams, and the CDT remain on schedule. DRC believes that no school should experience a delay in its testing or reporting schedule due to the inability of a vendor to meet deadlines.

DRC understands that the PSSA is administered once a year, during a spring testing window (March–April). All students in the required grades participate.

There are three testing windows per year for the Keystone Exams – winter (December/January), spring (May), and summer (July). The majority of testing will occur during the spring testing window, since the Keystone Exams are to be given to students near the end of the associated course. The spring testing window will also have students retesting from a previous administration. Testing during the winter administration will include first time testers in schools with block scheduling, as well as retest students. The summer administration will have the fewest students, and will mostly include retest students. The optional Civics & Government Keystone Exam and the English Composition Keystone Exam will follow the same model.

The CDT is available year-round and is typically given three times per year, and up to, but not more, than five times per year.

Please see *Volume IV; Appendix O, Project Schedules and Hours by Task*, for detailed information about program administration windows and key task and deliverable dates.

4.E.3. TESTING MODE

DRC has extensive experience managing testing programs that offer a combination of paper/pencil testing and online testing (dual-mode programs), as well as providing smooth transitions for tests moving to primarily computer-based administration for numerous statewide assessment programs. We understand that the PSSA and Keystone Exams are administered in both paper/pencil and online modes, with local educational agencies (LEAs) having the opportunity to select their testing mode. DRC looks forward to partnering with PDE to help guide LEAs as they continue to transition to online testing. Please see *Subheading 4.F.1.b., Online Assessment Implementation Plan*, for more information on our customized, innovative solutions and our proposed implementation plan for online testing for Pennsylvania.

We also recognize that the CDT is an online computer-adaptive test (CAT). Please see *Subheading 4.F.12., Computer-Adaptive Tests (CAT) System for the*

CDT, for a complete discussion of operational CDT test designs and configurations of the CAT algorithm currently used in Pennsylvania for the CDT.

4.E.4. TIMING OF TESTING SESSIONS

DRC recognizes that the PSSA and Keystone Exams are untimed in order to provide students with adequate time to complete their tests. DRC will continue to work with PDE to ensure that the estimated durations of testing sessions meets expectations of the Commonwealth, balancing test design and psychometric considerations. We also acknowledge that the CDT is an untimed test, and that CDT online test administration requires functionality to pause testing in order to resume at a later time, including the following day. Please see *Subheading 4.F.3., Tools and Accommodations*, for information on this and other online testing features.

4.E.5. RETESTS

DRC understands that retests are only administered for the Keystone Exams, and not the PSSA. We also recognize that the Keystone Exams will serve two purposes: federal and state accountability; and as high school graduation requirements starting with the class of 2017. Students who do not score at least proficient on an attempt on the Keystone Exams have the ability to retest. DRC understands that students may retest as often as desired until they reach proficiency, and we are also aware of PDE's expectations for remediations between retest attempts, as well as a student's option to move to a project-based assessment after two unsuccessful attempts to attain proficiency. Our processes and solution for the Keystone Exams will ensure that student test scores are accurately banked for accountability purposes and proficiency testing. We acknowledge all projected retesting percentages by subject and year provided in the RFP.

Estimated retesting on Keystone Exams is approximately 50% each year for all three subject areas.

4.E.6. ONLINE TEST ADMINISTRATOR TRAINING

DRC successfully transitioned management and oversight of the current Pennsylvania State Test Administration Training (PSTAT) website from PDE to DRC in the fall of 2014. Because of the time constraints for that transition, DRC retained the original vendor and worked with PDE to make any necessary updates to the 2014-2015 iteration of the training module. We provided full technical and customer service support for the system for the Winter Keystones and the Spring PSSA and Keystones.

Through the transition and the live administration, DRC has gained unparalleled experience and knowledge in supporting such a system with both technical and customer service support. We successfully updated and launched the system in a

very short timeline and successfully managed unprecedented volumes during peak usages.

For the 2015-2016 school year, we will be transitioning the online training module to our partner, **eMetric, LLC, (eMetric) a Small Diverse Business (SDB)**. For this proposal, DRC will continue the partnership with eMetric for the delivery of the PSTAT website. Our recent experience transitioning the site from PDE to DRC has provided us a unique insight into the expectations of the field and PDE and positions us as the most capable and prepared to manage the PSTAT website with eMetric. DRC will work closely with PDE to update any training materials annually.

We will utilize eMetric's successful test delivery platform, iTester 3, to host the customized training site. Five core components of the proven platform will be utilized in the transition of the online test administrator training site to eMetric: registration, role-based content access, test delivery, certification, and user management. The role-based content access design will allow the system to track completion of training modules and ensure that an individual has the appropriate content mastery to qualify for administering an assessment. The user management component will enable individuals to track their progress and, at an administration level, track all users' progress and certification results throughout the training cycle.

Because the eMetric training site will be based on proven components used in the iTester 3 platform, the system will be able to easily support the required 15,000 simultaneous users during peak periods. Also, DRC's customer service support of the training site has made us keenly aware of the field's desire to access the site via mobile devices. The eMetric solution provides additional value in the fact that its components from the platform agnostic iTester 3 system will allow users to access the training site from mobile devices, including iOS tablets and Chromebooks.

DRC and eMetric will collaborate to publish the updated training material developed in a timely fashion and facilitate an approval and signoff process. We understand that prospective test administrators must complete the training and pass a test before they are qualified to administer the assessments. We will perform data management tasks involving the tracking and reporting of the certification data for the training module. DRC and eMetric will collaborate with PDE to service the required data management tasks as required by the RFP.

Please see *Volume IV; Appendix F, Administrator Training Manual Presentations* for samples of training materials produced for Pennsylvania.

4.E.7. TEST SECURITY

DRC has in place all of the necessary security requirements for protecting our clients' sensitive data.

DRC is an industry leader in successfully delivering high-stakes, large-scale assessments, including those for Pennsylvania, as well as other for other states such as Alabama, Alaska, Idaho, Louisiana, Michigan, Missouri, Nebraska, Ohio, Oklahoma, South Carolina, and Washington. We have proven quality control and security procedures integrated throughout all of our operational processes. PDE can be assured that all Pennsylvania assessment materials, online and computer-based systems, and student responses and data will be handled and stored in a secure manner.

DRC understands that ensuring security is critical to maintaining the technical quality, perceived fairness, and integrity of any testing program. We recognize that assessment security is of the utmost importance to PDE. To ensure the highest level of security throughout all phases of each assessment component of the Pennsylvania assessments, DRC will implement the security features and procedures discussed below, including those pertaining to educator meetings and PDE approval and signoff processes. We will also implement other necessary security measures as requested and approved by PDE to enhance security and ensure compliance with state security policies. Please see *Subheading 4.E.8., Test Monitoring of Fidelity to Test Administration and Security Procedures*, for a discussion of recommended security processes and procedures that should be implemented at the LEA/school level during test administration.

DRC's Security Standards and Certifications

DRC regularly reviews our security features, systems, and procedures to ensure compliance with all applicable federal laws including the Americans with Disabilities Act (ADA), the Elementary and Secondary Education Act (ESEA), the Family Educational Rights and Privacy Act (FERPA), the Individuals with Disabilities Act (IDEA), Section 504 of the Rehabilitation Act of 1973, and Title I—Improving the Academic Achievement of the Disadvantaged.

DRC's online systems have all been designed to provide the level of security demanded by today's high-stakes assessment programs. With the advent of online testing, states are particularly concerned about how we protect student data (a requirement under the federal Family Educational Rights and Privacy Act). To assure clients of our commitment to information security, **DRC's information security policies and procedures are based on the National Institute of Standards and Technology (NIST) criteria (NIST Standard 800-53)**. This is a nationally recognized standard for information security practices. In addition, DRC is actively configuring our systems and processes to comply with the **ISO 27001 information security system standards**. ISO 27001 is the most internationally recognized information security standard in the world. Plans are in place to achieve formal, certified compliance towards ISO 27001 in 2015.

In addition to our excellent security protocols for statewide assessment programs, DRC is a full-service research partner for the Federal Government. We are well known among Federal agencies as a low-risk, high-quality partner, as evidenced by the fact that clients such as the U.S. Department of Defense, U.S. Department of Veterans Affairs, Defense Health Agency, and the Internal Revenue Service trust us to complete some of their most important research programs and protect highly sensitive client data.

- For our work with the U.S. Department of Defense (DoD), DRC's Survey Services' systems are compliant with the National Institute of Standards and Technology (NIST) Risk Management Framework (RMF), and we manage our Information Systems under the NIST RMF policies and procedures. NIST RMF compliance encompasses a stringent set of security requirements. DRC is one of only a few full-service survey research firms with this high-level of compliance.
- For the Defense Finance Accounting Service (DFAS), DRC prints and ships financial documents including W-2 Forms, 1099 Forms, and Account Statements, and Pay Visibility Statements for active and retired military personnel living in the U.S. and abroad. DRC's work for DFAS requires exceptional commitment to ensuring data security. Shipping addresses are highly confidential because due to national security concerns. DRC has met all of the security requirements for this program and client.
- DRC prints customer satisfaction surveys for the Internal Revenue Service (IRS). The data files for printing and mailing contain tax return information and personally identifiable information (PII). DRC has been audited and approved by the IRS for meeting the stringent security requirements of this contract.
- DRC is also compliant with Health Insurance Portability and Accountability Act (HIPAA) security requirements for work with our healthcare clients.

DRC will apply our extensive expertise and experience in meeting the most stringent security requirements for our state and Federal government clients to our work on the program. Our industry-leading security credentials are summarized below.

DRC's Security Standards and Certifications

- Adherence to federal Family Educational Rights and Privacy Act (FERPA) regulations for the security and confidentiality of student data
- Adherence to National Institute of Standards and Technology (NIST) Standard 800-53
- Compliance with ISO 27001 information security system standards (formal certification in progress for 2015)
- Compliance with NIST RMF for work with the U.S. Department of Defense
- Annual Federal Information Security Management Act (FISMA) audits for printing and distribution services contract with the Internal Revenue Service
- Compliance with Health Insurance Portability and Accountability Act (HIPAA) security requirements for contracts with healthcare clients

DRC understands the importance of keeping student-level information and data secure. We follow stringent procedures to protect personally identifiable information (PII) data and frequently verify these procedures to confirm adherence. See *Subheading 5.3, Student Confidentiality*, for more information on procedures for protection of student-level data.

DRC's Information Technology, Facility, and Personnel Security Measures

With **more than 35 years of experience managing confidential client data**, we have fine-tuned our security systems, disaster-recovery processes, and data security and confidentiality procedures to be the best in the industry.

The corporate security measures described in the chart below are in place at DRC and will protect and safeguard Pennsylvania's assessment data.

DRC's Information Technology, Facility, and Personnel Security Controls

Facility and Personnel Security

- ☑ Mandatory employee key-card picture identification badges to enter and work in DRC facilities. Mandatory visitor sign-in and temporary badges; all visitors accompanied by DRC employees.
- ☑ Secure access system logs all persons entering facilities, including all after-hours/weekend activity.
- ☑ Unauthorized personnel prohibited from receiving, check-in, document processing, or materials assembly areas unless accompanied by a Project Manager.
- ☑ Security and confidentiality training and employee-signed agreements.

**Information
Technology Security**

- ☑ Full-time IT Security Administrator, who oversees implementation and operational aspects of technology security. Security Team regularly audits security processes to ensure adherence.
- ☑ Locked data centers with limited key-card access. Fireproof and crushproof concrete data centers with fire suppression systems.
- ☑ Full array of security technologies, including audit trails, firewalls, intrusion protection, vulnerability scanning, anti-virus, source-code security, Secure Sockets Layer (SSL), and monitoring.
- ☑ Passwords—which must be changed regularly—are required for all employees to access any data. Data and electronic files accessible only to authorized personnel.
- ☑ Maintenance of redundant backup copies, data replication, and off-site vault storage, as well as a highly secure on-site vault. In-place disaster recovery plan for all systems and data.

**Test Development
and Psychometric
Security**

- ☑ Electronic item banking system (IDEAS) secured through password protection, user authentication, and SSL protocol.
- ☑ Electronic item and form development maintained in IDEAS, not on individual computer hard drives. Physically secured hard copies of item and form development materials.
- ☑ Mandatory signed security agreements for all committee members. Secure materials numbered, checked in and out, and monitored at all times before, during, and after committee meetings.
- ☑ Proprietary data forensics system systematically analyzes data to ascertain integrity of data results.

**Administration and
Operations Security**

- ☑ Direct control of in-house production and printing of scannable documents and other test materials. Outside printing vendors required to certify adherence to the DRC and client security requirements before documents are submitted for production.
- ☑ Unique security code pre-printed on each secure document to unequivocally associate it with one record in a master database.
- ☑ Innovative and proprietary Operations Materials Management System (Ops MMS) uses barcode technology to accurately and efficiently track materials through all assessment phases.
- ☑ All incoming and outgoing shipments “logged in” and “logged out.” Use only shipping vendors that provide online tracing and tracking services.
- ☑ Immediate secure materials check-in and processing. Real-time data on actual versus expected receipts provided by Ops MMS, along with missing materials reports.
- ☑ Proprietary customer service database allows tracking and documenting of potentially problematic issues such as inappropriate materials references and ordering.

**Online Systems
Security**

- ☑ Password-protected, role-based administrator access to all test setup, management, and reporting functions.
- ☑ Student Test Login Tickets provide secure student access to the test using a unique username and password.
- ☑ Secure transfer of test content using leading encryption technologies; content is decrypted only once the student login is validated. Decrypted test content is purged from memory upon completion of test session.
- ☑ Device lockdown during testing prevents students from copying, pasting, printing, and accessing other applications.
- ☑ If test is paused, content is removed from the screen to ensure security of test content. The system will time-out and close the test after a defined period of inactivity.

**Scanning, Scoring,
and Reporting
Security**

- ☑ All processing, scoring, and reporting conducted without personal identification of students.
- ☑ Handscoring system uses image scanning to permit scoring of student responses without inclusion of student names, birth dates, or other personal identification information.
- ☑ All scanning and scoring, including handscoring, conducted at fully secure facilities.
- ☑ Mandatory reader (scorer) signed confidentiality agreements.
- ☑ Extensive SQA tests to ensure that all data are scanned, captured, and accurately scored in secure database and all reports contain accurate data.
- ☑ Monitoring of distribution of hard copy reports through online delivery tracking services.
- ☑ Electronic results delivered through secure, password-protected report delivery system, with user-level access.
- ☑ Data files transferred using industry-leading encryption methods.

Back-up and Disaster Recovery

DRC has developed and implemented standardized back-up and recovery systems for our business data. All data associated with the Pennsylvania assessments, including item banks, will be securely stored and backed up using DRC's standardized back-up and recovery systems. This includes plans for regular back-up of data, reports, files, and systems. In addition, we have an Emergency Response Management Plan in place (see the Executive Summary in *Volume IV; Appendix N*), along with disaster recovery plans for recovering data in case of a physical disaster (such as fire or tornado) or a hardware/software failure in our systems. A summary of our features and procedures is presented below.

DRC's servers are housed in secure data centers in multiple locations in Minnesota. These data centers are constructed of concrete floors, walls, and ceilings and are fully climate-controlled environments. The data centers meet

industry standards and best practices for climate control, fire suppression, power and cooling, and physical security.

Access to the data centers is controlled through a card access system and is restricted to authorized technology support staff only. A log is maintained documenting each time a data center is entered, by whom, and for what purpose. In case of a disaster at any of the locations, another location can take over full operations.

The servers utilize load-sharing, virtualization, redundant power supplies, and RAID (Redundant Array of Independent Disks) subsystems to minimize the effect of a failed disk. The data centers all have Uninterruptible Power Supply (UPS) systems. For longer periods of potential power failure, an on-site diesel power generator will automatically start and supply needed power; the diesel generators are tested monthly. The computing environment, both servers and communications hardware, will continue to function without interruption if utility power is disrupted.

DRC uses storage area network (SAN) devices for maximum speed, flexibility, and redundancy in our data storage solution. Servers are connected to the SAN to ensure minimum interruptions due to hardware failures. The SAN facilitates disk space reallocation to provide space for applications or servers as needed. The SANs currently house 715 terabytes of storage. The environment has the ability to expand to multiple petabytes (1000 terabytes = 1 petabyte).

Our web-based systems include redundant web, application, and database servers. If one server should fail, for example, the load will automatically shift to other servers. The servers are load-balanced to distribute the requests and reduce the chance of one server becoming overloaded. The architecture is designed to easily scale up as the demands of the web systems increase. Every server's configuration is documented in the event a rebuild is required. Each server has an assigned primary and secondary system administrator responsible for its operation. Additionally, DRC utilizes a robust virtualized infrastructure. This virtualization technology allows increased flexibility, redundancy, and recovery time.

DRC employs industry best practices for data backup and recovery. Data is replicated between two data centers, so in the event of a disaster in which one of the facilities is lost, the other facility has the data required to recover and restore operations. Our disaster recovery procedures enable us to have contingency plans in place in case of emergency. Our clients can feel confident about the safety of assessment data, knowing it is protected by industry best practices for data center facilities, technology infrastructure, and security practices.

DRC also has in place systems for recovery of our image handscoring system. Once a reader has submitted a score for a constructed response, extended-response, and/or text-based analysis (writing) item, the data is electronically transmitted to our SQL Servers. Full backups are done nightly (Monday–Friday)

and two additional full backups are run every weekend on the handscored SQL Servers.

DRC's disaster prevention and recovery procedures deliver contingency plans in case of emergency. Our clients can feel confident about the safety of assessment data, knowing it is protected by industry best practices for data center facilities, technology infrastructure, and security practices.

DRC's Assessment Security Measures

PDE Review and Signoff

Incorporating state client review and approval of program requirements is critical to DRC's internal project schedules. DRC follows a meticulous set of internal quality standards to ensure high-quality and secure products and services for our clients. DRC's proposed Pennsylvania team has extensive experience working with PDE, and has developed an effective review and approval process over the years.

DRC will obtain PDE review and approval on all work as required by PDE, including, but not limited to, item and test development, test materials production and storage requirements, online/computer-based delivery procedures, Handbooks for Assessment Coordinators and Directions for Administration, and analyses for monitoring suspect scores. Any changes to these materials or procedures that result in a deviation from PDE-approved versions will require PDE approval. The Pennsylvania Project Director and Project Management team will include PDE review tasks and durations in the MS Project schedules for the Pennsylvania assessments (please see *Subheading 4.J.1.c. Project Schedule and Volume IV; Appendix O, Project Schedules and Hours by Task*). This practice will ensure adequate time for PDE review and incorporation of PDE revisions, while ensuring that all deadlines are met.

Item and Test Development Security

General Item and Test Development Security Procedures

The maintenance of test security for the Pennsylvania assessments through the item development process is essential given the nature of these high-stakes assessments. Item and form security continuously punctuate every phase of DRC's test development processes. DRC takes necessary precautions to implement and preserve the integrity of test items by maintaining the security of the physical environments, electronic environments, and file transfer processes.

- **Electronic Security**—Test items, test materials, electronic files, data files, answer keys, and other Pennsylvania program data will be managed within a secured network environment. Data and electronic files will be accessible only to authorized personnel. Passwords—which must be changed regularly—are required for all individuals with access to data. A full array of security technologies, including audit trails, firewalls,

intrusion protection, source-code security, and secure file transmission via Secure Sockets Layer (SSL) will further protect test and item data.

- **Item Writers, Contractors, Item Reviewers**—All item/passage writers, contractors, and reviewers for the Pennsylvania assessments must sign a statement in which they agree to treat all materials related to item development as confidential and not to disclose the content of the test materials or communication about secure information related to item development.
- **Physical Document Storage**—During the item and form development processes for Pennsylvania, all hard copy materials related to item and form development will be stored in secure locations when not in use. After review meetings and the delivery of items or printer’s proofs, all item and form development materials will be boxed for security purposes and final storage. Only authorized staff will be granted access to secure materials. Document retention will be based on PDE’s security policy requirements, and will include storage in an environment that is secure from access by the general public or unauthorized personnel. Item and form development materials will remain secure until PDE provides written authorization to securely destroy hardcopy materials.
- **Desktop and Laptop Computer Security**—All item and form development work will be done either on hardcopy or directly in DRC’s electronic item banking system (a server network system), eliminating the need to store item and form information on individual desktop or laptop computer hard drives. All information, including item and form images that are stored in the item banking system on the network, is protected by comprehensive security controls. All hardcopy materials are protected via DRC’s physical document storage procedures, discussed above.

Electronic Item Bank Security

DRC’s electronic item banking system, Item Development and Educational Assessment System (IDEAS), patent pending, is protected by password assignment and a sign-in process that authenticates users based on each person’s role for the project. Authorized users will be provided access only to portions of IDEAS pertinent to their roles. For example, mathematics test development specialists may not be allowed to view science items, while others may be restricted to read-only access. IDEAS has been successfully used in Pennsylvania since 2008.

Electronic item and form information stored in IDEAS will remain secure until written authorization has been received from the appropriate PDE contact to securely delete all such information. Please see *Subheading 4.C.4., Item Bank*, for more detailed information on IDEAS.

Committee Review Security Processes

DRC recognizes the importance of maintaining security of all items, prompts, and student responses. No Pennsylvania secure materials will ever be released to review, standard setting, and rangefinding committee members before meetings.

DRC requires signed security agreements from all Pennsylvania review meeting participants and will retain the agreements for the duration of the contract. At the beginning of all review meetings, each participating reviewer will be asked to sign a Confidentiality Agreement that specifies Pennsylvania confidentiality agreements and security regulations. The Confidentiality Agreement will also outline ownership regulations for the Pennsylvania assessments. DRC will ensure that no confidential materials related to the project will be released without PDE's explicit approval.

During the review meetings, secure materials (e.g., items, passages, rubrics) will never be left unattended. In other words, DRC test development specialists (facilitators and recorders) will monitor the security of all items, passages, and testing-related materials throughout the entire process. All materials sent to meetings are sent through a secured mailing process and have tracking documentation. DRC will number each set of materials used during the meetings so that any missing material will be immediately noted when materials are checked in and out each meeting day. DRC prohibits the use of personal computers and cell phones in meeting rooms. Our staff is vigilant about maintaining security at these meetings. Depending on PDE's preferences, DRC will either arrange for on-site shredding bins and secure disposal or securely ship the materials in tamper-proof boxes back to our test development facility in Plymouth, Minnesota, where they will be securely shredded and disposed.

Test Publication Security

Printing Security

DRC's Document Services Division incorporates our complete in-house Printing Department, which produces and prints scannable forms and other testing materials from typesetting to editing and printing. Because the Document Services Division is under our direct control, a majority of the printing for the Pennsylvania assessments will be completed by DRC staff at our fully secure printing facility, which adheres to DRC's stringent corporate-wide security requirements.

When outside printing vendors are used, DRC selects only printing vendors that have great sensitivity to state testing requirements and timelines and that have previous experience with printing educational testing materials. Each external printing vendor is required to maintain the strictest level of security during the production of materials and is asked to sign a security affidavit attesting to their commitment to this security before documents are submitted to them for production. All DRC vendors, including printing vendors, are fully-vetted and carefully monitored for security measures and performance as a part of DRC's

Vendor Management Program. Security practices are documented and embedded into DRC's ISO 9001:2008 certified processes that span the entire chain of custody of testing materials.

Secure Materials/Test Booklet Security Barcodes

DRC is confident that our methods to track student materials through the use of our barcoding technology will maintain an accurate account of all test booklets. DRC generates a unique security code that is pre-printed on each secure document. The barcode also ensures that each student response document returned to DRC for processing and scoring can be unequivocally associated with only one record in a master database. Requirements and printed documents are subjected to strict quality assurance inspections to ensure accuracy. The format and precision of the printed information are closely examined by DRC's Software Quality Assurance Analysts to make certain the information is correct.

Test Administration Security Features

Online Assessment Management System Security

DRC's web-based client system, DRC eDIRECT, will provide authorized Pennsylvania LEA and PDE users with access to the various administrative tools and functions necessary for the management and administration of the Pennsylvania assessments. This secure, permissions-based system employs role assignments to ensure a user can only view or edit data for which he/she is authorized. Users must login with a unique user ID and password to gain access to the system. DRC eDIRECT has been successfully used in Pennsylvania since 2009. Please see *Subheading 4.D.1., Online Ordering and Tracking System*, and *Subheading 4.F.7.c., Online Enrollment and Test Setup* for more information on the enrollment process and DRC's user-friendly, online assessment management system.

Materials Tracking

DRC will use Operations Materials Management System (Ops MMS), which is a proprietary and innovative system that uses barcode and scanning technology. Ops MMS provides an accurate and efficient method for tracking secure materials throughout packaging, distribution, collection, materials receipt and check-in. For packaging and distribution, Ops MMS identifies all secure test materials by site code and provides an automated quality check between items designated for a site based on the following: Name of Testing Program, Site (School or System), Grade, Subject, Material Type, Quantity, etc. For materials receipt and processing, Ops MMS provides data on actual versus expected receipts, along with used versus unused student response documents. Ops MMS also generates missing materials reports early on, so that any missing materials can be immediately resolved.

Secure Materials Receipt

Secure materials check-in and processing will occur immediately upon receipt of Pennsylvania testing materials. DRC Operations staff is able to provide real-time feedback on actual receipts versus expected receipts for LEAs. This allows for immediate communication with LEAs regarding any materials receipt “shortfall.” This processing system offers a tremendous advantage to PDE by providing quality control measures that are specifically related to potential test security issues. Problems can be detected early and swiftly resolved. Secure materials issues are identified and resolved before any reporting takes place. DRC’s IBML image scanners and Image Scoring System also allow for on-demand retrieval of specified images (e.g., specific batch files, specific grades, specific students); each image is assigned a unique identification number that allows for quick and easy retrieval at the student and school level.

Distribution and Collection Security

Shipping vendors utilized by DRC are fully-vetted and carefully monitored for security measures and performance as a part of DRC’s Vendor Management Program. Security practices are documented and embedded into DRC’s ISO 9001:2008 certified processes that span the entire chain of custody of testing materials. DRC’s proposed shipping vendors for the Pennsylvania assessments use controlled access where only authorized personnel can enter its facilities, consolidation points, and distribution centers. Our proposed shipping vendors will also provide real-time shipment tracking and proof of delivery, completing the distribution chain of custody process. DRC’s logistics experts carefully coordinate and monitor distribution activities of all shipments.

Materials Secure Storage

Upon completion of processing, scannable documents are boxed for security purposes and final storage at DRC’s secure storage facilities. Our storage facilities are also climate- and pest-controlled, allowing for the preservation of the documents. All Pennsylvania student response documents that are returned from LEAs will be securely handled and stored. Individual student tests (original hardcopies) are easily retrievable because of DRC’s effective document storage procedures, which is a critical requirement for thorough and appropriate investigations of potential security breaches. Materials will be securely destroyed only after written authorization is received from PDE.

Scoring, Reporting, and Data Security Features

Processing and Scanning Security

All processing and scanning occurs at DRC's fully secure facilities. DRC maintains stringent security and quality control procedures during scannable answer document processing. PDE-approved processing and scanning procedures will provide our Document Processing staff with step-by-step instructions to follow during scannable answer document processing. DRC's Software Quality Assurance personnel will perform extensive tests to ensure all scanned data are captured, and securely and accurately stored in a secure database environment. Student responses and data will be kept confidential and secure at all times. Our use of barcoding technology allows us to score and accurately link student response data and images without the inclusion of student names, birthdates, or other personal identification information. All client and student demographic and response data will be protected by stringent security features and procedures within DRC's secure computing environment.

Handscoring Security

All handscoring for the Pennsylvania assessments will occur at DRC's fully secure facilities. Access to all scoring facilities is limited to staff and to visitors accompanied by authorized personnel. These facilities have secure database servers and multiple applications that support the handscoring processes. The database backups and archived images are also housed on the secure servers. DRC staff discusses security guidelines and obtains signed security agreements from all scorers. DRC retains these agreements for the duration of the contract. To prevent the unauthorized duplication of secured materials, scorers are not able to print from their imaging stations without authorization by management. Additionally, scoring terminals do not have access to the Internet. DRC's scorers fully understand that no testing materials may leave a scoring site.

Online Assessment System Security

In high-stakes assessment, security of test content and student data is of paramount importance. The DRC INSIGHT Online Learning System incorporates numerous security protocols to ensure the highest level of quality and data integrity for all aspects of online testing programs. Throughout all data transfers—from the student testing device, across the Internet, to DRC's databases and back—test content and student responses are secured through a combination of methods, including:

- Use of kiosk mode and other device-specific settings to “lock down” the student testing device.
- Use of encryption technologies for encrypting data.
- Use of Secure Sockets Layer (SSL) protocol through Hypertext Transfer Protocol Secure (HTTPS) for securely transmitting data.

Test content is encrypted at the host server and remains encrypted throughout all network transmissions; content is decrypted only once the student login is validated. Decrypted test content on the student device is stored only in memory during each test session. Once the session is ended (the test is completed or the student logs out), computer memory is purged to ensure security of test content is maintained.

When the DRC caching service is used, test content is stored locally within a school's or district's network. All data that resides in the caching service is encrypted and is not decrypted until it reaches the student's testing device.

Please see *Subheading 4.F.10., System Reliability and Mitigation Experience* for detailed information on DRC's approach to ensuring system security and data integrity for DRC INSIGHT.

Student Confidentiality

DRC understands the importance of keeping personally identifiable information secure. Our systems and processes are designed so that all data is secure at all times. Procedures are frequently verified to confirm adherence. Where applicable, procedures are embedded into the process so that they must be followed. All DRC staff members receive training on our student confidentiality requirements. Only authorized personnel have access to electronic databases and networks. All DRC Project Managers are versed in security and privacy policies and are required to escalate privacy/security issues immediately.

DRC ensures that all student data remains confidential and secure. Individual student reports, data records, and any transmittal media will be distributed only to the appropriate entity upon approval of PDE. DRC carries out all processing, scoring, and reporting of test results in a manner which does not permit the personal identification of students or their parents by individuals other than representatives of DRC. Additionally, our use of barcoding technology allows us to score and accurately link student response data and images without the inclusion of student names, birthdates, or other personal identification information. All sample reports, student data DVDs, and student data files provided to PDE will be carefully developed to exclude student names. Mockups and samples will be provided with a nonspecific identifier (e.g., Student 01). This has been the practice at DRC over the years and is documented as part of the requirements and Quality Assurance testability for each deliverable.

Data Management Security

In our computing environment, DRC utilizes security controls that relate to our hardware, data, and network. DRC manages multiple terabytes of client data; therefore, security is an inherent, inextricable, and indispensable component of our business. DRC enforces strict security measures to prohibit unauthorized personnel from gaining access to assessment and client data, including personally identifiable information (PII), through either deliberate or unintentional action.

Our company-wide measures address the full range of security, including computing environment, physical building access, employee confidentiality and behavior, and the safeguarding of client information, documents, and products (please see above for detailed information). These physical and computing security procedures are in effect 24 hours a day, 7 days a week. This allows us to provide secure maintenance and storage of student and assessment data files, even when not in use. For the Pennsylvania assessments, all data will be captured and stored on a secure, protected server. Access to the data will only be granted to those DRC employees who are directly working on data-related tasks associated with the Pennsylvania assessments.

DRC incorporates rigorous quality assurance activities throughout the process to ensure the highest level of data quality, integrity, and security. Prior to any Pennsylvania test materials returning to DRC, the Software Quality Assurance staff will perform extensive tests to ensure all scanned data and multiple-choice items are captured and accurately stored in a secure database environment.

To provide the highest level of data security, we recommend that electronic results data transfers to and from clients be done via a secure, password-protected SFTP site established and hosted by DRC. Separate user IDs and passwords are created for each client-approved individual who requires access to the site. All files posted to the SFTP site are encrypted. DRC works with each client to confirm data exchange procedures are secure and appropriate. In addition, data transfers for PDE's versions of the District Student Data files have been transferred via eDIRECT or by DVD. Only the client-approved individual is given access to eDIRECT and shipped the DVDs. The DVDs are securely packaged and shipped via UPS requiring a signature.

Reporting Security

DRC has over 35 years of experience in reporting large-scale assessment results. Because of our proven history with reporting on Pennsylvania assessments, PDE can be assured that we have the ability to securely and accurately deliver report results. This includes distribution of hard copy reports, posting reports and data to our secure web-based reporting tools, or any other type of reporting medium.

Hard copy reports are packaged and clearly labeled so they can be securely and easily distributed. DRC uses only shipping vendors that provide online tracing and tracking services, such as UPS. In addition, DRC's Project Management

Team monitors the delivery schedule of reports. Each district or ship-to school signs for its report shipment. DRC tracks each delivery and compiles a record of each signed-for shipment. If a shipment is not delivered within the expected window, DRC's Logistics Team contacts the shipping vendor and traces the shipment, providing an update and resolution to the district/school.

For electronic delivery of test data and results, DRC utilizes secure, web-based reporting systems, which requires unique user IDs and passwords to ensure confidentiality and security. During log-in, the user ID and password are authenticated prior to allowing the user to view reporting results. Each user, based on user ID and role, receives privileges that are restricted to client-specified levels of access (i.e., school, district, state). DRC employs Secure Sockets Layer (SSL) for all data transferred over the connection.

4.E.8. TEST MONITORING OF FIDELITY TO TEST ADMINISTRATION AND SECURITY PROCEDURES

DRC has been dedicated to helping PDE maintain fair and valid assessments. We have the knowledge and proven experience to continue to support PDE with this critical effort. DRC also has the flexibility and top-level corporate commitment needed to swiftly respond to investigative requests from PDE. Whether it be collaborating with PDE to develop enhanced test administration procedures, hosting on-site facility visits by legal experts, or retrieving thousands of student test booklets and answer documents from past administrations, DRC has demonstrated our ability to handle test security issues with due diligence, responsiveness, and discretion.

For example, beginning with the 2012 administration, DRC partnered with PDE to develop a comprehensive test administrator certification process, including four levels of Test Security Certification forms, to increase awareness of the ramifications of test security breaches. We also worked with PDE to develop and formalize the Code of Conduct for Test Takers and Ethical Standards of Test Administration to reinforce the critical nature of test security.

Other specific examples over the years include investigating whether live PSSA items were used to create student and teacher worksheets, as well as an investigation into a student posting live Keystone Exams test items on Instagram. DRC also responded swiftly to a request for a data forensics investigation of a three-year-old administration, which included new analyses and booklet retrieval.

Below, we discuss our recommendations for processes, procedures, and systems that will continue to assist PDE with strengthening the overall security of Pennsylvania assessments.

Test Form Security

Several test form design and packaging features have been in use over the years to help strengthen test integrity. DRC supports the continued application of these features for the Pennsylvania assessments:

- **Security Seals:** Security seals manage the when and the how specific sections of tests are released to the students, such as with writing prompts, and to control administration of certain sections that require specific testing criteria, such as non-calculator mathematics sections. Consistent with the current ELA assessment, the writing prompts in the PSSA ELA test booklets will be covered with DRC's custom-designed zipper seals to provide a continued measure of test security.
- **Item Scrambling:** The scrambling of operational forms has been a successful modification to PSSA and Keystone Exams testing programs, designed to address test security without dramatically disrupting the test assembly and test administration process. Scrambling plans are built to be flexible and can be readily adapted as the needs of the testing program evolve.
- **Test Form Spiraling:** Although the primary purpose of test form spiraling is to ensure equal distribution of the various test forms within a classroom, spiraling also provided test security benefits, such as making it more difficult for closely seated students to share answers or test administrators to dictate test answers to students.
- **Shrink-Wrapped Test Booklets/Answer Documents:** While shrink-wrapping test booklets and answer documents in spiraled packages assists with distribution and helps ensure equitable distribution of test forms within classrooms, shrink-wrapping also secures test content until preparation and distribution of the test booklets by School Assessment Coordinators and Test Administrators.

Test Administration Security

Based on our years of experience with Pennsylvania assessments, we suggest specific site-level methods continue to be implemented in order to mitigate the potential for security breaches, including:

- **Training and Information:** One of the most critical pieces is conveying test security information to Assessment Coordinators and Test Administrators, as well as any other individuals assisting with testing. DRC will continue to collaborate with PDE on preparing and presenting information and training sessions, including recommendations for continued enhancements throughout the contract period as issues arise or new protocols or technology emerges. These training and informational needs include:

- Identifying all secure materials as “secure,” with “secure materials” notation on the footer of each page within a document
 - Communicating that all student work is confidential and secure
 - Providing detailed test security information in all manuals and informational materials
 - Providing test security training or training overviews in manuals to encourage the formal training of all local staff
 - Communicating that data forensics analyses are routinely conducted as part of each administration
 - Clearly specifying all activities that constitute breaches of security and identifying the individual and wide-ranging repercussions associated with a test security breach
- **Test Security Certifications:** We recommend the continued use of the four levels of Test Security Certifications for the Pennsylvania assessments to ensure that all LEA and school staff involved with assessments understand the security requirements and repercussions associated with potential breaches:
1. District Assessment Coordinator Test Security Certification
 2. School Assessment Coordinator and Principal Test Security Certification
 3. Test Administrator and Proctor Test Security Certification
 4. General Test Security Certification.
- **Test Proctors:** DRC supports PDE’s recommendation that schools and LEAs not allow teachers to administer assessments to their own students, or require the classroom presence of a second Proctor during testing, as well as this direct requirement for schools and LEAs undergoing potential security breach investigations.
- **Ethical Standards of Test Administration:** This set of guidelines for ensuring assessment integrity summarizes required and prohibited actions and behaviors before, during, and after test administration for Test Coordinators and Administrators. We propose that this document continue to be provided in the Handbooks for Assessment Coordinators and DFAs.
- **Code of Conduct for Test Takers:** This important document directly communicates to students the importance of the assessments, providing test taking guidelines and security requirements. We propose that this document continue to be provided in the Handbooks for Assessment Coordinators and DFAs and students continue to acknowledge their understanding of the Code of Conduct as an element of the paper/pencil and online assessments.

- **Parent Notification of Electronic Device Ban:** This communication tool enlists the support and assistance of parents with ensuring the integrity of assessments by communicating to them the ban on electronic devices during test taking, an issue of growing importance due to the popularity of sharing information and images via social media among youth.
- **Security Checklists and Range Sheets:** These pre-printed forms are critical tools for tracking and accounting for secure materials at the LEA and school levels before, during, and after test administration. DRC will continue to provide these pre-printed forms for reference and use by District and Building Test Coordinators to assign, check-in, and verify return and accountability of secure test materials before, during, and after test administration.
- **Materials Receipt Notice and Materials Accountability Forms:** The continued use of these forms will help track and provide accountability for secure materials distributed to and returned from LEAs/schools, and will be instrumental in the missing materials resolution process.
- **Communications from LEAs/Schools:** DRC's customer service database allows DRC to collect information related to specific communications (telephone conversations, emails, faxes, etc.) and correlate these communications. This provides DRC with an excellent tool to track potentially problematic situations or document references to possibly inappropriate activities regarding test security (e.g., references to specifics in test booklets). Our database also provides documented evidence related to any suspect activities.
- **Documentation of Potential Security Breaches:** In any instance of a suspected breach of test security, DRC staff will document the communication or circumstance and will immediately notify DRC Project Management. DRC Project Managers will review the documentation and swiftly notify PDE, providing as much documentation as possible. DRC will not address potential test security breaches with LEA staff; DRC considers the sharing of inappropriate information with any LEAs, parents, media, etc. to be a breach of our commitment to client confidentiality. DRC will continue to support PDE as it addresses any potential test security breaches within LEAs.

Online Test Administration Security

DRC provides several methods for monitoring session logging in and out of online test administrations. We currently provide Pennsylvania with an Excessive Logins Report that displays information about students who have logged into the system an excessive number of times. Students will appear on the Excessive Login Report if they exceed two logins for a specific module or section of an online assessment. The purpose of the report is to provide PDE and LEAs with a tool to monitor and research unusual login patterns that occur during the administration of the online assessment. Because these Excess Login Reports are

securely stored on eDIRECT, only PDE-approved individuals are given permissions to access these reports.

DRC also launched a Daily Student Resets Report for the spring 2015 assessments in conjunction with the assignment of ticket-unlock permissions to the District Assessment Coordinators (previously restricted to DRC Customer Service personnel). The capability for LEAs to unlock test tickets substantially reduced the burden on PDE staff to approve all resets prior to customer service staff unlocking the tickets. The “live” report was launched prior to the release of the unlock permissions in order to provide LEAs a way to monitor and document authorized resets, as well as a means for PDE to monitor and research any unusual or unexpected reset patterns.

As a value-added offering to PDE, DRC is pleased to offer several additional status reports and online testing statistics for PDE and LEAs to use to monitor online testing. These offerings are described fully in *Subheading 4.F.7.d., Online Testing Status and Statistics*.

Data Forensics

Due to the high-stakes nature of assessment programs and the recent and ongoing emphasis on assessment security at the national level, it is prudent to ensure that the results from statewide assessments are based on effective instruction and true student achievement. Through the years, DRC has partnered with PDE to investigate irregularities and aid the Commonwealth of Pennsylvania in multiple aspects of security analyses and reporting. Some examples include:

- Providing PSSA data forensic reports since 2009, including answer change analyses; across-year performance changes; and NCLB subgroup population changes
- Providing Keystone Exams forensic reports since 2013, including answer change analyses and Item response similarities
- Reporting results at the state and school level
- Providing erasure maps at the student level
- Working closely with PDE-appointed staff for additional support when needed

As assessment stakes have increased, DRC has developed high-quality data forensic tools and monitoring reports to support our clients in maintaining valid, reliable assessment results. Our forensic offerings include the evaluation of erasure data, response-pattern similarity, and performance fluctuation within paper/pencil administered assessments, as well as answer-change and response-time analyses within computer-based administrations. DRC continues to study emerging detection methodologies and develops and offers the latest known methods to our assessment clients. The common thread across DRC’s forensic

methods is to find aberrant, abnormal, or unusual behavior that may have been carried out by a student, teacher, or an administrator. Please see *Subheading 4.H., Psychometric Analysis Procedures and Data Forensic (DF) Psychometric Analysis*, for more information on DRC's proposed data forensics offerings for the Pennsylvania assessments.

4.F. Expanding the Utilization of Online Assessments and Technology Requirements (Redacted)

DRC's K–12 clients appreciate our ability to tailor technology solutions to meet their needs, while still maintaining superior quality and timely delivery.

DRC has continually invested in innovation in order to meet the increasing technology needs of our clients. Our strong business analysis, application development, networking, and software quality assurance resources provide the expertise required for today's evolving assessment programs. We offer software development; tailored assessment administration, scanning, and scoring solutions; computer-based and computer-adaptive testing; data warehousing; and custom reporting solutions. Our services are backed by a large, in-house team of highly qualified information system architects, software developers, software quality analysts, and systems support personnel.

Some of the innovative technological solutions we offer our assessment clients, including Pennsylvania, are listed below.

DRC's Assessment Technology Solutions

- Agile Software Development
- Web-Based Product Design
- Database Management
- Network and Security Management
- Online Assessment Delivery (Fixed Form and Computer Adaptive)
- Consolidated Assessment Administration Web Portal
- Online Enrollment, Precode, and Additional Materials Orders
- Electronic Reporting
- Dynamic Reporting with Resource Linking
- Classroom Progress Tools (Teacher-built Formative Assessments)
- Technology-Enhanced (TE) Items and Performance Tasks
- Electronic Scoring and Automated Scoring (TE Items)
- Image-Based Handscoring
- Assessment Data Analysis Tools
- Data Warehousing
- Precision Scannable Forms Printing
- Barcode-Based Materials Management
- Electronic Customer Service Call Log
- Electronic Shipping Database
- High-Speed Image Scanning
- Parent and Educator Websites
- Web Conferencing Technology
- Online Event Registration Software
- Team Communication and Collaboration Software (SharePoint, Google Sites, SFTP and EFSS file sharing, etc.)

DRC's goal is to provide user-friendly technology applications that make the assessment process—from online enrollment to assessment delivery to report interpretation—easier for educators, parents, and students. Throughout our proposal, we discuss each of our proposed technology solutions for the Pennsylvania assessments. In the remainder of *Subheading F*, we highlight the DRC INSIGHT Online Learning System and the DRC eDIRECT web portal.

4.F.1. EXPANDING ONLINE TESTING

DRC's most important advance in the use of technology for large-scale assessment has been our commitment to offering a superior online testing solution for our clients. **DRC is at the forefront of helping states across the country deliver innovative online testing programs.** We have a proven track record in shepherding states through the important progression to online testing, including Pennsylvania. We have successfully supported states as they expanded their online testing programs, and we have been a key driver in increasing district participation in online testing for our state partners. Our success is rooted in the belief that there is no “magic bullet” or one-size-fits-all approach to online testing. We are known for our outstanding customer service, our dedication to client satisfaction, and our willingness to go the extra mile in providing customized solutions. We offer PDE a thoughtful and personalized approach, working collaboratively to meet your online testing needs, as we have done for the past five years. We are familiar with the challenges Pennsylvania will encounter, and we have the expertise, experience, and technology solutions to ensure a successful online testing experience for all of the Commonwealth's students.

DRC INSIGHT Online Learning System



DRC is an industry-leading provider of innovative, highly reliable technology solutions for online assessment. Since 2010, we have delivered millions of high-quality online assessments in Pennsylvania and numerous other states using the DRC INSIGHT Online Learning System. DRC INSIGHT is a secure, browser-based system that supports and enhances the testing experience for students and educators.

Positive Feedback from Pennsylvania and Other DRC Client States

“Thanks very much to the CDT Core Team for the development of these outstanding professional development pieces, and of course, the Classroom Diagnostic Tools, to further enhance instruction with intervention and enrichment for our PA teachers, students, administrators and parents. The new tools fully utilize the PA Core Standards and the process of teachers working with their students to move learning forward. We were successful in accomplishing this work because of the expertise and commitment of DRC on our CDT Core Team and the development of their Classroom Diagnostic Tools with our PA educators.”

– *Bobbie W. Pfingstler, Educational Consultant, B.P. Educational Consulting, LLC*
Source: Email correspondence, August 2014

"Michigan is having a phenomenal transition to online assessments."

– *Venessa Keesler, Deputy Superintendent, Michigan Department of Education*
Source: *Detroit Free Press*, May 14, 2015

"I have been in a number of schools over the last few weeks. As I've had conversations with staff about how it is going, I've heard very positive reports."

– *Dr. John Jungmann, Superintendent, Springfield Public School District*
Source: *Missouri Department of Elementary and Secondary Education, Press Release*, May 5, 2015

"The computers worked out, and students said they liked testing online better. It went smooth, a lot smoother than I could have dreamed."

– *Michele Herbert, Principal, Eldon Upper Elementary School*
Source: *Missouri Department of Elementary and Secondary Education, Press Release*, May 5, 2015

"Thanks to all of you for a great testing year for NeSA in Nebraska!! We appreciate your patience, your attention to details, and the great customer service given our districts."

– *Valorie Foy, EdD, Director of Statewide Assessment and Accountability, Nebraska Department of Education*
Source: Email correspondence, May 6, 2015

DRC INSIGHT is a proven and extremely reliable online testing platform that is fully capable of meeting the online testing requirements of this contract. Our system has successfully delivered millions of online assessments for large-scale state programs, including high-stakes summative tests in multiple grades and content areas. Key advantages of our system for the Pennsylvania assessment program are noted on the following page.

Why DRC INSIGHT Is the Best Choice for Pennsylvania's Assessments

1. **DRC INSIGHT is a fast, powerful, and dependable online testing engine that works.** Our state partners trust us to deliver online assessments on time and without error. We have a proven track record of delivering high-stakes assessments—including Pennsylvania's assessments—with reliability.
2. DRC INSIGHT was selected to deliver the operational assessments in the 36 WIDA Consortium states, including Pennsylvania. **DRC is the only vendor that can provide Pennsylvania with the efficiencies and convenience that come from having a common online testing platform for all of the Commonwealth's assessments: PSSA, Keystone Exams, CDT, and ELL (WIDA).**
3. DRC INSIGHT provides **superior Technology Readiness tools and services** that go well beyond the industry standard. DRC is an expert in increasing district participation in online testing, and supporting schools and districts with diverse technology environments.
4. DRC INSIGHT is easier to install and maintain than other vendors' systems. **Our straightforward processes significantly reduce the burden on teachers and technology staff** who administer online tests.
5. DRC INSIGHT provides **flexible technology options for schools with limited bandwidth.** The system provides *content caching*, which reduces the bandwidth needed to deliver online tests, and *response caching*, which allows testing to continue if the school's Internet connection is lost—a huge advantage for schools with unreliable Internet. With DRC's solution, performance is consistent and reliable regardless of geographic location, and student responses are securely maintained and recoverable at all times.
6. DRC INSIGHT's intuitive interface has built-in universal tools and accommodations that are configurable to meet all students' needs. **DRC cares deeply about the student and educator experience during testing.** We have sought feedback and input from students and teachers to shape the design and ongoing development of our system. This attention to detail and user-oriented approach make DRC INSIGHT the truly student-friendly choice.
7. **With DRC's support, many of our state partners have rapidly increased their online testing participation.** Our success is rooted in a threefold approach: 1) proactive planning and early support of school preparedness; 2) increased access for students through continual technology advances; and 3) reduced workload on teachers and administrators.

DRC would welcome the opportunity to continue to partner with PDE to further the Department's goals and provide a superior online testing experience in this next phase of collaboration.

System Overview

DRC will work with PDE to deliver a complete online testing solution tailored to your unique requirements. **DRC INSIGHT is a powerful, integrated, end-to-end online testing system** that brings together all of the tools and resources needed to administer a secure online assessment. Our system is intuitive and easy to use for students and educators, and can be configured to meet the needs of any type of assessment. In addition, our system can operate independently with districts without the need for state-level mediation.

DRC's proposed system includes all of PDE's required functionality:

- ✓ Student Information System integration
- ✓ User authentication and authorization/security
- ✓ Test registration and test window scheduling (including changes to initial registration data)
- ✓ Test administration
- ✓ Test delivery
- ✓ Test client
- ✓ Key-based and rule-based scoring
- ✓ Handscoring interface
- ✓ Assessment data storage
- ✓ Test scoring monitoring

These functions are described in detail throughout our proposal.

DRC's system offers the convenience of a "one-stop" approach for administrators: all test setup and administration functions are accessed through a single-sign on, permission-based client portal. The **DRC eDIRECT client portal** provides tiered, secure access to all required administrative functions, including testing browser downloads, precode, enrollment, test scheduling and monitoring, reporting, and other resources. **Educators will only need one login to access administrative tools and resources for all online assessments.**

DRC INSIGHT: Unique Advantages for Pennsylvania Students and Educators

- ✓ Student-friendly interface supported by usability studies and feedback from students in several states, including Pennsylvania
- ✓ Common online testing platform for all of Pennsylvania's assessments, including the WIDA Consortium's ELL assessments
- ✓ Powerful planning and support tools that proactively address technology readiness well before testing begins
- ✓ Support for schools with low bandwidth, including unique ability to continue testing even when a school's Internet connection goes down
- ✓ Proven integration with PAIUnet
- ✓ Minimal setup requirements, saving valuable time for educators and technology staff
- ✓ Sophisticated computer-adaptive test (CAT) algorithm developed collaboratively with PDE for the CDT
- ✓ Interactive CDT reporting system featuring engaging, drill-down reports that can dynamically link to teaching and learning supports to help guide instruction
- ✓ Industry leader for system reliability and performance

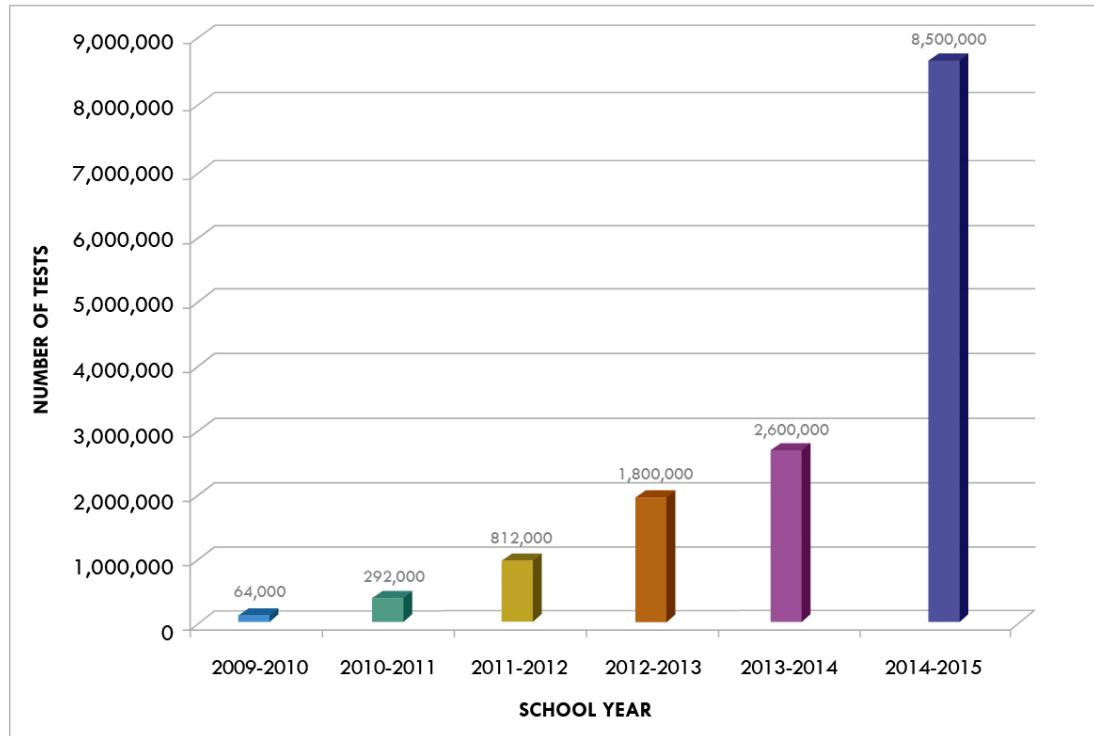
DRC's Proven Experience and Performance

DRC is at the forefront of successfully helping states across the country deliver innovative online assessments that incorporate new, rigorous content; innovative technologies; and meaningful feedback to teachers in support of classroom teaching and learning.

DRC has held contracts for 20 online testing projects in the past 5 years. Our system has delivered millions of online assessments for programs in Pennsylvania, as well as Alaska, Idaho, Louisiana, Michigan, Missouri, Nebraska, South Carolina, Washington, and the WIDA Consortium. Our programs include high-stakes assessments (grades 3–8, end-of-course, and English language learner assessments); interim and formative assessments; and classroom diagnostic assessments. The WIDA project alone involves online administration using DRC INSIGHT in 36 states.

The next figure illustrates the rapid growth of DRC's online testing volumes from year to year. **DRC successfully processed 8.5 million online tests in 2014–2015.**

DRC INSIGHT ANNUAL ONLINE TESTING VOLUMES



As this figure illustrates, DRC has significantly increased our online testing capacity and performance year-over-year. We have consistently met the needs of large student testing populations, have not experienced significant issues with our system, and we continue to grow. PDE can be confident in DRC’s proven capacity to administer the online PSSA, Keystone, and CDT assessments to all participating students.

4.F.1.a. Work Plan

Online Testing Deployment Schedule

Milestone schedules that describe the key steps in the online testing deployment process for the PSSA, Keystone Exams, and CDT have been provided in *Subheading 4.J.1.c., Project Schedule*. Full project schedules for all programs (Year 1 and Year 2) have been provided in *Volume IV; Appendix O, Project Schedules and Hours by Task*.

Compliance with Industry Interoperability Standards

DRC recognizes that next-generation assessments place great importance on data sharing. We are fully committed to the adoption of interoperability standards that enable standardized data exchange between parties, including the Common Educational Data Standards (CEDS) Assessment Interoperability Framework (AIF), the Schools Interoperability Framework (SIF) Data Standards, the Question and Test Interoperability (QTI) Specification, and the Accessible Portable Item Protocol (APIP) Standards. DRC is also compliant with HTML 5

(or newer) for all new development, and is compliant with XML 1.0 or newer standards.

CEDS AIF

The CEDS Assessment Interoperability Framework represents a giant leap forward in defining assessment system interoperability. DRC strives to provide the most value to our clients and is aggressively working to implement the interoperability defined by AIF via APIP and SIF in our next-generation assessment systems and ensure alignment with CEDS. DRC also recognizes that systems within states may not yet support AIF data exchange and is prepared to provide custom data exchange formats where needed.

SIF Data Standards

DRC's systems fully support XML, Comma Separated (CSV), or Fixed Width data exchange formats. Our systems can also interact with any other system or data which is compliant with the SIF data standards for data exchanges.

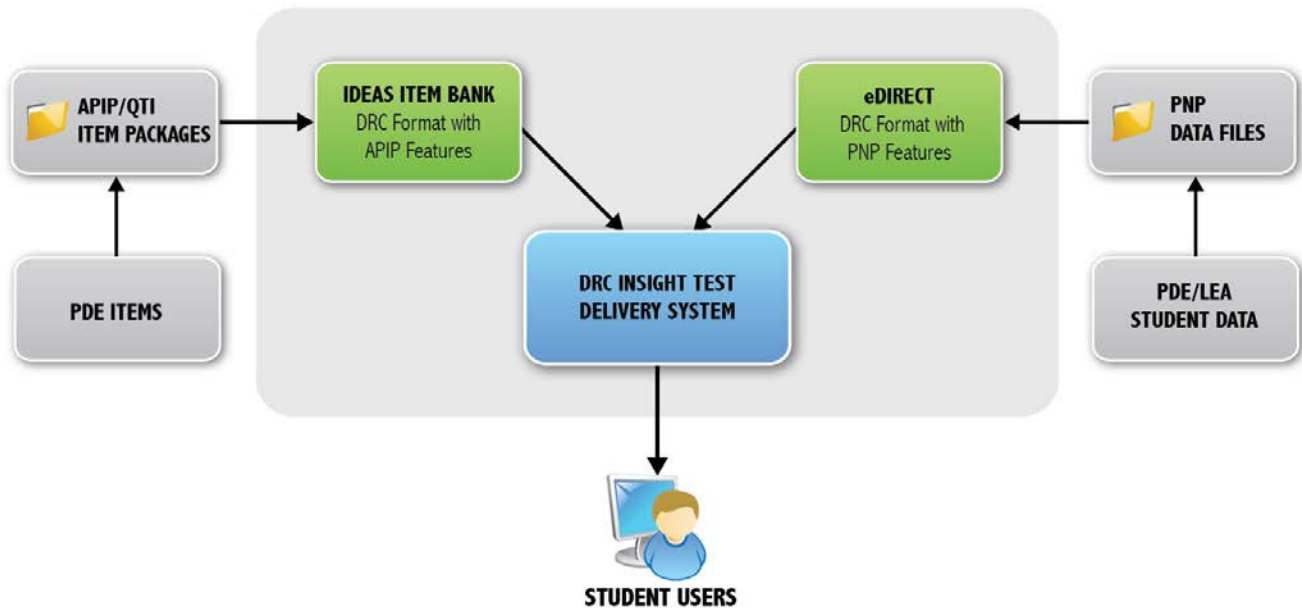
QTI and APIP Standards

DRC is very knowledgeable of the IMS Global Learning Consortium's QTI and APIP standards, and we are dedicated to making sure our systems are interoperable under these standards. We have long worked to ensure compatibility of our systems with QTI specifications and we fully support the import and export of items in the QTI v2.1 format. QTI v2.1 is embedded within the APIP 1.0 schema. DRC is actively integrating APIP requirements within our systems in alignment with the APIP Final Version 1.0 specification:

- DRC IDEAS item banking system—ability to import/export items and develop new items according to APIP standards
- DRC INSIGHT online testing system—compliance with APIP for the display of content in the testing engine
- DRC eDIRECT assessment management system—ability to designate accommodations in the student profile that are seamlessly integrated during online test delivery, ensuring each student receives the appropriate supports

DRC's item authoring system provides the ability to author items with accessibility features as well as the ability to render them to the students within the DRC INSIGHT test engine. It is important to note that the APIP 1.0 schema is designed to be a data exchange format between vendors and not between internal systems. DRC follows IMS's proposed standards and implements features from the standard for import and export functionality. The following figure represents how our systems work together to deliver an APIP compliant solution for DRC.

DRC Implementation of APIP



APIP-Compliant Item Import/Export

All items for the Pennsylvania program will be stored in our item bank, DRC IDEAS, where they are combined into forms. Items can be imported or exported from any system into DRC's systems using the APIP standard.

APIP-Compliant Item Development

New assessment content developed under this contract will be developed to conform to required elements in the APIP v1.0 core standards. During item writing, item writers will be required to include with the item content any extra information that will make the content accessible to all students; this information will be stored with the item in DRC's item banking system. Items and passages will be tagged with the meta-data that indicates changes needed to the content, display, or input method to provide appropriate accommodations. In addition, DRC can assist PDE and districts in providing the necessary information to ensure student demographic data is in PNP format.

DRC's Membership in the IMS Global Learning Consortium

DRC has a Contributing Membership in IMS Global, and is an active member. **DRC's Contributing Membership ensures that we have a voice and input within the organization.** DRC is actively involved in discussions with IMS on many fronts:

- DRC regularly votes on proposals submitted to IMS. We believe that it is important to review the proposals and ensure that the changes keep the schema moving forward.

- DRC partnered with the WIDA Consortium and the Center for Applied Linguistics (CAL) on a presentation at the 2015 IMS Learning Impact meeting.
- In order to advance the current standards, DRC submitted a change proposal to IMS that introduced HTML5 elements into QTI v2.2 to better support screen reader tagging for captions on SVG images. DRC is actively working on additional change proposals to ensure that new development and technology-enhanced items are aligned with the IMS standards.
- DRC's team participates in the general Accredited Profile Management Group (APMG), the QTI/APIP Development Task Force, and the Smarter Balanced Profile Group Task Force.

DRC's Contributing Membership was renewed in the fall of 2014, and we plan to continue to be engaged in this effort. Our work with IMS Global greatly enhances our ability to: 1) support PDE throughout the item transfer and rendering process, 2) ensure alignment with the appropriate interoperability standards, and 3) address all relevant considerations and revisions to the standards as they develop.

4.F.1.b. Online Assessment Implementation Plan

DRC has overseen the development and administration of online testing for numerous statewide assessments, both with our own online testing system and previously in partnership with an online testing subcontractor. In the past eight years, we have helped eight states and the multi-state WIDA Consortium implement and expand their online testing programs. We have expertly managed dual-mode programs (online and paper-based) as well as provided smooth transitions for tests moving to primarily online administration. As a full-service assessment partner, we have tailored innovative solutions that have helped our clients implement and expand their online testing programs, including Pennsylvania. The following list details the depth of our experience.

DRC's Proven Results: Online Testing Implementation

- **Alaska**—Began with a comprehensive technology readiness project to determine district preparedness for the introduction of online testing in fall 2013, followed by an online item pilot in spring 2014 to help districts, schools, teachers, and students gain experience with testing online.
- **Idaho**—One of the earliest states to move completely online; currently 99% online. In response to a survey, 100% of districts responded that they would not want to return to paper-pencil testing.
- **Michigan**—Administered online cognitive interviews to students in grades K–2 in 2012. In spring 2013, DRC piloted their interim assessment online. Michigan then selected DRC to administer next-generation assessments in DRC INSIGHT, which was done successfully in spring 2015.
- **Nebraska**—For the first operational administration of their standards-based assessment (NeSA) in Spring 2010, participation was over 75%. Nebraska achieved over 97% participation by Spring 2013.
- **Oklahoma**—Began transition with use of online testing for a non-high-stakes subject (Geography). Gradually moved to high-stakes subjects, adding mathematics and reading during the 2007–2008 school year.
- **Pennsylvania**—Introduced classroom-based diagnostic tests in 2010, and offered end-of-course exams in both paper-pencil and online formats. DRC has also helped transition the 3–8 program to online delivery with the first online administration in spring 2013.
- **South Carolina**—The State Legislature hired DRC to do a feasibility study of the issues and costs involved in transitioning to online testing. The state subsequently began offering its end-of-course tests online, followed by its English language development assessment in 2013. The 3–8 summative assessment moved online in spring 2015.
- **Washington**—Began voluntary online testing for grades 6–8 in 2010. In 2013, achieved nearly 50% online participation for grades 3–8.
- **WIDA Consortium**—DRC was selected as the technology partner to deliver WIDA's next-generation, technology-based language assessment system for students in grades 1–12 who are learning English. The field test was administered in 23 states in spring 2014, with another field test planned for early 2015 and operational dual-mode testing beginning in fall 2015.

For detailed descriptions of our work in the above states, please see the project summaries in *Section 4, Prior Experience*.

DRC recognizes that implementing a statewide online testing program can be a challenging undertaking for schools, districts, and departments of education. Over time, DRC has successfully met the challenges of deploying our testing engine in

schools and districts with unique and varied technology resources, and increasing participation at the district level. At the heart of our approach is **DRC's dedication to providing school and district staff with the customized support and collaborative, responsive customer service** that have become our hallmark in the testing industry.

Our proactive approach to handling implementation issues focuses on advance communication and preparation for school and district personnel. In serving as a true assessment partner to Pennsylvania schools, districts, and PDE, DRC will always go the distance to find solutions and offer support each step of the way. Key strategies of our proven implementation plan include:

- **Infrastructure and Capacity Planning.** Provide diagnostic tools and technology support to ensure readiness in as many schools as possible, based on proven practices.
- **Communications Plan.** Support PDE in communicating information about the online assessment system to districts, schools, teachers, parents, and students.
- **Comprehensive Training and Support Plan.** Provide comprehensive training to ensure that technology and assessment coordinators, test administrators, and students have the best experience possible. Provide clear documentation for all processes and procedures and provide prompt, Pennsylvania-specific customer service and technical support.
- **Support for All Students.** Encourage participation for the widest range of students possible and ensure accurate measurement of the standards by providing appropriate online accommodations and tools.
- **Support for PDE's Vision and Goals.** Continue to work closely with PDE to understand your vision and goals for the future of online testing in Pennsylvania; serve as a mission-partner in achieving those objectives.

We will work closely with PDE to document and finalize each element of the implementation plan upon contract award.

Increasing Participation in Online Testing

DRC INSIGHT provides districts with the ability to test online in all grades and subjects for the CDT, Keystone Exams, and PSSA. Districts may choose to test entirely online or partially online, and we have processes in place to support either approach. We understand that PDE is interested in ideas to increase the usage of online testing, and we are prepared to support PDE in this endeavor. DRC has been a **key driver in increasing participation in online testing** for our state partners by maximizing the use of technology to increase access for all students and reducing burden on teachers and administrators.

We have highlighted our strategies for increasing online testing participation in Pennsylvania in the following list.

- **Phase-in Approach.** Implement a deliberate, phased approach to increase online testing. This could include a staggered transition by selected programs, grades, and/or subjects over time, allowing districts with low participation to become acquainted with the testing system in a staged, deliberate process.
- **Start with the CDT.** Bring schools online first with the CDT since it shares many of the components of the high-stakes summative assessment, has a year-long test window with multiple opportunities for retakes, and showcases one of the big advantages of online testing—immediate and actionable reports.
- **Professional Development Support.** Provide targeted professional development sessions in districts with low participation to inform educators of the benefits of online testing and equip them with the knowledge and tools needed to effectively implement online testing.
- **Communicate New Features.** As new features become available that would increase school capacity to test online (such as new supported testing devices), DRC can work with PDE to communicate these advantages to schools and districts.
- **Online Testing Incentives.** If desired, DRC can help PDE determine possible incentives for districts to increase participation in online testing.

DRC would be pleased to collaborate with PDE on these and other approaches for increasing online participation.

4.F.1.c. Evaluation of Readiness for Online Assessment

DRC has worked extensively with intermediate units, districts, and schools in Pennsylvania and other states to support readiness for online testing. Our goal is to deliver the best student testing experience by identifying and reducing the issues associated with technology readiness. We strongly believe that technology preparation, in concert with people readiness and engaged technical support, are critical elements of a sound online testing program.

The following figure summarizes the proposed Technology Readiness offerings for Pennsylvania districts and schools. Information on each component of the plan is provided in the remainder of this section.

Pennsylvania Technology Readiness Plan



Powerful Diagnostic Tools

DRC is pleased to continue offering Pennsylvania a variety of diagnostic tools that help district technology personnel prepare for testing. While many vendors offer the basic technology services needed to implement online testing, **DRC has moved well beyond the industry standard, offering a comprehensive suite of diagnostic and simulation tools, reports, and support services.**

DRC’s technology readiness tools will help PDE, districts, and schools:

- Evaluate, monitor, and improve school and district readiness for online testing.
- Look at the technology variables that impact readiness.
 - Testing device specifications
 - District and school networks
 - Internet service providers
 - Internet connectivity
- Tailor services based on state and/or individual district needs.

The diagnostic tools available in DRC’s technology “toolbox” are highlighted in the following pages.

DRC Addresses Critical Technology Questions that Impact Performance

- Do testing devices meet the minimum requirements for online testing? Can they connect to the testing servers and transmit information?
- Is network capacity and configuration adequate for peak testing demands?
- What is the Internet service provider (ISP) capacity and configuration?
- How long will it take to download tests? Upload student responses?
- How many students can test at the same time?

System Readiness Check

The System Readiness Check verifies that each testing device meets the minimum system requirements for testing, including sufficient screen resolution, Internet connectivity, memory (RAM), and other technical specifications. This step helps to ensure that all testing devices are operating properly prior to testing and prevent delays on the day of testing. The following image shows the results of a completed system readiness check.

System Readiness Check

| System Information | | | |
|----------------------------------------|------------------------------------|-------------------------------------------------------------------------------|-----------------------------------|
| Client Version | | Installation Directory | |
| 5.1.0 | | C:\Program Files (x86)\PA Online Assessment System | |
| Machine Name | User Name | OS Level | OS Version |
| MGWS11274 | bbalderson | Microsoft Windows 7 Enterprise Edition Service Pack 1 (build 7601), 64-bit | 6.1 |
| Response Caching TSM Connection | Response Caching TSM Configuration | Content Caching TSM Connection | Content Caching TSM Configuration |
| https://MGWS11274:8443/ HTTPS Proxy | Yes | https://MGWS11274:8443/ | Yes |

| Required Test List | | |
|--------------------|---------------------------------|---------|
| Status | Test Name | Details |
| ✓ | Screen Resolution | Details |
| ✓ | Internet Connection | Details |
| ✓ | RAM | Details |
| ✓ | Audio Capability | Details |
| ✓ | OS Level | Details |
| ✓ | User Agent | Details |
| ✓ | Response Caching TSM Connection | Details |
| ✓ | Response Caching TSM Status | Details |
| ✓ | Response Caching TSM Version | Details |
| ✓ | Content Caching TSM Connection | Details |
| ✓ | Content Caching TSM Version | Details |

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The System Readiness Check runs automatically when the secure testing browser is installed. It can also be run on demand for debugging purposes at any time. DRC receives reports each time the application is run and can assist in any troubleshooting that may be required. District and schools technology personnel appreciate readiness applications such as this because they simplify the process of determining if student testing devices are capable of delivering tests.

Load Simulation Tool

The Load Simulation Tool performs simulations that estimate the amount of time it will take to download tests and upload responses, both for individual computers and averaged across multiple computers. The simulation traces the entire data route from the student testing device to DRC's testing servers, revealing any potential issues prior to live testing. Simulation results can be used to troubleshoot potential issues with network connections, computer memory, and computer configuration.

DRC recommends that the simulations include as many of the testing devices in a district as possible, to allow districts to better assess each location’s readiness. The intention is to replicate realistic upload and download traffic on the district and school infrastructure.

Load Simulation Tool

The screenshot displays the 'Load Simulation Tool' interface. At the top left is a 'Select Simulations' button. Below it is a 'Summary' view with a search bar and a table of simulation results. The table has columns for Simulation ID, Average Load Test (min/sec), Average Submit Test (min/sec), Simulation Date/Time, Transmitted Date/Time, Min Duration (min/sec), and Max Duration (min/sec). Below the table, it says 'Showing 1 to 3 of 3 entries' and includes navigation buttons for 'Previous', '1', and 'Next'.

| Simulation ID | Average Load Test (min/sec) | Average Submit Test (min/sec) | Simulation Date/Time | Transmitted Date/Time | Min Duration (min/sec) | Max Duration (min/sec) |
|---------------|-----------------------------|-------------------------------|------------------------|-----------------------|------------------------|------------------------|
| 2 | 00:08 | 00:06 | 01/07/2014 11:09:17 AM | | 00:13 | 00:14 |
| 3 | 00:06 | 00:06 | 01/07/2014 11:09:17 AM | | 00:09 | 00:18 |
| 1 | 00:04 | 00:06 | 01/07/2014 11:09:17 AM | | 00:08 | 00:10 |

Below the Summary view is a 'Details' view, also with a search bar and a table. The table has columns for Simulation ID, Computer, Content Source, Load Test (min/sec), Submit Test (min/sec), and Duration (min/sec). Below the table, it says 'Showing 1 to 9 of 9 entries' and includes navigation buttons for 'Previous', '1', and 'Next'.

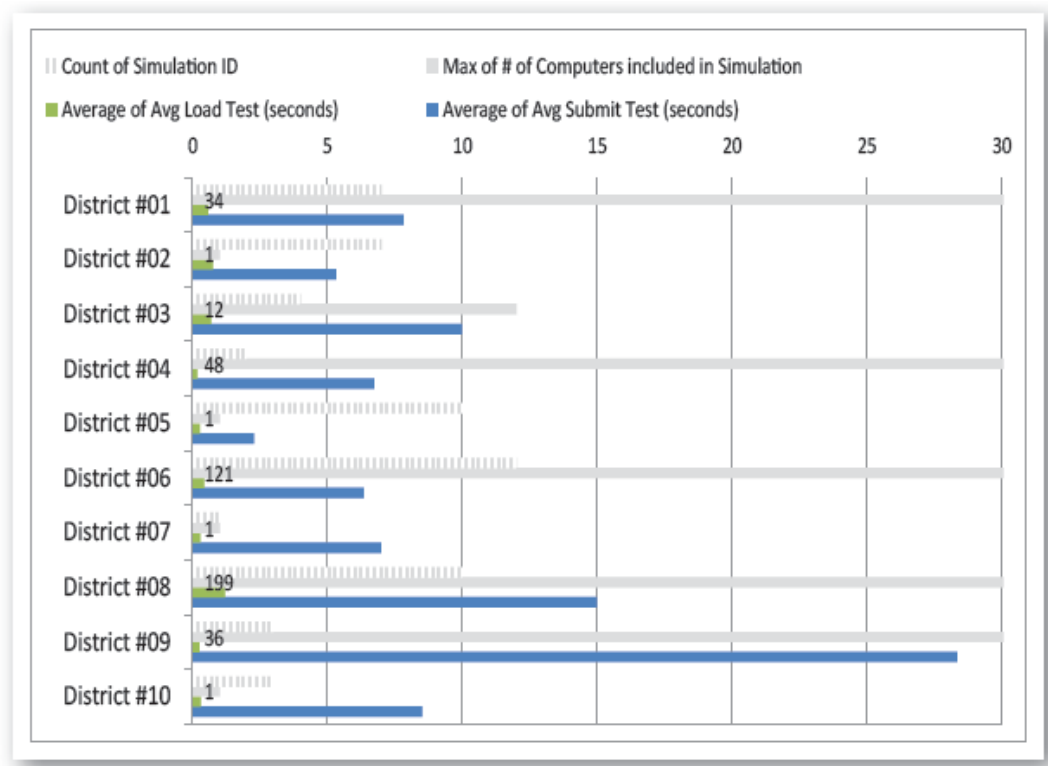
| Simulation ID | Computer | Content Source | Load Test (min/sec) | Submit Test (min/sec) | Duration (min/sec) |
|---------------|------------------------------------|----------------|---------------------|-----------------------|--------------------|
| 3 | PLSWS22222.DATARECOGNITIONCORP.COM | DRC | 00:13 | 00:05 | 00:18 |
| 2 | PLSWS33333.DATARECOGNITIONCORP.COM | DRC | 00:08 | 00:06 | 00:14 |
| 2 | PLSWS11111.DATARECOGNITIONCORP.COM | DRC | 00:07 | 00:07 | 00:13 |
| 2 | PLSWS22222.DATARECOGNITIONCORP.COM | DRC | 00:09 | 00:05 | 00:13 |
| 1 | PLSWS11111.DATARECOGNITIONCORP.COM | TSM | 00:03 | 00:07 | 00:10 |
| 1 | PLSWS33333.DATARECOGNITIONCORP.COM | TSM | 00:03 | 00:06 | 00:09 |
| 3 | PLSWS33333.DATARECOGNITIONCORP.COM | TSM | 00:03 | 00:06 | 00:09 |
| 3 | PLSWS11111.DATARECOGNITIONCORP.COM | TSM | 00:03 | 00:07 | 00:09 |
| 1 | PLSWS22222.DATARECOGNITIONCORP.COM | TSM | 00:04 | 00:05 | 00:08 |

DRC is also pleased to offer a **Load Simulation Results Report by District** that allows districts to delve deeper into the results of the load simulations that are run on district computers. This report will:

- Summarize information collected as part of the system readiness checks and load simulations implemented in schools across the district, including the date and location where each simulation was run.
- Identify districts and specific testing devices that were unsuccessful in passing any component of the readiness check (e.g., minimum operating system levels, minimum screen resolution, device RAM, active Internet connection, etc.).
- Identify districts and specific testing devices that were found to be, on average, outside the maximum acceptable tolerance for test load time and test submit time.

As another added benefit for PDE, DRC will provide our **Load Simulation Summary Graph**, which summarizes load simulation results across all districts who plan to test online. This graph gives PDE insight into which specific districts may be experiencing issues in advance of testing. A sample summary graph is shown below.

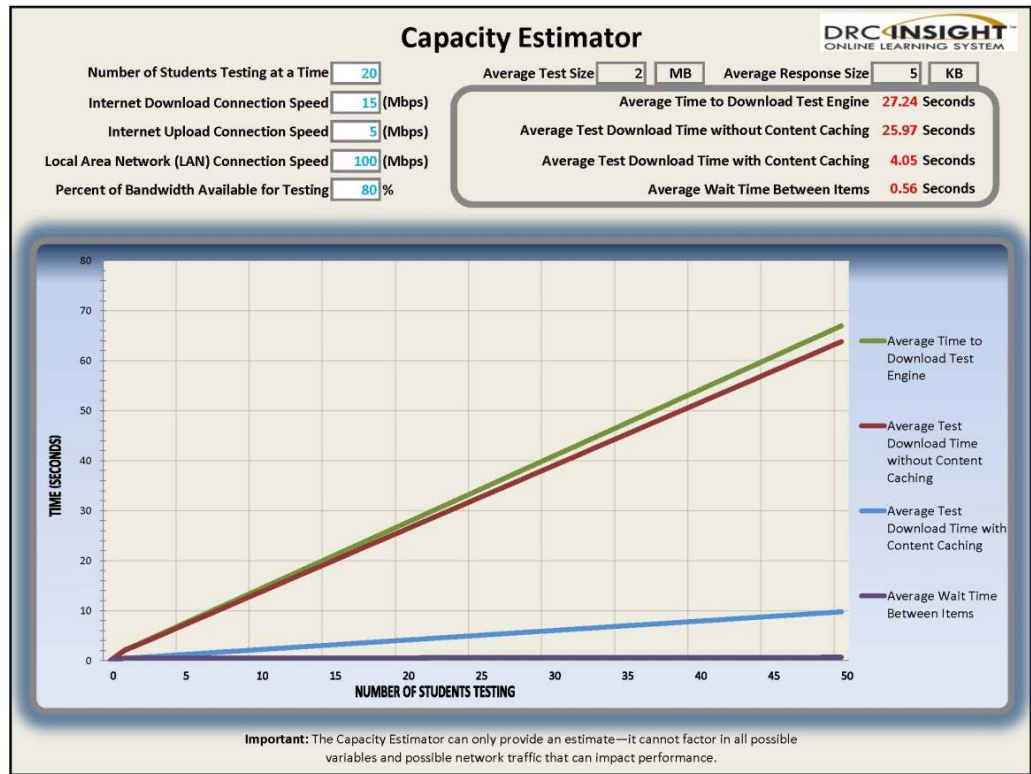
Load Simulation Summary Graph



Capacity Estimator

DRC’s Capacity Estimator helps sites plan for testing based on a number of factors, including the Local Area Network (LAN) connection speed, Internet upload and download connection speeds, estimated percentage of bandwidth available, and number of students who will test at roughly the same time (concurrently). Based on the parameters entered, the application estimates the average test download times and the wait time between items.

Capacity Estimator



ver. 2.2

Ping Trends

DRC's Ping Trends tool helps districts analyze their network traffic patterns. The tool sends a data packet from the school to DRC at multiple times of the day and measures how long it takes the data packet to return to the school. When the tool "pings" the DRC server, the network calculates the time it takes for the data to be received. The longer the time, the longer it has taken the DRC server to receive the data packets (usually because of excess network traffic).

This rate of data transfer across a network is referred to as response latency. Knowing the latency is useful for helping districts determine peak network traffic times and for analyzing the best times for testing.

A sample ping trends results graph is shown below. As the time required for ping attempts increases, peaks or spikes appear that can indicate increased network traffic and slower response time. District technology staff can use this information to plan for optimum testing times based on their unique network patterns.

Ping Trends Graph



DRC's Technology User Guide will contain instructions on how to use each of the above diagnostic tools. DRC also provides prompt technical support via phone and email to assist users with our diagnostic applications.

LEA Technology Readiness Checklist for Deploying Online Assessments

DRC will continue to collaborate with the Pennsylvania Technical Readiness Team to update and improve the comprehensive technology readiness checklist that serves as a reference guide for LEAs to implement online assessments. The document is structured in a checklist format for ease of identification of various factors an LEA needs to consider, including the following categories:

- **Staff and Personnel:** identifies each team member's assignment in facilitating the online testing experience so that all staff and personnel have a clear understanding of the testing process and expectations
- **Scheduling and Logistics:** identifies a number of technology and non-technology considerations, including consideration for students requiring accommodations
- **Network and Devices:** guidelines to assist technology staff in determining their district's capacity, identifying eligible computers, and the total number of students the district can serve

A number of checklist items involve not just technology directors, but also assessment coordinators, curriculum directors, and others within an LEA working together as a team. Within each checklist item, there is an area for LEAs to track the status of each item, as well as an area to identify those involved within the LEA.

Option: Site Evaluations and In-Depth Diagnostics

Gathering input directly from districts is an important step in determining technology readiness. DRC can conduct site interviews with technology staff to obtain information on current challenges and the infrastructure within the district. Using feedback from the field, DRC can perform a high-level technical evaluation and analysis of the site's preparedness for online testing.

In cases where initial findings reveal issues or concerns at a specific site, DRC's technology experts can visit the district to perform a more in-depth analysis. On-site evaluations allow us to provide individualized attention and support, as well as expanded reporting and recommendations for a designated site.




If PDE is interested in implementing district interviews or on-site evaluations to support key districts, DRC would be happy to discuss this option further upon award.

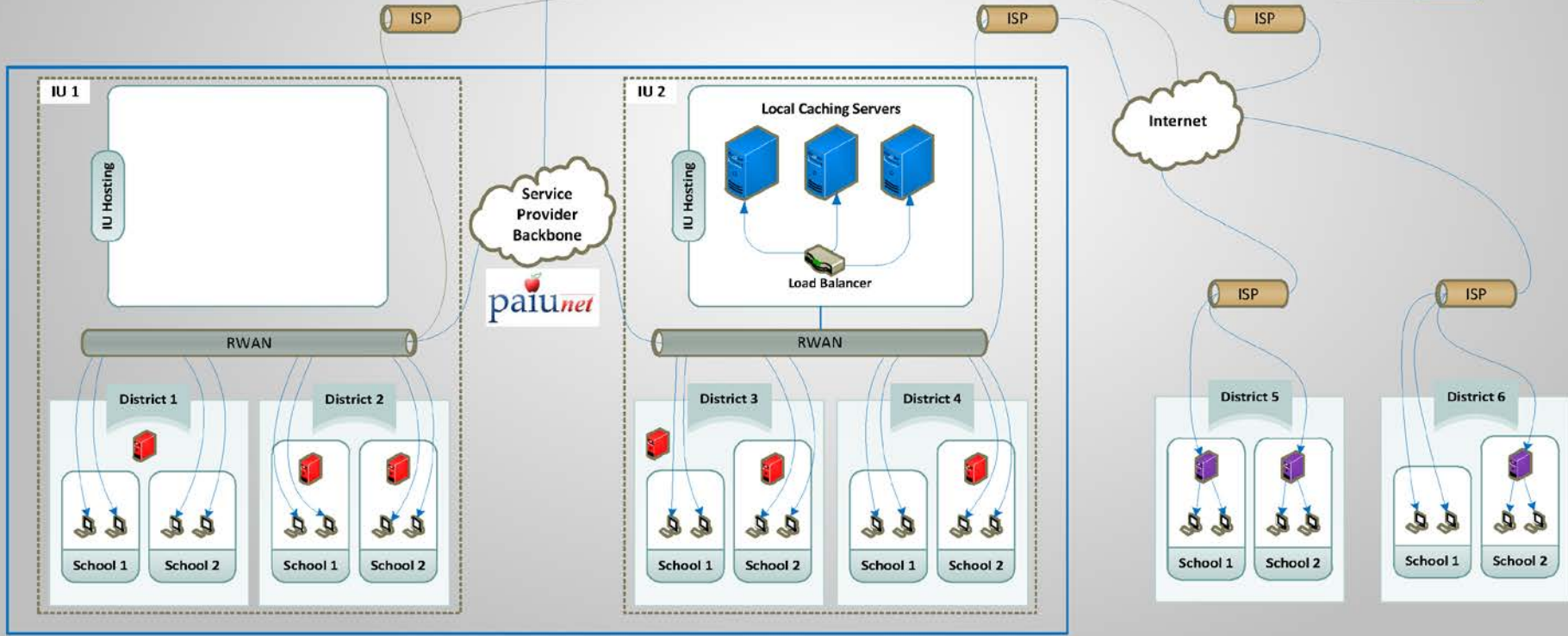
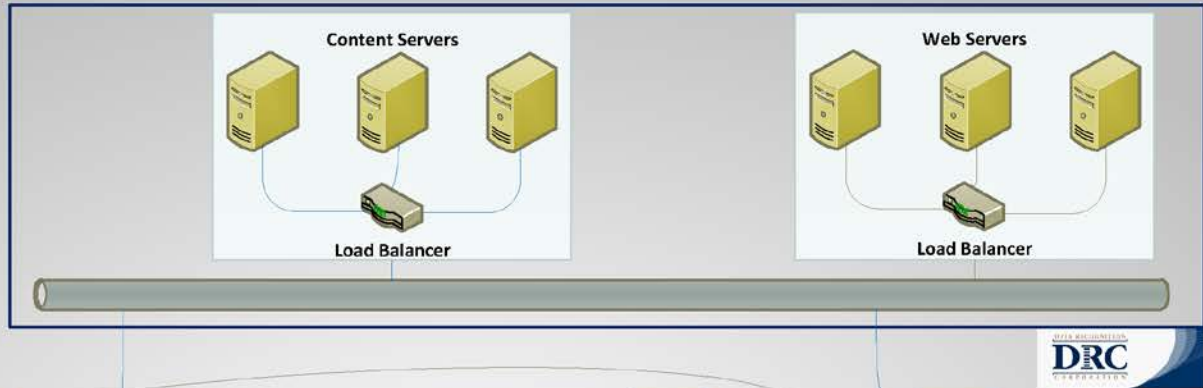
4.F.1.d. PAIUnet

DRC has partnered with PAIUnet to deliver online testing directly through its Regional Wide Area Network (RWAN). The solution was implemented in July 2014 and used successfully throughout 2014–2015 test administrations.

DRC has worked closely with the PAIUnet team and technical experts from Chester County Intermediate Unit to develop an effective solution for connecting DRC to PAIUnet’s wide area network to deliver a secure, reliable, and scalable testing experience. The solution is also designed with failover capabilities resulting in increased availability. On the following page is a high-level diagram that depicts our solution with PAIUnet.

Connection between DRC and PAIUnet

-  **Response Caching Only**
Response caching is only used in scenarios where an Internet connection is lost. It must be as localized as possible to the student machines and the student machines must be able to reconnect to the same exact response caching service instance for all responses sent. It cannot be load balanced.
-  **Content Caching Only**
Content caching is a way of bringing the content closer to the student machine and eliminates duplicate requests across the general Internet. It can be load balanced as all content caching services are identical to one another.
-  **Response & Content Caching**
A combined response caching and content caching service performs both roles in a consolidated fashion but must be configured for the restrictions of response caching alone. The student machines must be able to reconnect to the same exact response caching service instance at all times. They cannot be load balanced.



DRC has also worked with PAIUnet to configure and deploy content caching capabilities on servers within Intermediate Units (IUs) on PAIUnet. This allows for testing content to reside on servers in the RWAN, providing added security and additional performance. Additional redundancy for content caching and response caching can be achieved by deploying DRC's TSM on either the district WAN or testing location LAN. These deployments would be optional.

4.F.2. ONLINE TESTING SYSTEM

4.F.2.a. Web-Based Online Test Delivery System

System Modifications for Pennsylvania Assessments

The system proposed for the Pennsylvania assessments is DRC's current web-based testing engine, DRC INSIGHT. The following new features will be introduced for DRC INSIGHT under this contract:

- Support for Refreshable Braille
- Support for Braille note-taker

The full suite of DRC INSIGHT tools and accommodations is described later in this section.

Software Releases

DRC INSIGHT is a proprietary system that is maintained in-house. We continually update and enhance our system to take advantage of the latest technologies, respond to research and best practices on system tools and accommodations, and to meet the changing needs of our clients. Each "release" of the DRC INSIGHT software is built upon the previous version of the software, and contains new features and functionality that are targeted for that particular release. New releases of the software typically occur twice per year: a summer release (for the fall/winter testing season) and a spring release (for the spring/summer testing season).

The current version of the DRC INSIGHT system, which is being used by six states and the multi-state WIDA Consortium this spring, is DRC INSIGHT 5.2.0.

The version that will be provided for Pennsylvania's first administration under the new contract (i.e., the Keystone Exams in the summer of 2016) will be based on our current version at that time and will include additional modifications/features as required by this contract. The anticipated release number for summer 2016 is DRC INSIGHT 7.0.

Customer List and Implementation History

The current version of DRC INSIGHT is a web-based test engine that operates on a secure web browser. Our current web-based version was implemented in Pennsylvania in February 2014, and has been in use by other DRC clients since fall 2013. DRC’s test engine formerly operated as a desktop-based Java application that was installed directly on the student computer. The following table gives a comprehensive history of DRC INSIGHT programs in the past five years, including the software version(s) used.

DRC INSIGHT Online Testing Programs

| DRC INSIGHT Program | Timeline | Description | Software Version(s) Used | |
|--------------------------------------------------------------------------------|---------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|
| | | | Current Web-Based Version | Prior Desktop-Based Version |
| Pennsylvania Classroom Diagnostic Tools (CDT) | 2010–Present | Classroom-based, computer-adaptive tests in grades 3–12 in reading, writing, mathematics, and science. | ✓ | ✓ |
| Pennsylvania Keystone Exams | 2010–Present | End-of-course summative exams administered three times per year in Algebra I, Biology, and Literature. These exams are required for graduation. | ✓ | ✓ |
| Pennsylvania System of School Assessment (PSSA) | Spring 2013–Present | Online versions of Pennsylvania’s summative testing program administered in the spring in grades 3–8 for English language arts, mathematics, and science. | ✓ | ✓ |
| Michigan Interim Assessment—Cognitive Labs, Pilot Test, and Field Tests | 2012–2014 | Online interim assessment system in K–2 reading and mathematics; grades 3 through high school in science and social studies; and high school reading and mathematics. Included online cognitive labs with teachers and students in grades K–2. | ✓ | ✓ |
| Washington Measurements of Student Progress (MSP) | 2012–2014 | Online versions of Washington’s summative assessment program delivered to students each spring at grades 3–8 in reading, mathematics, and science. | ✓ | ✓ |
| South Carolina End-of-Course Examination Program (EOCEP) | 2012–Present | End-of-course assessments administered three times per year in Algebra, English, Biology, and U.S. History and the Constitution. | ✓ | ✓ |

| DRC INSIGHT Program | Timeline | Description | Software Version(s) Used | |
|-----------------------------------------------------------------------------------------------------------|---------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|
| | | | Current Web-Based Version | Prior Desktop-Based Version |
| Louisiana Transitional Field Test | Spring 2013 | Field test of newly developed English language arts and mathematics items for use in Transitional Assessments. | | ✓ |
| Idaho End-of-Course Field Test | 2013–2014 | Field test administration for new end-of-course tests in Biology and Chemistry. | ✓ | |
| South Carolina English Language Development Assessment (ELDA) | 2013–2014 | English language development assessment administered each spring in reading, writing, listening, and speaking in grades K–12. | ✓ | ✓ |
| Nebraska Check 4 Learning Formative Assessments (C4L) | Fall 2013–Present | Formative assessments administered by teachers at the point of instruction in order to monitor student learning. Delivered on demand throughout the year. | ✓ | ✓ |
| Nebraska State Accountability (NeSA) | Fall 2013–Present | Summative assessments in grades 3–8 and high school in reading, mathematics, science, and writing. | ✓ | ✓ |
| Alaska Online Item Pilot | Spring 2014 | Pilot test to help districts, schools, teachers, and students gain experience with testing online and to expose students to items aligned to the new Alaska Mathematics Standards in grades 3–8. | ✓ | |
| Michigan Alternate Assessment Pilot | Fall 2014 | Online pilot test and subsequent online cognitive labs for Michigan’s alternate assessment in social studies, administered to students in grades 5, 8, and 11. | ✓ | |
| WIDA Consortium: Assessment Services Supporting ELs through Technology Systems (ASSETS) Field Test | Spring 2014–Present | Next-generation, technology-based language assessment system for students in grades 1–12 who are learning English. The field test includes listening, speaking, reading, and writing. | ✓ | |
| Idaho Science End-of-Course Test | Spring 2015–Present | End-of-course test in Biology and Chemistry for high school students. | ✓ | |
| Idaho Standards Achievement Tests (ISAT) | Spring 2015–Present | Criterion-referenced tests in science for grades 5 and 7. | ✓ | |

| DRC INSIGHT Program | Timeline | Description | Software Version(s) Used | |
|--------------------------------------------------------------------------------|------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|-----------------------------|
| | | | Current Web-Based Version | Prior Desktop-Based Version |
| Michigan M-Step Online Statewide Assessments | Spring 2015–Present | Summative online assessments for grades 3–8 and 11 in ELA and mathematics (Smarter Balanced), as well as science and social studies; and Interim assessments for grades K–12 in ELA and mathematics and grades 3–high school in science and social studies. | ✓ | |
| Missouri Assessment Program (MAP) | Spring 2015–Present | Summative assessments in ELA and mathematics, grades 3–8 (Smarter Balanced assessments); and science, grades 5 and 8. | ✓ | |
| South Carolina Palmetto Assessment of State Standards | Spring 2015–Present | Online version of South Carolina’s 3–8 assessment in science and social studies. | ✓ | |
| WIDA Consortium: ACCESS 2.0 and ACCESS for ELLs Operational Assessments | Beginning in Fall 2015 | Summative ELL assessments for grades K–12 in Listening, Reading, Speaking, and Writing, delivered in 36 member states. | ✓ | |

4.F.2.b. Infrastructure Plan

DRC realizes that a sound infrastructure plan is vital to the Pennsylvania assessments. We have mastered the hardware and software needed for large-scale online assessment and our technical environment will continue to meet PDE’s requirements. Our technology staff continually monitors and evaluates the requirements of current clients, along with those of potential new contracts; we proactively add capacity and resources where necessary so that service levels always meet or exceed requirements. **Infrastructure availability and performance are our technology team’s top priority.**

The following is an overview of DRC’s infrastructure for delivering online testing programs. As required by the RFP, we are prepared to provide a detailed Infrastructure Plan customized to Pennsylvania’s program upon award. The Pennsylvania Infrastructure Plan implemented by DRC will ensure that we follow ITIL (Information Technology Infrastructure Library) industry standards and processes, including IT Service Management best practices, state-of-the-art technologies, and NIST security standards and processes, as well as meeting Pennsylvania’s capacity, process, and security requirements. We will work with

PDE to review and update the Infrastructure Plan as needed throughout the contract. PDE will have final approval of the plan and any modifications.

Hardware and Software Infrastructure

DRC has a very robust infrastructure supporting large-scale assessment projects.

- We have two main secure data centers, one in Brooklyn Park, Minnesota, and one at the Level 3 co-location data center in Minnetonka, Minnesota. Both data centers are connected via a high-speed fiber optic ring, enabling high availability, redundancy, and recovery.
- DRC's applications are deployed on converged infrastructure using Virtual Computing Environment's Vblock Systems, which integrate best-in-class computer, network, and storage technologies from industry leaders Cisco, EMC, VMware, and Intel.
- Data is backed up across sites via EMC's Avamar Data Domain backup and recovery solution. All scanned content is stored on Isilon Network Attached Storage, which is also replicated between data center sites.
- DRC's infrastructure, applications, and websites are monitored for availability and performance 24 hours a day, 7 days a week.
- Our application development platforms include both .NET and Java, and they are deployed on either Windows Server 2012 R2 or Red Hat Enterprise Linux 6 (RHEL) servers.
- Our infrastructure is highly virtualized using VMware's vSphere virtualization platform. Microsoft SQL Server 2012 is our primary database platform, and we also deploy NoSQL databases using MongoDB.

Servers

DRC's server infrastructure is highly virtualized, effectively managing resource utilization and scalability. Across the data center there are approximately 950 virtual servers and 300 physical servers. The combination of standalone, clustered, and virtualized servers run either Microsoft 2012 Server or Red Hat Enterprise Linux 6 (RHEL) operating systems.

DRC employs redundant web, application, and database servers; if one server should fail, the load will automatically shift to other servers. The servers are load-balanced to distribute the requests and reduce the chance of one server becoming overloaded. The architecture is designed to easily scale up as the demands of the web systems increase.

Networks

The DRC wide area network (WAN) utilizes a dedicated, private fiber optic ring in our core ring, Multi-Protocol Label Switching (MPLS) network and Virtual Private Network (VPN). Communication capacities range from 45 Mbps to 2

Gbps based on the operations carried out at each DRC facility. The data center facilities have high speed Internet links with the capacity to support up to 3 Gbps of traffic. Each local area network (LAN) in all facilities is a switched, 10 Gbps Ethernet network with fiber backbone and gigabit connections to the desktop.

Data Storage

DRC utilizes storage area network (SAN) devices for maximum speed, flexibility, and redundancy in our data storage solution. Servers are connected to the SAN via redundant connections to ensure minimum interruptions due to hardware failures. The SAN allows disk space to be reallocated with ease for availability to those applications or servers as needed. DRC’s is currently utilizing 825 terabytes of storage with the capacity to store over 1000 terabytes (1 petabyte). The environment has the ability to expand to multiple petabytes.

Online Testing System Infrastructure

The DRC INSIGHT online testing system comprises a system of databases, file systems, web systems, and applications hosted on DRC servers. We currently use JavaScript for the DRC INSIGHT web-based test engine, ASP.NET for the DRC eDIRECT administrative portal, SQL Server for the database, and Microsoft .NET-based web services and Java-based web services.

Our testing system’s primary applications—eDIRECT and DRC INSIGHT—are highlighted in the following table.

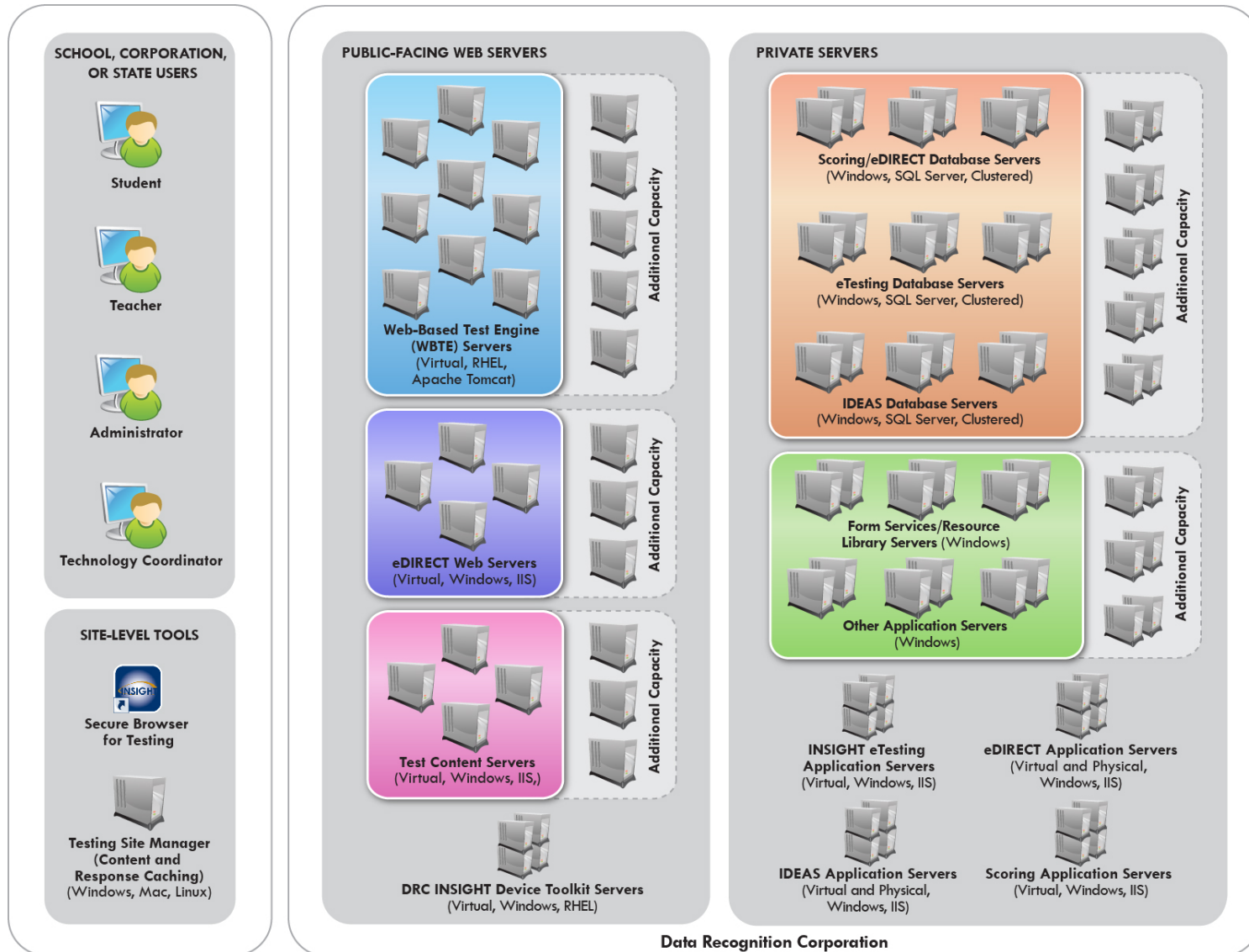
| eDIRECT Portal | DRC INSIGHT Test Engine |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> ■ Web-based ASP.NET platform used by: <ul style="list-style-type: none"> — Technology Coordinators for downloading the assessment software (secure testing browser, Testing Site Manager) — Test Coordinators and educators for access to test setup and monitoring tools — Students for access to online tutorials and training tools — Administrative personnel for access to data and reports ■ Secure, permissions-based system accessible through common web browsers | <ul style="list-style-type: none"> ■ The test engine software delivers test content to students via a secure web browser ■ JavaScript web-based application ■ Supports automatic updates ■ Used in the following configurations: <ul style="list-style-type: none"> — Standard single-user desktops, laptops, and tablets — Remote connectivity configurations (e.g., Citrix, terminal server, remote desktop, etc.) — Wired and wireless networks — “Cloud ready” setup for use with virtual networks and thin-client environments |

Servers at DRC host a Unified Database (UDB) dedicated to each state's content that holds much of the relevant data needed to operate DRC INSIGHT (e.g., teacher/class/student data, test data) and the test setup functionality within the eDIRECT administrative system. A separate DRC INSIGHT database holds transactional data for students as they take a test through the testing interface. During testing, student response data is sent to the UDB from the DRC INSIGHT database.

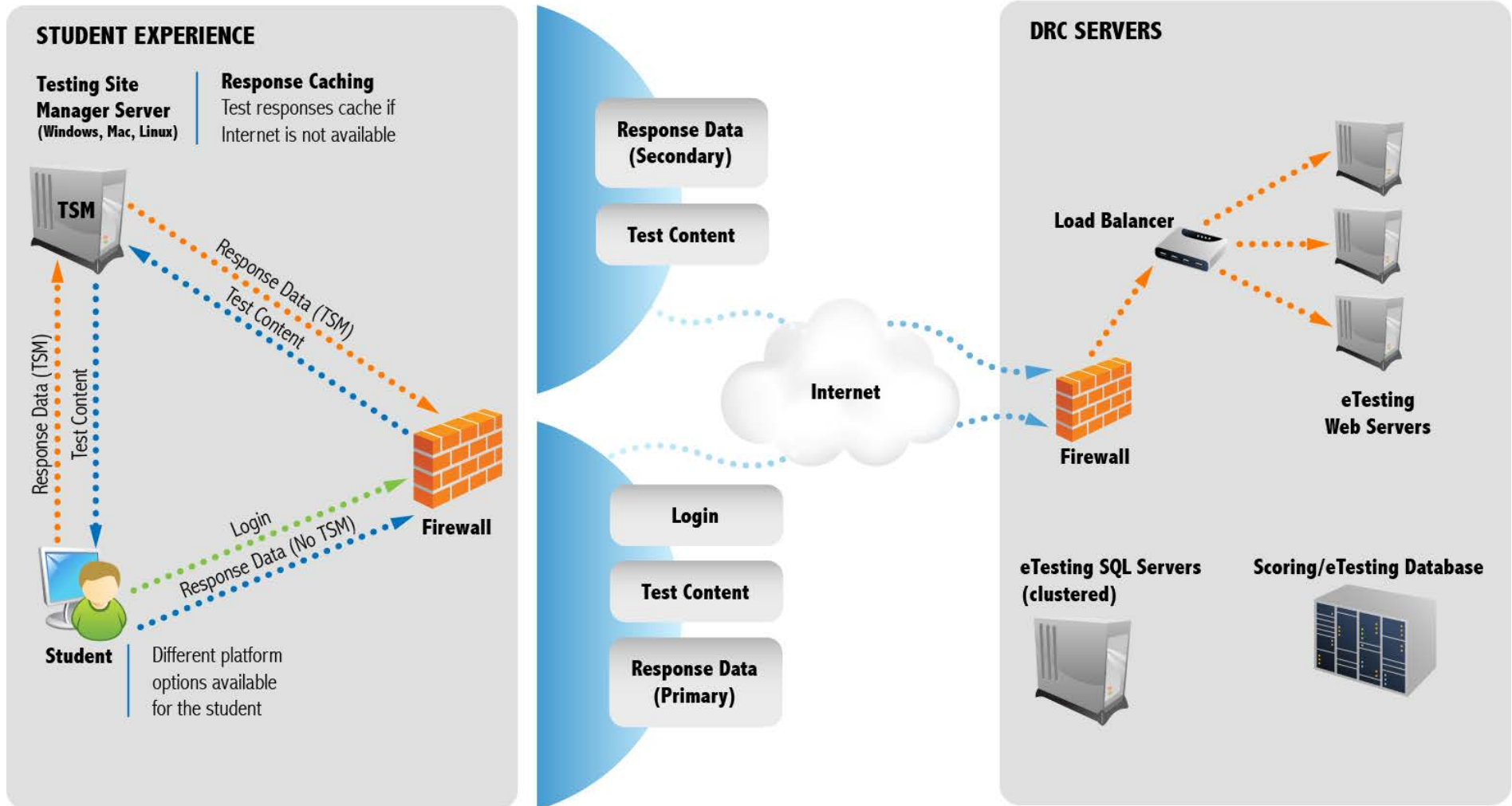
The DRC INSIGHT File System holds copies of downloadable software installation packages for the testing interface, downloadable software for the Testing Site Manager, form resources, and item resources.

Diagrams of the System Architecture for DRC INSIGHT are provided on the following pages.

Online Testing System Architecture



Architecture of the Student Testing Experience



4.F.2.c. System Specifications

DRC INSIGHT is a scalable, fully secure testing system designed to meet the technical requirements demanded by today’s high-stakes assessment programs. Our system is designed to work with the technology commonly available in schools and provide flexible options for districts with limited technology and bandwidth. The system is platform-independent (agnostic), meaning that it provides standardized display of content and consistent performance across all supported testing devices and all supported monitor/resolution settings.

DRC INSIGHT: Powerful and Reliable Performance

With DRC INSIGHT, educators enjoy the peace of mind that their students will have a consistent, uninterrupted online testing experience. Our safeguards include:

- Innovative tools to support schools with low bandwidth
- Unique ability to continue testing during Internet outages
- Continuous performance monitoring and engaged technical support
- Robust, scalable infrastructure with back-up data centers in two independent locations
- Proactive planning to avoid unexpected demand issues

DRC’s system ensures that students and teachers can focus on the test, and not the technology.

Innovative, Web-based Platform

The DRC INSIGHT test engine runs on a custom web browser that is designed to ensure a fully secure environment during testing. Our secure browser “locks down” the student’s testing device, preventing the student from accessing the desktop, the Internet, and other external programs. For non-secure testing such as practice and training sessions, students can use our Online Tools Training (OTT) environment, which runs on a standard web browser.

Our system utilizes the same code base for different testing platforms (for example, desktop/laptop computers and tablets), positioning DRC for emerging technologies and ensuring a consistent user experience across testing devices. In contrast to desktop-based test engines that are installed directly on the testing device, DRC’s browser-based system also offers a clear advantage to district technology personnel: updates to the test engine do not require installation of new software versions on student computers.

The custom browser software is downloaded from eDIRECT and installed onto student testing devices. The secure browser can be installed on computers

individually, or it can be downloaded to a central location, copied, and distributed to multiple computers simultaneously using common network distribution tools. DRC includes everything needed for testing with the secure browser, eliminating the need for districts to coordinate updates to third-party software.

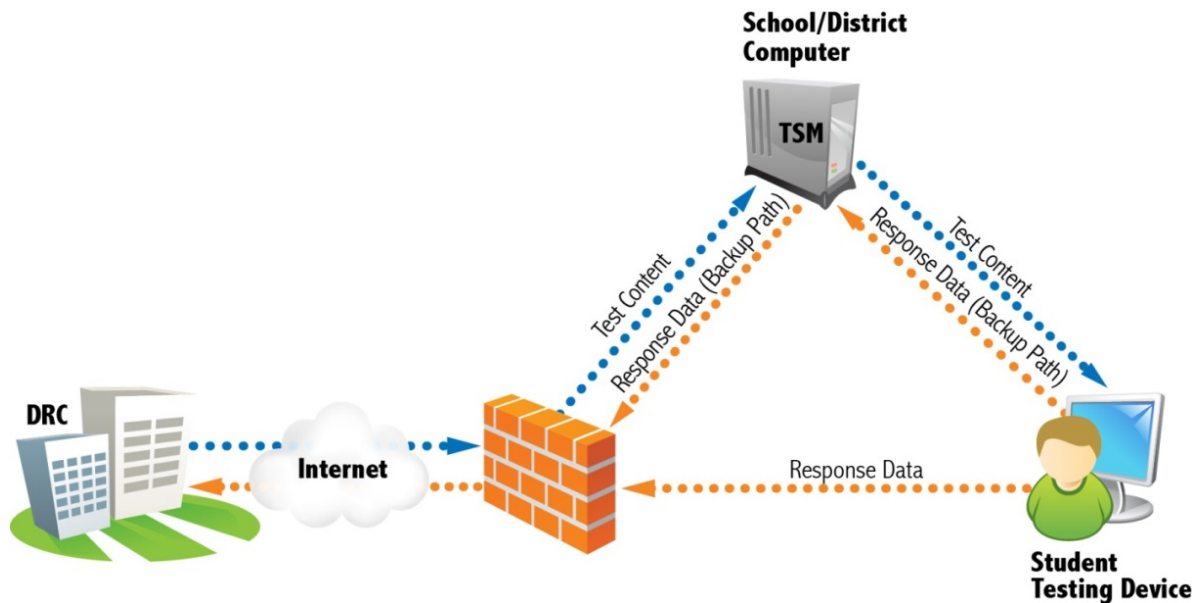
Proven Solution for Schools with Low Bandwidth

To meet the needs of schools with low bandwidth and/or unreliable Internet connections, DRC offers content and response caching through our Testing Site Manager (TSM) application. The TSM is a powerful, easy-to-configure, web-based application that provides caching and other tools to help plan, configure, and manage an online testing environment. The TSM can be installed and configured at the same time that the secure testing browser is installed, resulting in no undue burden on the technology coordinator. The TSM does not require any special hardware—it can be installed on any device (desktop, laptop, or server) that meets the system specifications.

DRC has worked with PAIUnet to configure and deploy content caching capabilities on servers within Intermediate Units (IUs) on PAIUnet. This allows for testing content to reside on servers in the RWAN, providing added security and additional performance. Additional redundancy for content caching and response caching can be achieved by deploying DRC's TSM on either the district WAN or testing location LAN. These deployments would be optional.

Caching helps manage the bandwidth required to administer online tests, and saves student responses if the Internet connection between the testing site and DRC is lost. By temporarily storing test content or test responses locally, **DRC's solution improves performance, reduces Internet traffic, and preserves student responses if a school's Internet connection goes down.**

Improved Performance with DRC's Testing Site Manager



Reduces bandwidth needed to deliver online tests by approximately 50%

- Aids schools that have limited Internet bandwidth
- Allows twice as many students to test online at the same time
- Supports tests containing large audio and video files

Decreases Internet traffic at the school

- Frees valuable bandwidth that can be used for teaching and learning
- Prevents bottlenecks on congested networks

Provides a "safety net" when Internet outages occur

- Allows testing to continue if the Internet connection is congested or lost
- Saves students' responses and ensures an uninterrupted testing experience
- Protects against delays and keeps the school's testing schedule on track

DRC takes pride in our flexible caching options because **unlike other vendors' solutions, DRC's software allows the student to continue testing when Internet connectivity is lost.** The Testing Site Manager provides a unique set of benefits found only through DRC.

Support for Multiple Testing Devices and Configurations

DRC INSIGHT can be used on desktop, laptop, and netbook computers with Windows, Mac, and Linux operating systems. The system also runs on iPad tablets, Windows tablets, Chromebooks, and Android tablets.

DRC INSIGHT can be used in several configurations, including:

- Standard, single-user testing devices
- Remote connectivity configurations (such as Citrix, terminal server, and remote desktop)
- Wired and wireless network configurations
- “Cloud ready” setup for use with virtual networks and thin-client environments

DRC’s online testing system does not require the school or district to install or host additional servers; all servers are hosted by DRC and are fully secure. The only hardware needed by the school is the devices (computers, tablets) that will be used for testing and for hosting the TSM application.

Including Student Feedback through Tablet Usability Studies

To prepare for testing on tablets, DRC conducted small-scale iPad usability trials with students in Pennsylvania, Minnesota, South Carolina, and Nebraska. DRC’s study facilitators worked with students and teachers at the classroom level to:

- Understand how students respond to testing on an iPad
- Gather feedback from students regarding the functionality of the system
- Explore the “ease of use” of system tools and various item types, from the student’s perspective

Input and feedback from DRC’s usability studies—including observational findings, facilitated classroom feedback, and teacher and student surveys—greatly enhances DRC’s ability to provide a smooth and reliable tablet testing experience for students. DRC presented findings from the usability studies at the 2014 Annual Meeting of the National Council on Measurement in Education (NCME) in Philadelphia, Pennsylvania. We would welcome the opportunity to share the usability study results with PDE.

Wireless Networks

DRC applications perform equally well on a wired or wireless network configuration. A testing site can use either a wired or wireless configuration, or a combination of both, without restriction. Schools and districts can expect that the performance on a wireless network will be comparable to the performance on wired networks, as long as the necessary bandwidth requirements are met. With a

wireless network, during peak utilization the onsite technology staff should monitor closely the number of devices that are connecting to each wireless access point. Over-use of a wireless access point can negatively impact performance. The same holds true for the use of Bluetooth/wireless keyboard devices with iPads.

DRC is committed to working with testing site staff to address network and computer lab configurations prior to testing. Based on test content and response sizes, DRC can provide network and bandwidth recommendations that technical staff can use to optimize the online testing experience for students. DRC's technical support materials will include configuration guidance and recommendations for schools and districts.

Reducing the Burden on District and School Staff

DRC appreciates the many demands on Pennsylvania district and school technology staff and we understand how valuable their time is. We have minimized the time and effort needed to deploy our online testing system so that technology personnel will experience straightforward and user-friendly installation processes. DRC INSIGHT will minimize burden on technology staff in several important ways, as described in the following figure.

DRC INSIGHT: Advantages for Pennsylvania Technology Personnel

Testing can be a busy and stressful time for school personnel. Dealing with technology issues that could have been avoided shouldn't be part of that stress. **DRC provides our clients with the most user-friendly and straightforward set up process of any vendor in the industry.** Here's why our system is different:

- **No third-party software requirements.** DRC includes everything needed for testing with the secure browser and does not require third-party software plug-ins, such as Java or Adobe Flash Player. Other vendor systems require technology personnel to first install the plug-ins and then carefully coordinate regular updates to those plug-ins in conjunction with testing windows. DRC's all-in-one solution eliminates these efforts for district staff.
- **No dependencies on commercial browsers.** DRC's system runs on a custom web browser that is maintained by DRC. Unlike systems that run on commercially available browsers, our system has no dependencies on third-party browsers and is not affected by changes to those browsers. With DRC INSIGHT, technology staff are not required to respond to complicated and ever-changing dependencies between the testing engine, commercial browsers, and third-party software.
- **Support for automatic updates.** As a web-based application, DRC INSIGHT supports automatic updates. In contrast to desktop-based test engines that are installed directly on the testing device, updates to DRC's test engine do not require installation of new software versions on student computers.
- **Low-maintenance caching tool.** DRC's Testing Site Manager (TSM), a content and response caching application, can be installed on a standard computer at the school or district; no additional servers or hardware are required. Once installed, test content is automatically downloaded to the TSM. If content is updated or changed, the TSM is automatically updated by the DRC servers, requiring no intervention from personnel at the testing site.
- **High-quality Text-to-Speech with no installation requirements.** Unlike other vendors' systems, DRC does not require voice packs to be pre-installed on student computers to support text-to-speech (TTS). DRC's TTS is embedded in the test content that is delivered during testing, so no additional software or supporting plug-ins need to be acquired and installed on the testing device. In addition, DRC uses only high-quality, licensed TTS voices that meet the approval of special education and ELL experts.

Positive Feedback from Pennsylvania Educators

"In my more than a decade of association with DRC, I cannot recall a single instance when DRC did not answer my question or resolve our issues satisfactorily. Being so large, we have unique challenges and DRC never shirked from going out of its way, if necessary, to accommodate our needs and provide additional assistance and supports to get our work done on time. ... Their web portal, eDIRECT, is quite versatile and user-friendly that even our novice test coordinators (1/2 to 1/3 of our test coordinators are new every year) find easy to navigate. Their information products such as videos, manuals, and other documents are easy to understand and are available in good time."

– *Uma D. Jayaraman, Assessment Development Coordinator for Philadelphia School District*

"I just wanted to tell all of the DRC Customer Representatives that I am so thankful for all of the help I have been given. You have kindly guided me through and helped me to learn Online PSSA Testing. You have also helped with the eDIRECT Website as well as other PSSA issues. I am so appreciative of your patience with me and your kindness throughout the many questions I ask you. ... All I can say is Many, Many Thanks! "

– *Sheri Brooks, Glendale Elementary Counselor*

"I cannot thank you guys enough for the fantastic support given me today during the load of my school's students for the Keystone exam. I misread the required date for upload to PIMS. It would have been a major effort to bubble up all the 143 effected students. Your assistance saved us uncountable man-hours of work effort. I especially appreciated your patience in the numerous calls I had to make to get the students loaded. Each of you are to be commended for exceptional customer service!!!!!! Again thanks!!!!!!"

– *Juanita Solomon, Accountant, Math Civics & Sciences Charter School*

Positive Feedback from Other DRC States

"Compared to [other vendor's assessment] this was a breeze for administration and product accessibility. Thank you!" – *Michigan*

"Was a very clear deployment and execution. Installation instructions were great and so was the help desk." – *Michigan*

"It worked wonderfully for us. We tested on laptops and desktops and did not have a problem. Loved not having to use CD-ROMs for the Oral administrations. It was so much easier not to have to worry about paper tests with the Oral Admins." – *South Carolina*

"I must commend the NDE and DRC on this year's NeSA testing. After receiving the trial instructions from DRC, I was able to successfully connect all of our Chromebooks with ease. This process was very easy ... thank you for making Chrome OS state testing a great success in our district!" – *Nebraska*

"This district has been working with the Smarter Balanced Field Test as well, and he wanted to let us know that our preparation materials and training are much better organized and helpful and he wanted to commend us on that. I have heard this from a few others as well and wanted to pass this on to all of you, good work!" – *WIDA Consortium member state*

4.F.2.d. and 4.F.2.e. Testing Device Requirements

DRC is committed to supporting all of the testing devices identified in the RFP. DRC's system is designed to work with the technology commonly available in schools, minimizing the financial burden on districts when they participate in online testing. The following table outlines the current DRC INSIGHT minimum and recommended system requirements. These requirements ensure we can support industry interoperability standards and deliver next-generation content.

DRC INSIGHT System Requirements

| Supported Operating Systems | Hardware Devices | Screen Size | Processor | Disk Space | Memory | Resolution |
|----------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|---------------------------------------|--------------------------------------|--------------------------------|--------------------------------------------|
| Windows Windows Vista Windows 7 Windows 8 and 8.1 Windows 10 Windows Server 2008 Windows Server 2012 Windows Server 10 | Non-touch-screen devices plus the following touch-screen devices: | Non-touch-screen devices: | <u>Minimum</u> 1 GHz | <u>Minimum</u> 100 MB | <u>Minimum</u> 512 MB RAM | <u>Minimum</u> 1024 x 768 |
| | Lenovo Yoga – Netbook/Tablet Dell Latitude – Laptop Microsoft Surface Pro – Tablet | <u>Minimum</u> 9.5” <u>Recommended</u> 13” or larger | <u>Recommended</u> 1 GHz or faster | <u>Recommended</u> 100 MB or more | <u>Recommended</u> 1 GB RAM | <u>Recommended</u> 1024 x 768 or higher |
| Mac (OS X) OS X 10.7 OS X 10.8 OS X 10.9 OS X 10.10 | Non-touch-screen devices | Touch-screen devices: <u>Minimum</u> 10” | | | | |
| Linux Ubuntu 12.04 and 14.04, LTS version, with 32-bit and 64-bit Gnome 3.4, Unity Shell | Non-touch-screen devices | | | | | |
| Chrome OS Chrome OS recent stable channel | Non-touch-screen devices plus the following touch-screen devices: Acer C720P Lenovo N20P Dell Chromebook 11 HP Chromebook 14 G3 | | | | | |
| Apple iOS iOS 8.1.3 iOS 8.2 | iPad 2 or newer iPad Air devices | 9.7” | n/a | n/a | n/a | |

| Supported Operating Systems | Hardware Devices | Screen Size | Processor | Disk Space | Memory | Resolution |
|------------------------------------------|------------------------------------------------------------------------------------|-----------------------|-----------|------------|--------|------------|
| Android Lollipop 5.0 or higher | ASUS Transformer Pad TF103CE Dell Venue 10 | <u>Minimum</u> 10" | n/a | n/a | n/a | |
| Thin Client/Virtual Desktop | All supported operating systems noted above, excluding Chrome OS, iOS, and Android | | | | | |

* Minimum versus recommended requirements: the minimum levels listed above represent a low compliance threshold. Application will run at the minimum specification, but districts should attempt to exceed the minimum level of requirements for an optimal student testing experience.

Additional Specifications

| Supported Accessories | |
|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <ul style="list-style-type: none"> • Mouse • English language keyboard (internal and external, wired and wireless) • Touchpad • Headphones • Microphone | <ul style="list-style-type: none"> • Earphones • Earbuds • Stylus for touch devices • Refreshable Braille, Braille note-taker, and other input devices as supported for accommodations (determined in conjunction with PDE) |
| <p>The input device must allow students to: select and deselect; drag objects; highlight text, objects, and areas; enter letters, numbers, and symbols; use the Shift, Tab, Return, Delete, and Backspace keys.</p> | |
| Internet Connectivity | |
| <u>Minimum</u> Devices must be able to connect to the Internet using wired or wireless networks | <u>Recommended</u> Devices connected via wired network |
| Power Supply | |
| <u>Minimum</u> For battery devices, a fully charged battery with a two-hour life | <u>Recommended</u> Device connected to a plugged-in power supply |

DRC is sensitive to the need to provide online testing to as many students as possible. While the above specifications provide the optimal testing experience with DRC INSIGHT, we acknowledge that the RFP requests support for some older technical standards, such as Windows 98 and Mac OS 10.5. Because these versions are no longer supported by their vendors and therefore are no longer being patched with the latest security protections, they present security and support risks for schools. For example, Windows stopped supporting Windows 98 in 2006, which exposes the operating system to over eight years of advances in virus exposures.

The RFP also requests support for Fedora, which is one of many Linux distributions. DRC's current Linux standard is Ubuntu. Because there is limited variation within the different Linux distributions, DRC is confident that we can work with PDE to provide a solution that meets Pennsylvania's needs.

We are committed to providing a testing solution that meets the range of technological capabilities present across Pennsylvania school districts, and supporting schools/districts using older technologies as they transition to more current systems. Upon contract award, we will work with PDE to address any gaps between current school hardware and our testing system specifications, and make recommendations and provide assistance in order to satisfy the needs of the Commonwealth. We are confident based on our past performance with online testing in Pennsylvania that our solution will continue to meet Pennsylvania's needs.

DRC Support Policy

For operating systems and browsers on the DRC supported list, DRC will support all versions that are publically supported by the vendor. These versions are considered to be supported and tested by DRC.

Any new version of a supported operating system will be supported within three months of public availability of the operating system version or by the next planned common or client-specific release date of the application, whichever duration is greater.

Any new version of a supported browser will be supported within one month of public availability of the browser version or by the next planned common or client-specific release date of the application, whichever duration is greater.

For each of DRC's applications, once an operating system or browser version has reached the end of vendor support, DRC's approach is that support will end by the next planned common or client-specific release date of the application. DRC will seek PDE approval when discontinuing support of an operating system or browser version that has reached the end of vendor support.

4.F.2.f. Ensuring Accurate Online Item Display

DRC conducts extensive item rendering reviews prior to online testing. All items are rendered for online tests in a manner that is as comparable to the paper-based modality as possible. DRC has had to work through the obvious differences in the modes (e.g., portrait versus landscape item layout) to ensure that nothing in the item presentation detracts from a student's ability to interact with the item and respond. In addition, we take into consideration differences in item display on tablet devices. We have and will continue to work with our clients to meet their needs of a dual-mode assessment.

Our item rendering review process includes:

- Item rendering preview in the IDEAS item banking system
 - Paper/pencil vs. online considerations
- Item and form review in the DRC INSIGHT online testing system

Once an item's contents are populated in DRC's item bank, it can be rendered for review under the identical formatting structure in which a student would see the item for a test. As shown in the following figure, the DRC IDEAS item banking system allows users to see a preview of the item precisely as it will appear in either an online test or a printed test book.

ITEM CONTENTS IN THE IDEAS ITEM BANKING SYSTEM

The screenshot shows the IDEAS Item Banking System interface. The top navigation bar includes 'Home Search Create Action' and 'Help Preferences Logout'. The main content area is divided into two panes. The left pane, titled 'Item Characteristics', contains various dropdown menus and text boxes for defining the item: Item Type (Multiple Choice), Subject, Standard 1 (KAACS-1: A1.1.1), Standard 2, Key (A), Points (1), Est. Difficulty Level, Achievement Level, Cognitive Level, Bloom's Level, Porter's Level, Depth of Knowledge, Calculator (Non-Calculator), Item Description, and Focus. The right pane, titled 'Item Image', displays a question: '1. Jason set the table.' followed by an image of a table setting with a triangle, a circle labeled 'plate', and a rectangle. Below the image is the question 'What shape is the plate?' and a single option 'A. circle'. At the bottom of the interface are buttons for 'Print', 'Preview', 'Preview HTML', 'Preview WBTE', 'Open Editor', 'Save', and 'Cancel'.

This screenshot shows the 'FormPreview' window in 'ONLINE TEST MODE'. It features a 'Student Name' field at the top right. The main content area displays the question '1. Jason set the table.' with the table setting image. Below the image, the question 'What shape is the plate?' is followed by three radio button options: 'A. circle', 'B. rectangle', and 'C. triangle'. The bottom of the window contains a toolbar with buttons for 'Review/End Test', 'Exit', 'Flag', 'Options', and navigation arrows.

ITEM PREVIEW: ONLINE TEST MODE

This screenshot shows the 'FormPreview' window in 'PAPER/PENCIL TEST MODE'. It displays the same question and image as the online mode. However, the question 'What shape is the plate?' is followed by three lettered options: 'A. circle', 'B. rectangle', and 'C. triangle'. The bottom of the window does not have the interactive toolbar seen in the online mode.

ITEM PREVIEW: PAPER/PENCIL TEST MODE

After items have gone through formatting, quality assurance, and rendering processes, the items are prepared for external review in DRC INSIGHT. All reviewers can be confident that all items are presenting properly in the online environment (both desktop computers and tablets) just as the students will see and interact with them. PDE will have an opportunity to review and provide approval regarding rendering of all assessment items and assessment platform functionality in DRC's system. Should there be any suggested or needed changes to this online presentation, DRC will apply them only after receiving the needed approvals using a designated process.

Although seeing the items alone is a significant part of the review process, DRC knows that seeing the items in the context of a fully functioning test is also important. This form review will also take place using the DRC INSIGHT test delivery system. The forms will appear and function just as students will see

them, including such features as the online tools provided with each item, test directions, help files, and accommodations.

DRC’s quality review checklist for online forms (excerpt below) has been provided in *Volume III; Appendix B, Test Development Samples*.

Pennsylvania Online Form Review Checklist (Excerpt)

| PA Online Form Checklist | | | | |
|--------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---|---|---|
| Test Directions | | | | |
| 32 | Correct Content directions entered | ● | | ✘ |
| 33 | Directions set up as scrolling or page-turning | ● | | ✘ |
| 34 | "Three circles" page present | ● | | ✘ |
| Scrolling Passage/Scenario | | | | |
| 35 | Working title entered for each passage/scenario | | ✘ | ● |
| 36 | No horizontal scrolling present | | ✘ | |
| 37 | Passage directions entered correctly | | ✘ | |
| 38 | Title/byline formatted according to client style | | ✘ | |
| 39 | Paragraph/line numbers entered according to client style | | ✘ | |
| 40 | Paragraph indents correctly according to client style | | ✘ | |
| 41 | Graphics transparent | | | ✘ |
| 42 | Paired passage instructions entered correctly | ● | ✘ | |
| 43 | Acknowledgements included as required | ● | ✘ | |
| Page-Turning Passage/Scenario | | | | |
| 44 | Working title entered for each passage/scenario | | ✘ | ● |
| 45 | No horizontal or vertical scrolling present | | ✘ | |
| 46 | No page/page indicator present for single-page passages | | ✘ | |
| Items | | | | |
| 47 | Divider line on for side-by-side layouts | | ✘ | |
| 48 | Measurement tools available as required by item or client | | ✘ | ● |
| 49 | Calculators available as required by item and client | | ✘ | ● |
| 50 | Graphing tool available as required by item and client | | ✘ | ● |
| 51 | Reverse-N or Z format used as required by client | | ✘ | |
| 52 | Equation Builder available as required by response type and client | | ✘ | ● |
| 53 | Graphics transparent | | ✘ | ✘ |
| 54 | Character count set according to client specifications | | ✘ | ● |
| 55 | Maximum number of line returns set according to client | | ✘ | ● |
| 56 | Scroll bar deactivated where required by client | | ✘ | ● |
| 57 | EBSR maximum selections set for all parts | | ✘ | ● |
| 58 | Help feature present for every contextual help button | | | ✘ |
| 59 | Stand-alone items labeled accordingly | | ✘ | ● |
| Technology Enhanced Items | | | | |
| 60 | TE response areas aligned (left-justified or centered) according to client style | | ✘ | ● |
| 61 | Help file is available for each TE response type on form | | | ✘ |
| 62 | Drag and Drop: -Directions are precise -Drag entities set for single or multiple use according to item need -Drop regions set to snap or for absolute placement -Drag entities fit the drop area | | ✘ | ● |

Comparability across Testing Devices and Operating Systems

Considerable care and attention is paid during the software development and form creation processes to ensure that items will render and function comparably across different hardware and operating systems. DRC's Information Systems team makes use of a comprehensive computer lab throughout the development and testing of DRC INSIGHT. The Solutions Lab includes a wide variety of desktop, laptop, and tablet computers running supported operating systems. As new features and functionality are added to DRC INSIGHT, DRC's Software Quality Assurance team conducts extensive platform testing, using both manual and automated tests, to ensure consistent functionality and display. Item display and functionality is a particular focus of this testing.

During software development, sample forms containing a comprehensive test deck of items representing all supported item types, tools, and graphics are executed on supported platforms. Initial rounds of testing include in-depth manual comparisons of item display and function across platforms. Later rounds use automated tools to compare screen captures of items to a baseline set of images, which ensures consistency of the display. The automated tests also exercise the functionality of the response fields, tools, and navigation features.

During form publication, production form reviews are conducted. During these reviews, representatives from Test Development and Software Quality Assurance complete tests using all production forms or item sets across supported platforms as a final check.

Lastly, DRC's Psychometric team routinely conducts validation research to confirm the comparability of scores resulting from different testing devices and operating systems. More information about such validation research can be found in *Subheading 4.H.1.c., Validity/Research Studies*.

More information on DRC's application testing approach is provided under *Subheading 4.F.6, Application Testing*.

4.F.2.g. Bandwidth Requirements

Bandwidth requirements are based on the type of test content that is being delivered and the responses coming from students. Based on test content and response sizes, DRC can provide network and bandwidth recommendations that can be used by technical staff to optimize the online testing experience for students.

Sites with low bandwidth and/or large numbers of simultaneous users are encouraged to utilize DRC's Testing Site Manager (TSM) caching tool. With caching, the bandwidth is used more efficiently due to the ability to load the test from the TSM over the local area network rather than from DRC over the Internet. In addition, caching reduces Internet traffic on congested networks. Test forms that include media-rich content and accommodations (e.g., text-to-speech,

video sign language) require more bandwidth and therefore caching is recommended to improve the student testing experience.

DRC’s required bandwidths are well within the RFP’s expected bandwidth of 30 Kbps per student to be tested simultaneously. DRC has worked closely with PDE, districts, and schools in recent years to ensure our online testing system meets your performance expectations, and **we are committed to continuing our strong record of high-quality, reliable performance in the future.** We will continue to work with schools and districts to make recommendations regarding both wired and wireless network configurations (both LAN and WAN) and TSM caching, as well as partnering with PAIUnet. Recommendations will be based on a given site’s available bandwidth, available testing devices, and the anticipated number of students who will test simultaneously.

DRC also provides a suite of diagnostic and simulation tools that aid district technology staff in preparing for testing. These tools help district staff analyze their network traffic round-trip from the student testing devices to DRC servers and back, as well as help estimate testing response times and determine testing devices readiness. Please see *Subheading 4.F.1.c., Evaluation of Readiness for Online Assessment* for more information.

4.F.2.h. Virtual Environments

DRC INSIGHT is a web-based application that is supported on specific operating systems. To successfully run DRC INSIGHT, the student testing device must meet all system requirements (operating system, processor, disk space, memory, Internet connectivity, screen resolution, etc.). As long as the testing site meets these requirements, DRC INSIGHT can also be run in a virtual or remote desktop environment.

DRC’s system will run in many remote connectivity configurations, including Citrix, terminal server, remote desktop, virtual machines, nComputing vSpace, and App-V. Our system can also accommodate virtual networks and/or thin client environments, including Wyse Thin Clients and Wyse Zero Clients.

Security Considerations for the Use of Virtual Environments

When DRC INSIGHT runs on a device and operating system, it uses “kiosk mode” (built in for all supported operating systems) to “lock down” student access and prevent students from performing inappropriate testing activities, such as accessing the Internet.

When DRC INSIGHT is running on virtual or remote clients and not directly on the testing device the student is using to take the test, kiosk mode is not available directly on the testing device. Any site using virtual computing technology must implement their own security measures to ensure that the actual testing devices cannot access other applications during the administration of an online

assessment. The school or district technology coordinator should confirm that the following security standards are in place during testing:

- Students cannot perform a screen capture and save or retrieve the information.
- Students cannot access other local or network software applications to take notes or perform other communication.
- Students cannot access other web browsers or the Internet.
- No other software applications or messages are started or active.

DRC will work with districts and schools to provide support and advice on best practices for the use of virtual environments.

4.F.2.i. Integration with Next-Generation Devices

DRC recognizes the growing need to utilize new technologies in order to make the creation of next-generation assessments efficient and affordable without sacrificing content validity. DRC has invested significant resources in developing new technologies that promote student access and engagement while also achieving efficiencies that reduce the cost of assessment.

DRC's application architecture leverages open-source technology solutions and open-architecture principles that give us the flexibility to deploy our solution on multiple devices and platforms. This approach has positioned DRC well as new devices have emerged on the market, and we anticipate that it will work well as devices continue to evolve.

Throughout our history, DRC has proven that we are able to provide custom, innovative solutions that meet specific needs and ensure that programs are sustainable over time. DRC is particularly skilled at bridging the gap that often exists between the desire and need for new and innovative ways to assess student learning and progress with the real technology and resource limitations faced by states and schools. We are known for always helping our clients find a solution and for helping meet the needs of all stakeholders in that solution.

Technology Awareness as a Business Practice

In 2013, DRC formed a Technology Awareness Product Team (TAPT) for the specific purpose of identifying and leveraging emerging technologies that could benefit our clients' programs. The TAPT is tasked with developing a roadmap of technologies to be supported or used for DRC's development and infrastructure operations. Key goals of the TAPT initiative include:

- Defining the technology roadmap for DRC's online offerings
- Tracking and evaluating technology solutions and emerging technologies in the marketplace

- Considering psychometric and mode comparability implications of emerging technologies
- Making technology recommendations that align with DRC’s strategic direction and our clients’ needs

The TAPT meets regularly to monitor and evaluate information or changes in the marketplace, as well as technology questions and requests from clients. Some examples of past TAPT projects include preparing for online test delivery on iPads, Windows 8 touch, Chromebooks, and Android devices, including recommending the best options for ensuring security on these devices.

The TAPT will ensure that DRC is prepared to leverage the latest advancements in technology and online assessment delivery for the Pennsylvania program.

4.F.3. TOOLS AND ACCOMMODATIONS

Engaging Student Experience

The DRC INSIGHT testing system provides an engaging experience for students who test online. Our system was designed to be intuitive and easy to use for students. Highlights of the student interface include:

- **Platform-neutral technology**—The student interface provides standardized display of content across all supported platforms/testing devices (desktops, laptops, and tablets) and across supported monitor/resolution settings. The system also ensures text and graphics are device-appropriate.
- **Intuitive, student-friendly tools**—An important design feature of the student interface is the capability to mimic the tools and test-taking strategies used on paper-based exams. A set of familiar universal tools is presented with images for quick comprehension, and can be tailored by test and by individual questions.
- **Easy-to-view screen layout**—Only one item at a time is displayed on the screen with all answer choices visible for clarity and ease of viewing. Passages are presented in a split-screen view, allowing independent vertical scrolling of passage text while keeping all answer choices visible.
- **Effortless test navigation**—Straightforward navigation buttons help students move through the test with ease and check progress as they go. A “Go To Question” feature allows the student to jump from one question to another in non-sequential order, indicates if an item has been flagged, and shows all the passages with titles and their associated items. For longer items such as passages, pages can be either “turned” or “scrolled.” Tests can be delivered and reviewed in multiple sections over multiple days (including security to prevent students from returning to a previous section, if restricted).

Features of the DRC INSIGHT student interface are illustrated in the following figure.

Intuitive and Easy-to-Use Student Interface

The screenshot displays a student interface for a Mathematics Grade 8 assessment. At the top, it shows 'Mathematics Grade 8' and 'Sample Student'. A toolbar contains icons for navigation, editing, and calculation. Below the toolbar, a question is presented: 'Alex, Laura and Melissa each have 8 markers.' with radio buttons for 'Laura' and 'Melissa'. A text input field is provided for the answer, with 'EQ' entered. At the bottom, there are buttons for 'Review/End Test', 'Pause', 'Flag', 'Options', and 'Next'. Red callout boxes with arrows point to various elements: 'Question 1' dropdown, toolbar icons (arrow, eraser, highlighter, sticky note, magnifier, line guide, calculator, graphing tool, protractor, X+Y), 'Quick Navigation' (Move to any item or passage with one click), 'Common Tools' (Pointer, Cross-Off, Highlighter, Sticky Notes, Magnifier, Line Guide), 'Calculators and Graphing Tool', 'Measurement Tools and References' (Rulers, Protractor, Glossary, Formula Sheets, Periodic Table), 'Help' (Including 'What's This' Feature), 'Review Test Progress', 'Pause Test for 20 minutes', 'Flag for Later Review', 'Options' (Including Audio Features and Color Chooser), and the bottom buttons.

Positive Feedback from Students

“All of the kids from third grade up LOVED the tools on this test. They could use the highlighter for their reading strategies, and the cross outs for answers they knew were not correct, etc. They all claimed they wished those same tools were available on [different vendor’s] tests!” — *Pennsylvania*

“The system was easy to use and worked wonderful! Our students liked using this method. We plan to continue using the online format. We were so pleased.” — *South Carolina*

“The computer program and icons [of tools] are very user friendly. The students are able to use them utilizing intuition alone.” — *Pennsylvania*

“It was really cool. It had all these tools, and if you got tired of the white color, you could change the background! I changed it to yellow ... I also liked the flag part because on the other tests I could never go back and look at things again. It was awesome!” — *Missouri*

“The students were extremely motivated by taking the test on the computer and using the tools.” — *Pennsylvania*

Student-Friendly Online Testing Tools

DRC INSIGHT offers a sophisticated suite of universal tools that provide a straightforward and user-friendly testing experience. We will continue to work with PDE to ensure that the appropriate tools are provided for Pennsylvania’s online tests.

- **Navigation tools**, used for moving through the test, include the ability to move forward and backward between items and quickly jump to items in non-sequential order (skipping items), unless restrictions are in place that would preclude moving backward or skipping items; flag/bookmark items for review; pause the test; and use keyboard equivalents to navigate instead of a mouse.
- **Common test-taking tools** include the pointer, strikethrough/cross-off (for multiple-choice items), highlighter, magnifier/variable zoom, line guide, test directions, and help tools. Multiple tools may be used simultaneously.
- **Advanced tools** include calculators (basic four-function and scientific), a graphing tool, equation editors, measurement tools (rulers, protractor), sticky notes/notepad, reference materials (such as reference sheet, glossary, periodic table, and others), and audio/video tools. These tools can be turned on and off at the item or form level, depending on the requirements of the item. These tools can be set to appear only when

needed for a specific item or test form, giving PDE complete control of online test manipulatives available to students.

- **Writing tools** are provided based on the particular needs of each program. Our system supports several formatting tools for written responses, including: undo, redo, cut, copy, paste, bold, italic, underline, adjustable font size, justify, and indent. A dictionary, thesaurus, and spell check are also available.











Student-Centered Online Testing Tools: The DRC Difference









Most online testing vendors have come to offer a basic, familiar set of online tools for students to use during testing. **But not all online testing tools are created equal.** What differentiates DRC is our commitment to continually enhance and improve our tools to offer the best possible online testing experience for every student. We consult with leading education specialists and organizations to ensure our tools are supported by the latest research and best practices. And most importantly, we seek feedback from our students to truly understand how they use tools to test online. **Here are some of the ways DRC's online testing tools stand out from the rest:**


- Unlike other systems that only allow the passage or item text to be highlighted, DRC's **Highlighter** can be used virtually anywhere within the item to highlight passage text, item text, answer options, portions of graphics and images, and text within images.
- DRC's **Sticky Note** tool is more flexible than other vendors' notepad tools. Multiple notes can be created for each item or passage, and the notes can be moved around the screen, minimized or completely hidden, and re-opened.
- DRC's **Text-to-Speech (TTS)** tool offers more control, flexibility, and ease-of-use than standard screen reader software, providing a superior student experience. Our TTS uses only high-quality, licensed voices that meet the approval of special education and ELL experts. These high-quality voices are far superior to those that are freely available or that come pre-installed on an operating system.
- DRC's **Video Sign Language** tool offers many unique features. The student may select any starting point in the video by using a slider bar to navigate to the desired segment. The student can also be given the option to listen to the content as it is signed. We have found that these expanded features are very important to the student and provide improved opportunities to understand the content.
- DRC's **Dictionary, Thesaurus, and Spellcheck** tools all draw from the Merriam-Webster student dictionary word bank, ensuring we are aligned across these three writing support tools and utilizing student-appropriate choices. We offer a high level of flexibility and customization with our Spellcheck tool based on each client's content requirements. DRC works with the client to establish a specific set of words that are incorporated into the tool based on the content of the item.

All of the available DRC INSIGHT online testing tools are described in the following table. Accommodations are described later in this section. DRC will work with PDE to ensure the appropriate tools are provided for each assessment item.

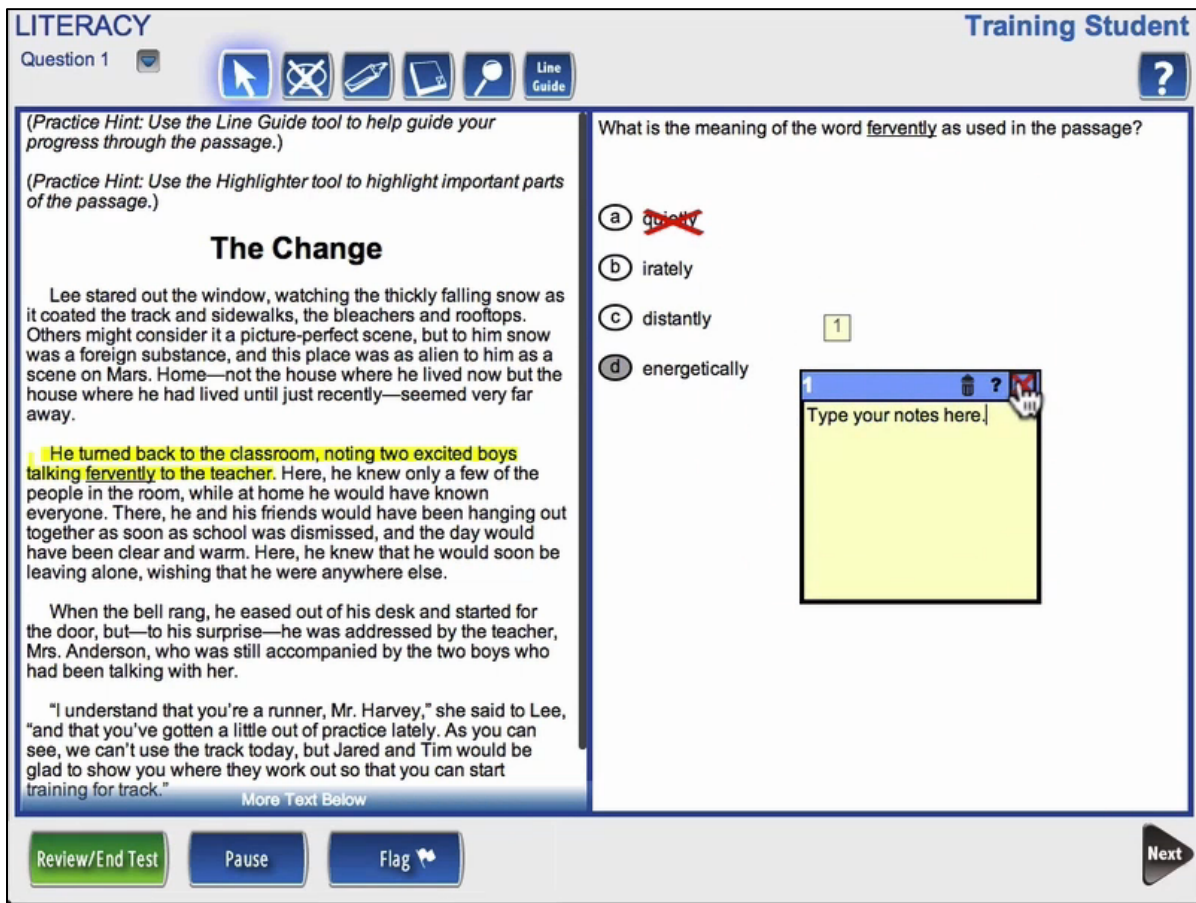
DRC INSIGHT Online Testing Tools

| Tool Icon | Description/Function |
|-------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Navigation Tools | |
|  | Back and Next —Navigation tools for moving to the next question or a previous question. |
|  | Go To Question —Allows a student to jump to any item or passage set on the test by choosing the item from a drop-down list (unless restrictions are in place that would preclude skipping items, such as computer-adaptive testing or sectioning of the test across multiple sessions/days). |
|  | Pause —Pause the test for a short period of time (e.g., restroom break) and resume upon return. Allows the student to leave their machine for a break without logging out of their test, while still providing test security by not showing their items on screen. |
|  | Flag/Mark for Review —Mark a question for review at a later point, if allowed. |
|  | Test Review —Allows student to see which items have been answered/unanswered and return to questions and change answers, if allowed. Indicates if a test is ready to be scored. |
| N/A | Keyboard Navigation —Move through the test, access tools, and answer questions using the keyboard rather than the mouse. |
| Common Test-Taking Tools | |
|  | Pointer —Select, change, or unselect an answer option; select other user tools; and navigate through the test. When moved over an answer choice, the pointer converts to a pencil image. |
|  | Strikethrough —Cross out/eliminate a multiple-choice answer selection(s) (distractors) believed to be incorrect. Includes an eraser to remove the cross off if a student changes his or her mind. |
|  | Highlighter —Highlight a portion of text or a graphic and remove highlights. Unlike other systems that only allow the passage or item text to be highlighted, DRC's highlighter can be used virtually anywhere within the item to highlight passage text, item text, answer options, portions of graphics and images, and text within images. |
|  | Magnifier/Variable Zoom —Magnify/enlarge the entire screen, including all text, images, and objects, by 150% or 200% (configurable) for better viewing. |
|  | Line Guide —Movable, straightedge line used to follow along with each line of text. Student can drag the guide up or down on the screen as an aid in reading an item or passage. |

| Tool Icon | Description/Function |
|-------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | Help —The Help Library provides information on tool usage, test directions, helpful hints, and other topics. Also includes a “What’s This?” feature that allows a student to access contextual help for a specific tool or button. |
| N/A | Tooltips —Pop-up labels that describe each tool/function within the testing interface. Tooltips appear when the student hovers over a tool with the mouse pointer. For students who use the Text-to-Speech audio accommodation, the tooltip description will be read aloud to the student. |
| Advanced Test-Taking Tools | |
|  | Sticky Note (Notepad) —Creates and places a note on the screen in which a student can type a short message for later reference. DRC’s sticky note is more flexible than other vendors’ tools. Multiple notes can be created for each item or passage, and the notes can be moved around the screen, minimized or completely hidden, and re-opened. For a passage or scenario that contains multiple parts (for example, one passage that has several questions associated with it), the student can use the Sticky Note tool to take notes that are retained for all questions associated with that passage or scenario (i.e., a Global Note). |
|  | Calculator —Basic four-function and scientific options are available as required, either individually or together. |
|  | Equation Builder —Allows student to enter and edit symbols not found on the keyboard in order to create an expression or equation. Available in variable configurations, allowing for grade-level, content area, and subject customization. |
|  | Measurement Tools and Manipulatives —Includes a Ruler that can be moved to the desired location on the screen and pivoted, and that takes measurements in both inches and centimeters (standard and metric). Also includes a Protractor for measuring angles that can be moved over any object on the screen and rotated. DRC can also provide Drawing Tools and Compasses for Pennsylvania when item types that require those tools are developed. |
|  | Reference Materials —Includes a Formula Sheet that provides patterns or rules to aid students in answering a question. Also includes a Periodic Table and a Glossary of Terms. |
|  | Graphing Tool —Used to graph one or several functions. Includes zoom and trace features. |
|  | Customizable Exhibit Window —DRC’s Click-to-Enlarge feature allows for large graphics by using a thumbnail image of the graphic that can be enlarged for viewing. Students can interact with the test item and other tools simultaneously. We also have a Click-to-Respond tool that allows for placing various types of response areas in a snapshot view that a student expands in order to respond to the question. For example, a large graphing item can be placed in an item where it might not normally fit. |

| Tool Icon | Description/Function |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  | <p>Writing Tools—Formatting tools that can be made available to the student include: undo, redo, cut, copy, paste, bold, italic, underline, adjustable font size, justify, and indent.</p> <p>A Dictionary, Thesaurus, and Spellcheck tool are also available. These tools all draw from the Merriam-Webster student dictionary word bank, ensuring we are aligned across the three writing support tools and utilizing student-appropriate choices. We offer a high level of flexibility and customization with our Spellcheck tool based on each client’s content requirements. DRC establishes a specific set of words that are incorporated into the tool based on the content of the item.</p> |

Sample Tools: Highlighter, Strikethrough, and Sticky Note



LITERACY **Training Student**

Question 1 ?

(Practice Hint: Use the Line Guide tool to help guide your progress through the passage.)

(Practice Hint: Use the Highlighter tool to highlight important parts of the passage.)

The Change

Lee stared out the window, watching the thickly falling snow as it coated the track and sidewalks, the bleachers and rooftops. Others might consider it a picture-perfect scene, but to him snow was a foreign substance, and this place was as alien to him as a scene on Mars. Home—not the house where he lived now but the house where he had lived until just recently—seemed very far away.

He turned back to the classroom, noting two excited boys talking **ferverently** to the teacher. Here, he knew only a few of the people in the room, while at home he would have known everyone. There, he and his friends would have been hanging out together as soon as school was dismissed, and the day would have been clear and warm. Here, he knew that he would soon be leaving alone, wishing that he were anywhere else.

When the bell rang, he eased out of his desk and started for the door, but—to his surprise—he was addressed by the teacher, Mrs. Anderson, who was still accompanied by the two boys who had been talking with her.

"I understand that you're a runner, Mr. Harvey," she said to Lee, "and that you've gotten a little out of practice lately. As you can see, we can't use the track today, but Jared and Tim would be glad to show you where they work out so that you can start training for track."

[More Text Below](#)

What is the meaning of the word ferverently as used in the passage?

(a) ~~quietly~~

(b) irately

(c) distantly

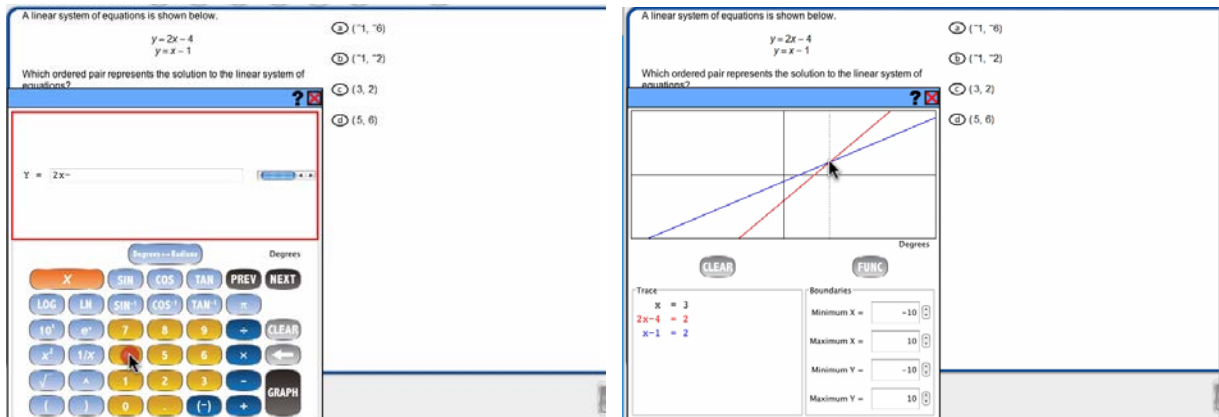
(d) energetically

1

Type your notes here!

Review/End Test Pause Flag Next

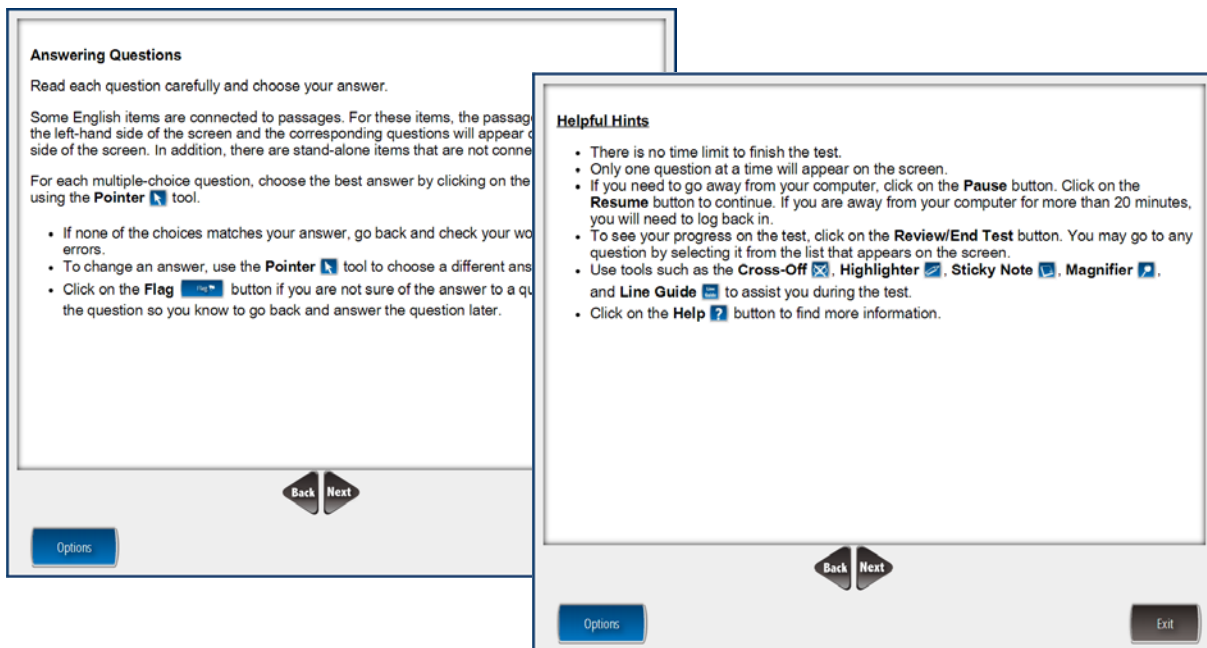
Sample Tool: Graphing Calculator



Supportive Features for Students

Easy-to-follow instructions are provided at the beginning of the test to guide students on how to use the online tools and how to navigate and submit the test. Test directions are customized to each particular assessment, and the student can return to them at any point during the test.

Instructions and Helpful Hints



Based on the assessment design, students may be allowed to review items and change their answers. The system can be configured to allow students to review answers for specific sections, for sets of questions, or for entire tests, before moving on to the next section or submitting their test.

If permitted by the test design, the test review screen allows students to easily see which questions have been answered or not answered, and which questions they previously flagged for review. The student can quickly return to any item to review their answers from this screen.

Review and Confirm Answers before Submitting the Test

Please be sure you have answered all of the questions.
Click on the question line to move to that question.

| Question | | Question | | Question | |
|----------|--|----------|--|----------|--|
| 1 | | 5 | | 9 | |
| 2 | | 6 | | 10 | |
| 3 | | 7 | | 11 | |
| 4 | | 8 | | | |

Key

- Unanswered Multiple Choice
- Answered Multiple Choice
- Flagged
- Blank Constructed Response
- Filled Constructed Response

Once you finish taking the test, click the "End Test" button to end your test.
To continue testing, click the "Return to Questions" button.

[Options](#) [Return to Questions](#) [End Test](#)

The system can also be configured to warn the student if they try to exit the test but still have unanswered questions. This ensures that the student doesn't intentionally or accidentally end their test without first confirming that's what they want to do.

You have at least one unanswered question.

To continue testing, click the "Return to Review" button.

To end your test, click the "End Test" button.

[Options](#)

[Return to Review](#) [End Test](#)

Complete Protection of Student Responses

During testing, if the test is interrupted for any reason (such as an Internet outage, a device crash/reboot, a student pausing a test, a session timeout due to inactivity, or any other reason), the student's responses are protected. Responses are saved automatically every 45 seconds during testing, or when the student navigates away from an item or answers a selected-response item (whichever comes first). If a particular question takes the student longer than 45 seconds to answer, then the partial, incomplete responses are submitted at 45-second intervals until the student completes the item. This auto-save helps safeguard against students losing their work on longer items, such as constructed-response items. When the student returns to the test after a break or interruption, the student is returned to the point that they left off without having to navigate through all previously answered questions.

Online Accommodations

DRC has many years of experience in applying the Principles of Universal Design to the items and tests we develop for our state assessment clients. In adherence with the Individuals with Disabilities Education Act of 2004, we have incorporated universal design principles into the design and development of the DRC INSIGHT testing interface, ensuring that the online testing system is accessible to the widest possible range of students. In moving to digital environments, DRC also understands the importance of providing for assistive technologies and embedded and non-embedded accommodations. DRC is current on industry best practices and developments regarding the application of universal design to online testing, and consults with leading figures in special education, accessibility, and accommodations. In addition, DRC is actively working to follow the guidance provided through the W3C Web Accessibility Initiative (WAI) by complying with the Accessible Rich Internet Applications (WAI-ARIA) specification in order to deliver accessible web content by means of an industry standard. DRC is committed to developing and sharing a clear understanding of the need for online accessibility tools as well as supports and accommodations, in collaboration with education stakeholders nationwide.

DRC offers numerous online accommodations and universal accessibility tools for students. System accommodations may be turned on and off at the student level, giving access only to those students who require it. Our client-centered approach gives PDE the flexibility to determine the features that are most appropriate for your students' needs.

In addition to the online testing tools described previously, our proposal for Pennsylvania includes the following online accommodations:

- Text-to-Speech Audio, including:
 - Advanced audio for CDT mathematics and science graphics
 - Highlighting of portions of the screen to be read aloud (“follow along” feature)
- Video Sign Language
- Masking
- Support for refreshable Braille
- Support for Braille note-taker
- Adjustable Font Face/Online Large Print
- Background and Foreground Colors (including Reverse Contrast)
- Color Overlays
- Standard accessibility tools (Magnifier/Variable Zoom, Line Guide, Pause/Resume, Keyboard Navigation, etc.)
- For the CDT K–2 expansion option, DRC’s proposal also includes Human Voice Audio (HVA)

We will continue to work with PDE to address the Department’s vision for online tools and accommodations under the new contract, and will be receptive to the needs of students. If PDE is interested in implementing additional accommodations at any point during the contract, such as Human Voice Audio, DRC would be pleased to provide more information and costs.

Below, we describe the full suite of DRC’s available accommodation and accessibility tools.

DRC INSIGHT Online Accommodations

For audio accommodations, DRC offers both Text-to-Speech (TTS), where a computer screen reader supplies the reading of the item text and alternate text for graphics, and Human Voice Audio (HVA), where a human reader records the reading of the item text and alternate text for graphics. DRC also offers another mode of alternate text for graphics for students with visual impairments. This Visually Impaired (VI) audio provides a more detailed description of graphics, approved by specialists in visual impairments, so that visually impaired students are neither disadvantaged by the original TTS nor advantaged by the more robust TTS.

DRC INSIGHT Audio Accommodations

| Accommodation | Description |
|------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Text-to-Speech (TTS) Audio</p> | <p>The DRC INSIGHT Text-to-Speech (TTS) function allows the student to listen via headphones or speakers to test information displayed on the screen. Words and numbers, including test directions, questions, answer choices, and other information can be read aloud and repeated as necessary. DRC’s TTS tool offers more control, flexibility, and ease of use than standard screen reader software, and provides a superior student experience. Advantages of DRC’s TTS software include:</p> <ul style="list-style-type: none"> ■ Unlike other vendors, DRC does not require voice packs to be pre-installed on student computers, nor do we require preferences to be configured on computers in advance—reducing burden on technology personnel. DRC’s TTS is embedded in the test content that is delivered during testing, so no additional software or supporting plug-ins need to be installed on the testing device. ■ DRC’s TTS uses only high-quality, licensed voices. In our research, DRC has found that high-quality voices such as these are preferable to those that are freely available or that come pre-installed on an operating system. ■ DRC’s TTS reads content beyond the test question and answer choices. DRC’s TTS can read information contained in graphics and formulas, as well as popup labels, buttons, and the contents of the Help section. ■ DRC’s TTS includes a “follow-along” feature that visually highlights the words on the screen as they are being read aloud to the student. ■ Students have the ability to select from multiple starting points to listen to the audio within the item and answer options. ■ Speed and volume controls can be accessed from within the item, not just at the beginning of the test, giving the student greater flexibility. <p>All text tagged for TTS is scripted in advance to ensure that it is spoken exactly as intended (e.g., to indicate if the word “read” should be pronounced [reed] or [red], etc.). In addition, DRC’s TTS can be configured for Reading items so that only the item and response options are read aloud, but not the passage itself.</p> |
| <p>Human Voice Audio (HVA)</p> | <p>DRC INSIGHT can deliver recorded human voice audio that narrates all items and response options for the student, using pre-recorded, human-voice audio files. DRC’s HVA includes audio controls (play, pause, stop, and volume control) and starting points. We have found that some states prefer to use human voice audio for younger students.</p> <p>DRC is pleased to include HVA in our proposal for the CDT K–2 expansion option (see <i>Subheading 6, Optional Services and Associated Tasks; 4, Option 4</i>).</p> |

Pros and Cons of TTS and Recorded Audio

DRC's TTS provides a follow-along feature that helps the student track with the audio. Start Points is a feature offered for both TTS and HVA that allows the student to start the audio at various places within each item or scenario. The number and location of Start Points is decided by our content specialists in collaboration with PDE staff. This allows the student to listen to just a single answer option if desired.

Text-to-Speech: Follow-Along Highlighting and Audio Controls

The screenshot displays a mathematics assessment interface for "Mathematics—Grade 4" and "Training Student". The main content area shows a question: "The picture below represents the bottom of a jewelry box." Below this is a diagram of a rectangle labeled "Jewelry Box" with a height of "8 inches" and a width of "2 feet". The question asks: "Sam is covering the bottom of the jewelry box with fabric. How many square inches of fabric does Sam need?" A practice hint is provided: "(Practice Hint: Use the formula sheet)".

On the right side, there are four multiple-choice options: (a) 16 square inches, (b) 40 square inches, (c) 112 square inches, and (d) 192 square inches. Option (c) is highlighted in green.

An audio control window is overlaid on the question text. It contains sliders for "Volume" and "Speed", a checked "Follow Along" option, and a note: "Changes may take effect on the next page." The audio control window is circled in red.

At the bottom of the interface, there are several navigation buttons: "Review/End Test", "Pause", "Flag", "Options", and "Next". The "Options" button is circled in red.

Text-to-Speech: Starting Points

Mathematics—Grade 4 Training Student

Question 3

The figure below represents the bottom of a jewelry box.

Jewelry Box

8 inches

2 feet

Sam is covering the bottom of the jewelry box with fabric. How many square inches of fabric does Sam need?

(Prerequisite: Use the formula sheet.)

(a) 16 square inches
(b) 40 square inches
(c) 112 square inches
(d) 192 square inches

Review/End Test Pause Flag Options Starting Points Next

Both TTS and HVA read graphics and tables using the provided alternate text. Alternate text tags are used with TTS to pronounce difficult words or terms from math and science. A reader's script with pronunciations is used with HVA. Each button on the screen uses visual tool tip text that is read by both TTS and HVA.

There are advantages to both TTS and HVA. TTS is more flexible than HVA. For instance, if the content of an item changes, TTS will capture the changes without needing to bring in the voice talent to re-record that item. TTS tends to be less expensive and can be implemented in a shorter timeframe. TTS gives direct control to our content specialists who know the terms and the flow and pace of the text. TTS also provides a consistent voice from year to year rather than what could be changing voice talent, and minimizes the possibility that intonation could queue a student to a specific answer choice (Lazarus, Thurlow, & Kinkaid, 2013). TTS also allows the student to control the pace of the voice where HVA does not.

HVA, on the other hand, is more easily understood by a larger audience. This can be especially helpful with younger children, and in some cases is preferred by the user. This preference, however, has not been found to impact learning or accessibility (Moller, Krebber, & Smeele, 2006). As noted previously, DRC is proposing HVA be used for the expansion of the K–2 CDT option.

Essentially, the best choice comes down to what the student uses on a regular basis. The testing environment should be as close as possible to what the student uses in the classroom.

Altering Audio to Eliminate Cueing

Standardization is used to ensure adherence to uniform administration procedures, and it is an essential feature of Pennsylvania's assessments, producing comparable test results that reflect actual student learning. The online audio accommodation does not eliminate the expectations for learning and it must not invalidate the assessment; rather, it is made available to allow students to access information displayed on a computer screen in an alternate way, leveling the playing field and enabling the demonstration of knowledge and skills. Correctly implemented, the audio accommodation helps to ensure fair comparisons with other students taking the test who do not require an audio accommodation.

Whether the audio is delivered using Text-to-Speech (TTS), Human Voice Audio (HVA), or even with sign language via an interpreter in Video Sign Language (VSL), the accommodation must be the oral (or signed) equivalent of simple, natural reading, mirroring the first step in the reading process without providing a cognitive advantage over students who only have access to the printed or displayed (computer screen) versions. When read aloud, audio scripts must be crafted carefully so as not to inadvertently give clues that indicate the correct answer or help eliminate answer choices. Signaling to students through scripted cues can be as simple as inappropriate inflection or inadvertent elaboration created by scripting test items word-for-word, exactly as written.

In order to provide fair scripts, so that a student does not receive any cues by the way the information is read, DRC content specialists will alter the audio scripts prior to implementation of the audio (or VSL) accommodation. For example, the following scripting guidelines are used when providing scripting for students who are struggling to read on-grade/course-level texts for PSSA and Keystone Exams.

Examples of Audio Scripting Guidelines

Mathematics

- In some cases, symbols are scripted to be read as “a symbol is shown” (rather than saying “greater than” or “less than”) when the name of the symbol would cue the correct answer. If the item asked which number is greatest, reading the symbol would provide the answer.
- In questions where the student is given a written-out dollar value to match with a numerical value, \$18.24 will be read as “dollar sign, one, eight, point, two, four.”
- If the question is assessing a student’s knowledge of place value, a number like 2,224 will be read as “two, comma, two, two, four” and a number like 10.205 will be read as “one, zero, point, two, zero, five.” For questions where the place value is not a concern, numbers will be read in standard form (e.g., 1,234 would be read as “one thousand, two hundred thirty-four”).
- When a graph or plot is involved, and the student is required to identify or characterize the data, the exact location of data points will not be read. Instead, the graph or plot elements (like titles, labels, keys, scales, etc.) will be read.

Science

- If a question includes both the name and the symbol of an element or compound, the symbol will be read as the name in later instances within the test question. If only the symbol appears within a test question, only the symbol will be read (e.g., Cl_2 should be read as “C, L, two,” not as “chlorine gas” or “chlorine”).
- Food webs will be described by starting at the bottom of the food web and reading all labels describing the direction of the arrow rather than reading the web to indicate the specific relationships.

English Language Arts

- In spelling items, an incorrectly spelled word will be pronounced like the correctly spelled word. Individual letters of the words will not be spelled out.
- In punctuation or capitalization questions, the name of the punctuation or the existence of capitalization will not be scripted. Quotation marks and apostrophes also will not be read. However, artifact of natural reading will be scripted to be read. End punctuation will be read with normal, natural inflection, and commas will be acknowledged with brief pauses (but not noted explicitly as commas).

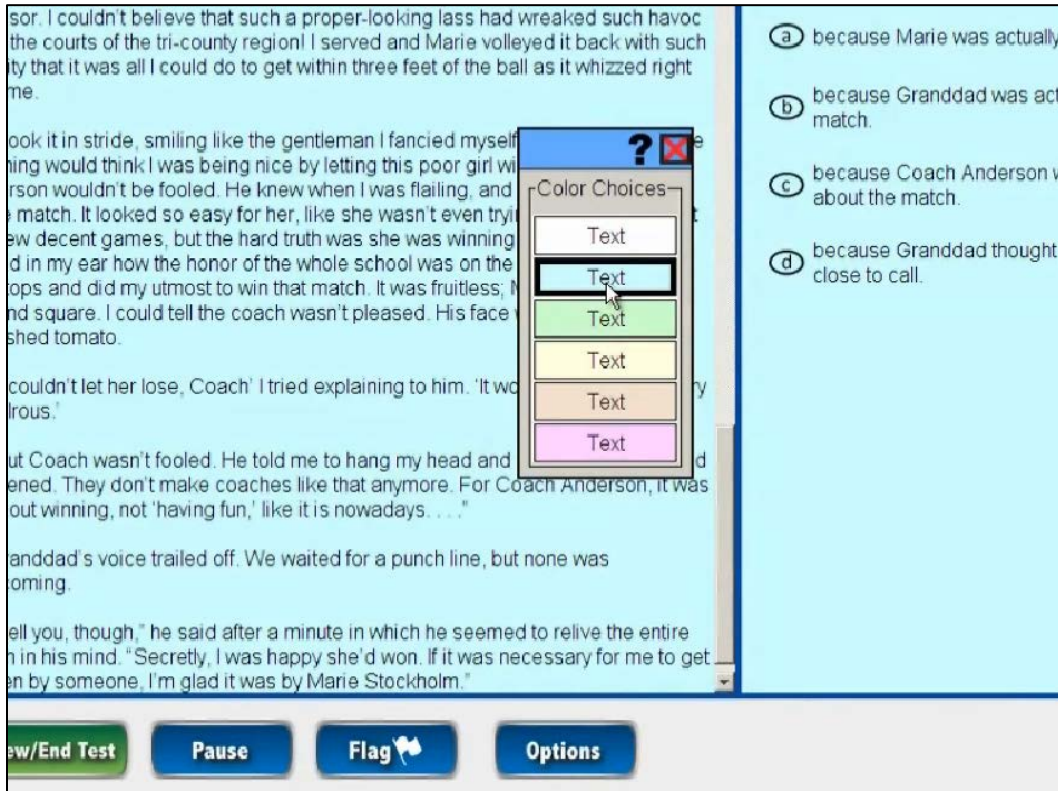
For the CDT, audio scripting is used in place of a Braille or Large Print form due to the computer-adaptive nature of the assessment (a print version is not available).

DRC INSIGHT Visual Accommodations

| Accommodation | Description |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Variable Font Size/ Adjustable Font Face | DRC’s system supports configurable font sizes within items and text (for example, larger font sizes may be preferable for younger students). Within Writing items, students also have the ability to adjust the font size of their responses. |
| Online Large Print | DRC has developed a fully scalable Large Print solution for students who test on larger monitors. Using vector-oriented image formats (“vector graphics”), DRC’s solution enlarges the screen display to maximize the area available on the larger monitor, while maintaining the correct aspect ratio for all test content. This means that all text, tools, and images are resized to scale, without any distortions or fuzzy, pixelated images resulting from the increase in size. In addition, because the system scales in relation to the available area, the student does not have to scroll around the screen to see the entire item/response area. |
| Magnifier/Variable Zoom Tool | DRC’s magnifier tool allows the student to enlarge the screen by 150% or 200% (configurable). The entire screen is magnified, including all text, graphics, and images. |
| Refreshable Braille Display and Braille Note-takers | DRC has extensively researched various third-party refreshable Braille devices. We have sought recommendations and feedback from numerous national organizations that specialize in vision accommodations and policies, such as The National Braille Press and the American Printing House for the Blind. DRC has also worked with NCEO, and current teachers of vision impaired students, to investigate some of the best options for students with low or no vision. DRC will work with PDE to support refreshable Braille devices and Braille note-takers when needed for Pennsylvania’s online assessment administrations. |
| Background and Foreground Colors | <p>Color Contrast: A variety of background color and text color combinations are provided based on recommendations from the National Center on Education Outcomes (NCEO) and consultation with the American Printing House for the Blind (APH). Specifically, DRC has followed the advice of both NCEO and APH to use color combinations that are in opposite positions on the color wheel.</p> <p>Color Overlays: DRC’s system provides color overlays that change the background color behind text, graphics, and response areas based on student needs. This tool also follows recommendations from NCEO and APH as noted above.</p> |
| Masking Tool | Allows the student to cover up (mask) content that may be distracting, enabling the student to more easily focus their attention on a specific part of the screen. |

| Accommodation | Description |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Alerts to Test Takers that Alternate Representations are Available</p> | <p>DRC’s system has the ability to provide special notifications on specific test questions (for example, practice hints are provided for the OTT). This functionality can be leveraged to provide alerts to test takers regarding alternate representations on specific items.</p> |

Color Overlays



Masking Tool

The screenshot displays the 'ELA Grade 3 Sample Items' interface for a 'Training Student'. The main window shows a reading passage titled 'A Few New Neighbors' by Kerry McGee. The passage describes Jessie spotting a tiny bird fluttering around Mrs. Baxter's front door. A 'Masking' dialog box is open over the text, with 'Add Mask' and 'Show/Hide Masks' buttons. A second, larger 'Masking' dialog box is shown in the foreground, partially overlapping the main window, also with 'Add Mask' and 'Show/Hide Masks' buttons. The interface includes navigation buttons at the bottom: 'Review/End Test', 'Pause', 'Flag', 'Options', and 'Next'.

The student can place a mask over any portion of the screen. Multiple masks may be used simultaneously to customize the viewing area.

DRC INSIGHT Translations

| Accessibility/ Accommodation Feature | Description |
|---------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Translated Test Directions and Items | DRC's system supports the delivery of translated test content, including test directions and test items. Multiple layouts are available for full-text translations, including standalone translations; "stacked" translations where the translation of the item is presented directly above the English version of the item; and "side-by-side" translations where the translation is presented next to the English version. |
| Glossing | DRC's system can provide a dynamic "pop-up" glossary that gives a definition or translation for a specific word. When the student hovers over the word with the pointer, the definition/translation appears on-screen. |
| Video Sign Language (VSL) | <p>DRC's system includes a Video Sign Language tool that delivers embedded, pre-recorded video files of a human signer. DRC's versatile Video Sign Language tool provides an improved student experience with many unique features:</p> <ul style="list-style-type: none"> ■ Video controls with the ability to play, pause, stop, and restart ■ Ability to select starting points for the video using a slider bar ■ As an available option, the ability to listen to the content as it is signed (not currently utilized by Pennsylvania) <p>We have found that these expanded features are very important to the student and provide improved opportunities to understand the content. Being able to listen to someone actually speaking the words as they sign is an important option for students who are hearing impaired but not completely deaf, and provides a different means of access required by some students.</p> |

Translated Test Directions (Spanish)

Math—Grade 8 Spanish Practice Test Training Student

Nota: Asegúrate de haber visto el Tutorial de Matemáticas y la Prueba de Práctica para tu grado antes de tomar la prueba de Matemáticas.

Lee estas instrucciones **cuidadosamente** antes de comenzar la prueba. Para ver otra vez estas instrucciones, haz clic en el botón de interrogación (? [Help]) y selecciona la pestaña de instrucciones de la prueba (**Test Directions**).

Esta prueba tiene solamente preguntas de opción múltiple. Cada pregunta de opción múltiple tiene cuatro opciones de respuesta.

- Solamente aparece una pregunta a la vez en la pantalla de la computadora.
- Las herramientas en la parte superior de la pantalla pueden ayudarte a contestar la pregunta.
- Usa la herramienta de flechita (**Pointer**) para seleccionar o cambiar tu respuesta.
- Haz clic en el botón de banderita (**Flag**) si no estás seguro de la respuesta para una pregunta. Se marcará la pregunta para que sepas que tienes que volver y contestar la pregunta más tarde.
- Si necesitas alejarte de tu computadora, haz clic en el botón de pausa (**Pause**). Haz clic en el botón de reanudar (**Resume**) para continuar. Si permaneces alejado de tu computadora por más de 15 minutos, tendrás que registrarte otra vez.
- Usa herramientas como la de tachar (**Cross-Off**), la de resaltar (**Highlighter**), la de notitas (**Sticky Note**), la lupa (**Magnifier**), y la línea guía (**Line Guide**) como ayuda durante la prueba.
- Haz clic en el botón de referencias (**References**) para ver una hoja de referencia que contiene fórmulas y tablas de conversión.
- Encontrarás más información disponible de cada herramienta si usas el botón de interrogación (? [Help]).

Begin The Test

Options
Exit

Glossing/Pop-up Glossary

Question 2

Read the text. Then answer the questions.

Fishy Weather Conditions
By Phillip Cho

Lajamanu, Australia, is a dry little town with 600 residents, sitting right on the edge of the Tanami desert. On a map, Lajamanu looks a lot closer to the center of Australia than any coast. On any given day, red dust blows down the streets, and a dry wind hurries weeds down the dirt roads. Not much happens that is new or unexpected, so imagine how amazed its residents were when live fish rained down on them from a dark gray cloud one afternoon.

That is exactly what happened in the remote Australian village. Raining fish, especially more than 300 miles from an ocean, seems like it must be an elaborate hoax. In some places, however, it happens so often that it doesn't even surprise residents any longer. In Yoro, Honduras, it happens so regularly that they have begun to predict the Lluvia de Peces, or Rain of Fishes, once or twice a year.

How do clouds make fish? The simple answer is that they don't. There is a particular weather

More Text Below

The following question has two parts. First, answer part A. Then, answer part B.

Part A

What is **most likely** the author's intent by mentioning blind fish in the text?

a to show how different fish survive, depending on the manner and location in which they live

b to persuade the reader that scientists do not yet understand the territory of certain species of fish

c to persuade the reader that the ecosystem, even if they are

d to show how knowledge of waterspouts were respons

Part B

Which sentence from the text **best** illustrates the inference made in part A?

"Scientists knew that some fish that lived in deep, underground caves with no light sources often lost their eyesight over generations of adaptation."

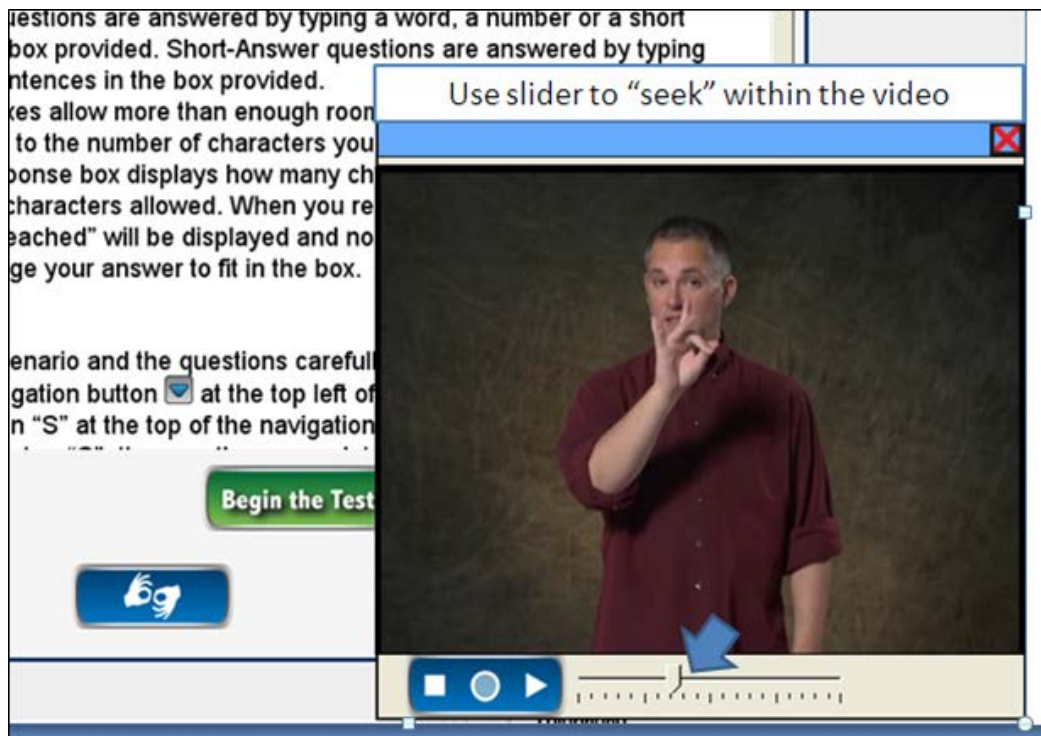
Review/End Test

Pause

Flag

Back
Next

Video Sign Language



Additional Accommodation Tools and Third-Party Devices

| Accommodation | Description |
|------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Voice Capture Response</p> | <p>DRC’s system has the ability to capture a student’s spoken responses via microphone. The oral response is recorded as an audio file and can be transmitted directly to scorers for evaluation. DRC’s Voice Capture Response provides an alternate response option for students with special needs.</p> |
| <p>Audio Amplification Devices (Headsets)</p> | <p>DRC’s system supports headsets (headphones/earphones and microphone) for listening and speaking.</p> |
| <p>Other Assistive Devices and Software</p> | <p>DRC can work with PDE to investigate other assistive-use technology devices and software that provide alternate response options for students, such as specialized keyboards, alternate keyboards/mouse, and other alternative communication devices. In that process, we would be happy to learn which assistive technology devices are most frequently utilized by students in Pennsylvania schools, and discuss the viability of using those devices with our system. We are not aware of limitations within our system for supporting such alternative and augmentative communication devices.</p> |

DRC can also work with PDE to support accommodations that relate to test setting, timing or scheduling, and assisted response, such as:

- **Setting Accommodations** that allow for changes in the location where an assessment is administered. Setting accommodations can be met without special features built into the online testing system. For example, testing on tablets provides increased flexibility for the test location.
- **Timing or Scheduling Accommodations** that allow for increased testing time or a change in the way the time is organized.
- **Response Accommodations** that are supported by a test administrator or other personnel. Examples include a test administrator marking or transcribing answers at the student's direction, a qualified interpreter translating ELL student responses, or providing for augmentative communication devices and manipulatives not intended for the online environment.

DRC can work with PDE to address accommodations for test setting, timing/scheduling, and assisted responses in the training materials and documentation prepared by DRC for test coordinators and administrators.

Tracking Tool and Accommodation Usage

Through the use of telemetry—the technology of automatic measurement and transmission of data for recording and analysis—DRC can record data related to the student testing experience during a specific testing event. DRC captures/logs a variety of transaction data during student testing and stores this information in our secure databases.

DRC is pleased to provide high-level tracking of student use of tools and accommodations for Pennsylvania under the new contract. Our system will track whether or not a student accessed a tool or accommodation at any point on a given test.

Use of Subcontractors or Third-Party Systems

DRC uses the following subcontractors or third party systems to meet support and other accessibility requirements in our online testing system.

- Various licensed voices are used for DRC's Text-to-Speech digital audio accommodation (e.g., Cepstral's "David" voice; NeoSpeech's "James" voice).
- Expert sign language contractors are used for the translation and creation of Video Sign Language (VSL) files.
- Merriam-Webster is used for DRC's dictionary tool (not currently provided for Pennsylvania).

- Professional voice talent and recording studio contractors are used to produce Human Voice Audio (HVA) files (not currently provided for Pennsylvania).

Subcontractors and vendors will be approved by PDE before being implemented for Pennsylvania assessments.

4.F.4. TEST ACCOMMODATIONS

DRC will be pleased to work closely with PDE staff in continuously considering accommodations and supportive universal tools to optimize accessibility and student success across all Commonwealth assessments, including consideration of the needs of Section 504, special education, and English language learner populations. The growing body of research on accommodations for ELLs and ELLs with disabilities is just one example of the work that DRC experts constantly review with attention to testing system upgrades.

DRC has experienced educators on staff who proactively research and recommend updates, as we simultaneously respond to client desires. DRC staff actively participate in all of the CCSSO SCASS groups, and know and appreciate the depth that states and the national assessment consortia groups are giving to considerations for students with disabilities and to ELLs. We are particularly fortunate to be headquartered in close proximity to the National Center on Education Outcomes (NCEO) at the University of Minnesota, and to be able to consult with NCEO staff in our own development efforts.

DRC recognizes that the Individuals with Disabilities Education Act (IDEA) is more than a law—it is a promise to educators, students, their families, and communities that works to address both the intentions and the implications of NCLB for multiple special populations. In moving to digital environments, we also understand the importance of providing for assistive technologies, embedded and non-embedded accommodations. We can also provide professional development or other assistance, as PDE might desire, to staff who are seeking to fully understand the selection and use of accommodations for CDT, Keystone Exams, and PSSA testing.

It is important to DRC to ensure that an assessment measures students' knowledge and skills rather than disabilities. This is demonstrated in our attention to our clients' statewide assessment policies and practices, standards setting efforts, and assessment related graduation requirements, as well as DRC's assurance that our accommodations and tools will not interfere with the ability to validly measure a construct. DRC is ready to support both online and onsite practices, as well as to respond flexibly to PDE policy updates regarding assessment design and practices for students with 504 plans, disabilities, and English language learners.

4.F.5. ONLINE TUTORIALS

To aid students and teachers in preparing for online testing, DRC offers an online tutorial and online tools practice environment for the DRC INSIGHT system. We will continue to provide separate tutorials and OTTs for each grade and subject of the CDT, Keystone Exams, and PSSA.

Student Tutorial

The web-based Pennsylvania Online Assessment Student Tutorials are available for each operational assessment and are designed to be used by students at all grade levels. They use pictures, motion, and sound to present visual and verbal descriptions of the features and functionality of the Pennsylvania Online Assessment system.

Tutorials will be available for review by administrators, teachers, students, and parents a minimum of 4 weeks prior to the beginning of testing. Because they are non-secure, tutorials can be made available on the public area of eDIRECT so that students and parents have the flexibility to view them from home.

Students may be allowed to repeat the tutorial as often as desired and needed. Narration within the tutorial includes both spoken audio and print captioning, allowing the student to read along as the script is spoken aloud. The tutorial operates on industry-standard web browsers such as Internet Explorer, Mozilla Firefox, and Apple Safari.

Sample images from a current Pennsylvania tutorial are provided on the next page.

Student Tutorial: Basic Tools

English Language Arts

Question 2

Basic Tools:
To learn more, click on the Previous Menu button in the bottom left and choose the Testing Basics video.

- Pointer**
Mark answers to multiple-choice questions, select other testing tools, and modify the test.
- Cross-Off**
Mark answer options you believe are not correct.
- Highlighter**
Add highlighting to important text or graphics within a test question.
- Sticky Note**
"New Sticky Note" - Add a sticky note anywhere on the screen, and type notes you can use for future reference.
"Hide Sticky Notes" - Hides sticky notes.
- Magnifier**
Enlarge text and graphics on test screen.
- Line Guide**
Movable straight line used as an aid for tracking text while reading.

Review/End Test Pause Flag Options Back Next

Previous Menu Main Menu

Student Tutorial: Coordinate Grid

Mathematics—Grade 5 Training Student

Question 10
Page 1 of 3

Mathematics

Coordinate Grid – Plot/Label Points

Taylor is plotting points onto some coordinate grids.

The first point Taylor plots is on the y-axis.

A. On the coordinate grid shown below, plot a point that could be Taylor's first point.
(Practice Hint: Click on the Point button. Click on the coordinate grid to plot a point.)

Review/End Test Pause Flag Back Next

When you have finished viewing this video, click the Previous Menu button below to view additional tutorials.

Click the Main Menu button to select a different subject.

Previous Menu Main Menu

Select a point on the coordinate grid and drag to rotate the line.
Release when you have completed your line.

Online Tools Training

The Pennsylvania Assessment Online Tools Training (OTT) is designed to provide an introductory experience using the online assessment software in preparation for taking an online test. The purpose of the OTT is for students to observe and experiment with the features of the online assessment software prior to the actual assessment.

The OTT allows students to try out system features and tools, practice navigating through the test, and become familiar with the look and feel of the system. OTTs are customized based on program, grade, content area, and item content.

Students will experience the same testing environment they will encounter during operational testing, and they will be able to experiment with the same features and tools that will be available during an actual test. Students do not need a login ticket to access the OTTs, and they can be taken multiple times.

Pennsylvania Online Tools Training

Welcome to Pennsylvania Online Assessments

CLASSROOM DIAGNOSTIC TOOLS
Online Tools Training

PENNSYLVANIA SYSTEM OF SCHOOL ASSESSMENT
Online Tools Training

PENNSYLVANIA KEYSTONE EXAMS
Online Tools Training

Please sign in with the following credentials:
Username: algebrat
Password: test1234
Username:
Password:

Back 4.5.0
2013.9.5.0902

Copyright © 2013 Data Recognition Corporation.

Detailed instructions are provided throughout the OTTs to guide students on how to use the online tools and how to navigate the test, as shown below.

Test Directions and Helpful Hints

Test Directions

Read these directions carefully before beginning the test. To look at these directions again, click on the ? [Help] button and choose the **Test Directions** tab.

This test has multiple-choice questions. Each question has four answer choices.

1. First, find the answer to the question. Then, choose the correct answer by clicking on the answer bubble using the **Pointer** tool.
 - Only one of the answer choices provided is correct. If none of the choices matches your answer, go back and check your work for possible errors.
 - To change an answer, use the **Pointer** tool to choose a different answer.
2. After answering the question, use the **Next** button to go to the next question.
3. A message will be displayed when the test is completed.

Helpful Hints

- There is no time limit to finish the test.
- Only one question at a time will appear on the screen.
- If you need to go away from your computer, click on the **Pause** button. Click on the **Resume** button to continue. If you are away from your computer for

Begin the Test

Exit

Tool Usage Instructions

Using Help

Test Directions

Tools

How To

Helpful Hints

Formula Sheet

The **Formula Sheet** tool provides various information that may be used to help you answer the questions on the exam.

To open a Formula Sheet:

- Click on the **References** button.
- A drop-down list of the available **Formula Sheets** will be presented.
- Click on the name of the desired formula sheet, and it will appear on the screen.

To use a Formula Sheet:

- To reposition the sheet, click on the blue bar at the top of the sheet and drag it to the desired location.
- Some of the formula sheets may require scrolling to see the entire contents.

To close a Formula Sheet:

Using Help

Test Directions

Tools

How To

Helpful Hints

Pause

When the **Pause** button is clicked, the test will be temporarily stopped. The test cannot be paused for more than 20 minutes. A countdown timer will be displayed showing how much longer the test will be paused. At any time during the countdown, the test can be resumed by clicking on the **Resume** button.

To Pause the test:

- Use the **Pointer** to click on the **Pause** button near the lower-left corner of the screen.

Resume

To Resume the test:

- Click on the **Resume** button before the countdown timer reaches zero to continue with the test.

In addition, on-screen training hints are provided to direct students to practice using specific tools and features of the online test. (Note: These hints do not appear in a live test administration.)

OTT Item with Practice Hints

LITERATURE Training Student

Question 1 ?

(Practice Hint: Use the Line Guide tool to help guide your progress through the passage.)

(Practice Hint: Use the Highlighter tool to highlight important parts of the passage.)

The Change

Lee stared out the window, watching the thickly falling snow as it coated the track and sidewalks, the bleachers and rooftops. Others might consider it a picture-perfect scene, but to him snow was a foreign substance, and this place was as alien to him as a scene on Mars. Home—not the house where he lived now but the house where he had lived until just recently—seemed very far away.

He turned back to the classroom, noting two excited boys talking fervently to the teacher. Here, he knew only a few of the people in the room, while at home he would have known everyone. There, he and his friends would have been hanging out together as soon as school was dismissed, and the day would have been clear and warm. Here, he knew that he would soon be leaving alone, wishing that he were anywhere else.

When the bell rang, he eased out of his desk and started for the door, but—to his surprise—he was addressed by the teacher, Mrs. Anderson, who was still accompanied by the two boys who had been talking with her.

"I understand that you're a runner, Mr. Harvey," she said to Lee, "and that you've gotten a little out of practice lately. As you can see, we can't use the track today, but Jared and Tim would be glad to show you where they work out so that you can start training for track."

More Text Below

What is the meaning of the word fervently as used in the passage?

- (a) quietly
- (b) irately
- (c) distantly
- (d) energetically

Review/End Test Pause Flag Next

4.F.6. APPLICATION TESTING

DRC tests all system functionality prior to release for operational testing. The remainder of this section describes our software quality assurance and application testing approach. Upon award, we will thoroughly document the specific testing plan for Pennsylvania, as well as the results of the application tests, and provide both the testing plan and subsequent results to PDE with sufficient time for PDE to review and request changes. We will demonstrate the final, fully tested version of the system to PDE prior to administration.

Software Quality Assurance

DRC is proud of the web-based systems that we have created in conjunction with many state departments of education over the years. **Our commitment is to deliver high-quality content and error-free, reliable systems to Pennsylvania educators and students.** Recognizing that quality is the most critical element of our business, we have developed and refined our quality approach to ensure the highest level of accuracy and customer satisfaction will be provided to our clients.

DRC's strategic quality approach begins at the initiation of an assessment program and continues through final reporting. This strategic quality approach safeguards DRC's requirements analysis processes, software design, development, integration, implementation, and support; and it ensures DRC's products and services are accurate and reliable.

DRC's quality values start with:

- Building quality into the requirements analysis, software development, and testing processes.
- Following a standardized methodology that focuses on the prevention of software and integration issues.
- Providing highly qualified and trained staff.

To achieve excellent quality, DRC's Software Quality Assurance (SQA) staff will apply a proactive and integrated approach to industry-standard requirements management, software development, and quality assurance methodologies on the Pennsylvania assessments. These methodologies serve as ongoing guidelines during the entire software development life cycle. All requirements, software development, test plans (unit and production), and procedures are thoroughly documented, reviewed, verified, and validated. The consistent application of the DRC quality methodologies provides:

- High-quality, flexible, and effective applications
- Accurate data
- Timely data delivery and reporting

We utilize a five-step quality assurance approach (described below) to ensure quality is built into every phase of a Pennsylvania assessment administration.

Five-Step Quality Assurance Approach

| Phase | Approach |
|-----------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Initiation and Planning | Information Systems (IS) activities begin during the project initiation and planning phase and ensure that software development and IS processes, procedures, and standards identified in the project plan are appropriate, clear, specific, and accurate. |
| Project Design and Development | Quality processes begin during the project design and development phase to ensure that software requirements are complete, testable, and properly categorized as functional, performance, or user interface. The software quality assurance team works closely with the business analysts and development team, testing all deliverables throughout each program. |
| Software Integration and Testing | IS has implemented an established and proven methodology for software integration and testing. The software developers and quality analysts determine the strategic test approach and create detailed test plans/scripts to validate system and software functionality and requirements. Throughout the software integration and test phase, test plans and scripts are run in accordance with the overall test strategy. Any non-conformances of requirements that are discovered are reported, resolved, and retested until requirements are met and the product is ready for PDE acceptance and release to production. |
| Client Acceptance | Prior to the implementation of a system or program(s), the SQA analysts perform a final configuration audit to verify readiness for production. The IS Manager is responsible for the coordination of acceptance testing to ensure that PDE is both satisfied with the development process and confident that readiness testing was sufficiently performed. |
| Implementation | IS practices are incorporated throughout the implementation phase of a project to ensure successful installation and integration of the system or software programs. These same procedures are again applied when changes or modifications to the system or software programs are implemented. |

Personnel Resources

DRC’s Information Systems and Software Quality Assurance departments are composed of dedicated software professionals specifically trained in the following areas:

- Requirements Analysis, Management, and Traceability
- Scope Management and Change Control Processes
- Software Development and Quality Processes

- Web Interface Development and Design
- Graphical User Interface Standards
- Software Quality Assurance Planning and Coordination
- Software Integration and Testing
- Defect Analysis, Tracking, and Resolution
- Continuous Quality Process Improvements

DRC's professionals have a wealth of software testing experience related to K–12 systems. Our dedicated staff of quality professionals will directly monitor all aspects of the software development efforts to ensure that processes and product deliverables conform to specified standards and requirements. The SQA management team assigns resources to tasks based on their individual aptitudes and experiences, and includes experts in data validation, report verification, performance testing, graphical-user interface testing, and test automation. SQA leaders work with Education Project Management to ensure timely execution of all test activities.

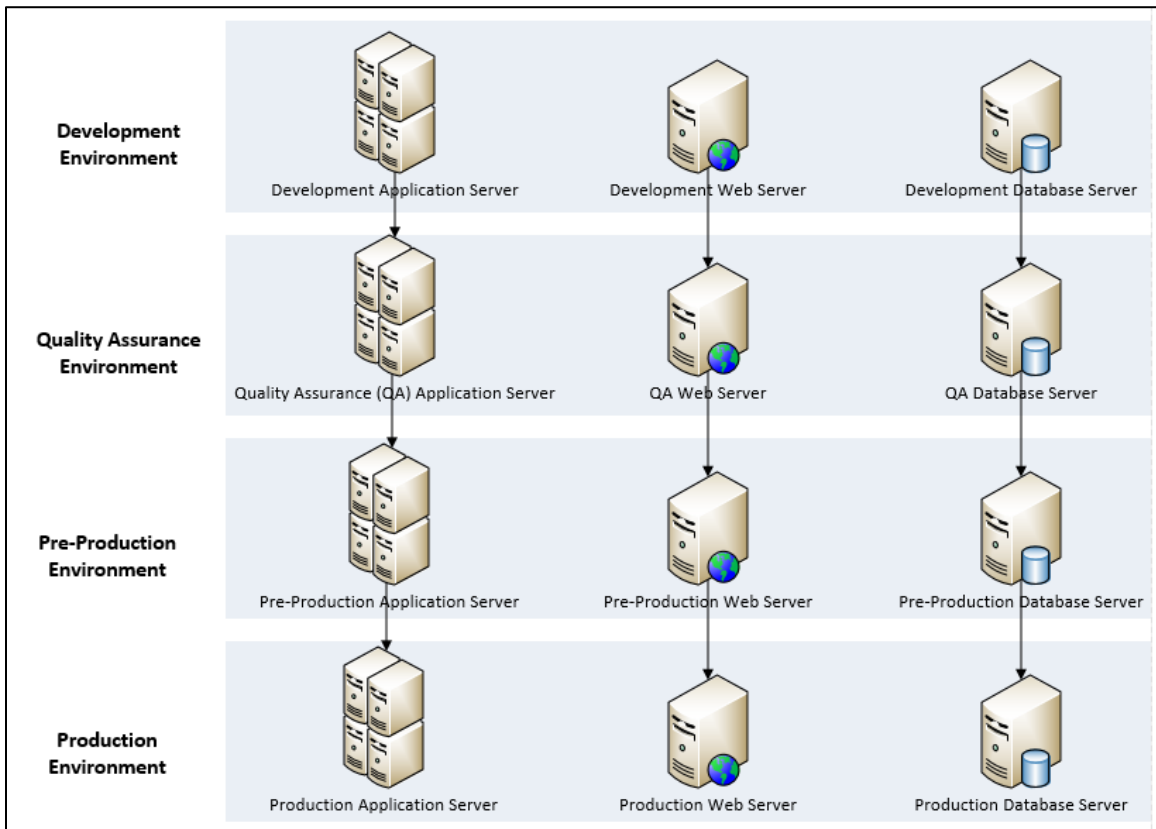
Application Development and Testing Environments

DRC manages four distinct environments for our application development and testing:

- Development environment
- Quality Assurance (QA) environment
- Pre-production environment
- Production environment

Our “best practices” process starts with programs created in the development environment and then migrated to the quality assurance (QA) environment. In the QA environment, the Software Quality Assurance (SQA) group verifies that the programs meet all our performance and usability requirements. Once the QA testing is successfully complete, the programs are sent to the pre-production environment. This environment, also known as Staging or User-Acceptance, mirrors the production environment, and allows software release candidates to be reviewed in their final state before deployment to production. Once approved in pre-production, software is deployed into the production environment. This methodology is supported by separate servers for each environment. The separate environments allow for development, testing, pre-production, and production to happen concurrently, while not compromising any environment. As each phase is completed, the code is physically migrated to the appropriate location for the next step in the development cycle. The following figure depicts the migration environments and processes.

Migration Environment and Processes



PDE System Review

The online system and all its components will be provided to PDE for review in advance of each online administration. We will provide PDE with access to each system component in a pre-production/user-acceptance environment that mimics the production environment, so that PDE may review the system and conduct its own application tests. Per the RFP, we understand that PDE should be allowed at least five (5) business days to review any system component and ten (10) business days to conduct any system-wide tests. DRC will demonstrate the system at least 12 weeks (90 days) prior to the start of online assessment administration, and all systems will be functional and available for district installation at least six (6) weeks prior to testing. Final, approved forms and items will be available in the online testing system a minimum of two (2) weeks prior to the opening of the test window. Any mandatory changes identified by PDE will be incorporated before the start of the administration.

System Documentation

System functionality, security, and performance requirements are clearly documented and verified. All system and processing requirements will be documented based on close collaboration with PDE and a shared understanding of PDE's decisions regarding the system. These documents will serve as the

systems' scope and will be used to validate overall functionality. These documents will be made available to PDE for review and approval.

Online System Testing

DRC's online system testing and quality control processes leverage the best practices learned through our years of web-based system development. Our procedures ensure that our test software performs as expected; that tests are presented to students exactly as they were designed; that tests are scored accurately; and more. Prior to operational use, DRC's quality assurance staff will perform full system-level tests in an independent test environment that simulates the production configuration. Tests are run on all supported computer platforms and browsers and include comprehensive review of system functionality, usability, reliability, security, and overall performance. Systems content is also validated for accuracy during this process.

Our online testing system quality review processes include:

- **Editorial review**—A multi-step editorial review of all item computerized displays is performed, including graphs, charts, illustrations, and tables.
- **Install/uninstall testing**—Installation procedures (for the secure browser), software updates, and patches are fully tested prior to releases.
- **Unit testing**—System features are subjected to functional testing by the software development staff. At this stage, issues can be detected and corrected prior to release to the quality assurance staff.
- **System testing**—The system is validated against requirements by software quality assurance staff and subjected to full-functional testing. This process includes verifying system accessibility, links, security, and performance. Issues can be detected and corrected prior to the final release.
- **Test decks**—DRC submits tests through the production systems to ensure all student responses are captured and accurately stored in a secure database environment. Each record in the database is independently verified against the test decks for validation. These test decks are custom configured by program to ensure that all program-specific requirements are being met by the online testing solution.
- **Performance and load testing**—Simulation of heavy loads on the system are performed to confirm that the solution will meet performance expectations.
- **Security testing**—Extensive tests are performed to ensure security requirements are being met on the system and user access is limited to the appropriate security level.

- **Platform testing**—The system is tested on all supported computer platforms and browsers to ensure consistent and reliable performance.
- **Large-scale simulations**—Cross-functional teams of 40–50 individuals perform exploratory tests on all enhancements to the online test client software to ensure usability and reliability across a wide range of usage scenarios.
- **Testing Site Manager (TSM) testing**—DRC verifies that the testing software interacts with a Testing Site Manager (TSM) when present in a school’s network to ensure efficient, uninterrupted testing for students.
- **Database accuracy**—Quality assurance staff perform extensive tests to ensure all data captured in the online system is stored in a secure database environment.
- **Scored data**—Quality checks are performed on the data to ensure that test scores have been computed correctly against the score keys and scoring rules.
- **Final production form reviews**—A final review of production forms is conducted prior to use by students.
- **Independent PDE review**—The system will be provided to PDE for validation prior to the release to Pennsylvania educators and students.

Below, we describe in greater detail our approach to performance/load testing and user-acceptance testing.

Performance Testing

DRC subjects our system to strenuous load testing and performance testing to validate that the infrastructure and capacity model can handle the expected testing volumes. System performance tests typically include the activities listed below. Test activities may be added or removed to fit the numerous scenarios tested.

- **Open Browser:** Student clicks on the secure browser icon and waits for the landing page to load.
- **Log in to Student Info:** Student clicks the Sign In button after entering username and password.
- **Load Test:** Student clicks on the test name and waits for the test to fully load.
- **Begin Test:** Student clicks on the Begin Test button and waits for the first item to be displayed.

- **Insert Response:** Student moves from one item to another after entering a response for a selected-response item or entering a significant amount of response data (1,000 characters) for an open-ended item.
- **Reload Test:** After student pauses and exits a test, load the test again. This is similar to Load Test; however, this will also load all of the student's previous responses.
- **Submit Test:** Student clicks the Submit Test button and waits for the next screen to appear.

Performance tests are based on the anticipated number of students who will test concurrently for a given assessment. **DRC repeatedly runs performance tests at three to five times the expected rate to demonstrate that our system will perform well above what is needed.** When evaluating expected loads, we also take into account the effect of varying testing patterns throughout the administration window. For example, test loads are typically lower at the beginning of the test window, reach their peak mid-window, and fall off again at the end of the window. Tests loads also trend higher or lower on certain days of the week and at certain times of day. All of these criteria are factored into the performance load testing process to ensure the system is prepared for every scenario.

DRC's proactive planning and testing allows us to meet the needs of Pennsylvania's online testing program and our other state contracts. Our past performance, along with our robust, fully scalable architecture, can assure PDE that we are capable of supporting your increasing participation in online testing.

DRC's recommended mitigation and contingency plans to address system inoperability are provided later in this section under *Subheading 4.F.10., System Reliability and Mitigation Experience; Disaster Prevention and Recovery.*

4.F.7. DATA INTEGRATION AND COLLECTION

System Requirements

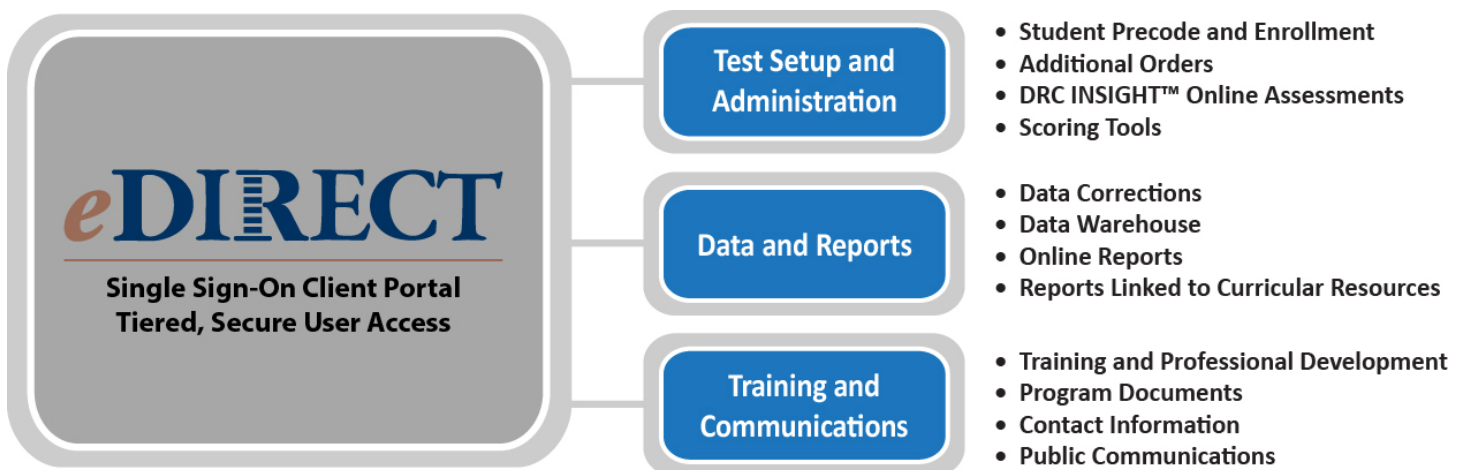
DRC eDIRECT offers users easy access through one online system, and one password, to all the information and data required for an assessment.

The DRC eDIRECT administrative portal will be used to collect student and teacher data for the Pennsylvania assessments. eDIRECT is a configurable, secure, web-based portal that seamlessly integrates the tools and resources needed by test coordinators, test administrators, and other state personnel to coordinate and administer assessments (both paper-based and online); access program communications and resources; and monitor student performance. Access is secure and tiered according to each user's role and assigned permissions.

eDIRECT is a web-based system that can be accessed on standard web browsers and does not require software installation or specialized communication infrastructures on the part of PDE, districts, or schools. Pennsylvania educators are very familiar with using eDIRECT for online and paper-based assessments. DRC eDIRECT has been successfully used in Pennsylvania since 2009.

The figure below diagrams the various tools, functions, and resources available via eDIRECT. Because eDIRECT was developed and is maintained in-house, DRC offers flexibility for interfacing with client data systems and customizing content to meet each client's needs. DRC is dedicated to enhancing the capacity and performance of all DRC systems, including eDIRECT, to ensure that PDE's operational requirements are met and exceeded.

DRC eDIRECT Assessment Management Portal



For the Pennsylvania assessments, eDIRECT will continue to provide the following functionality for PDE and LEAs:

- Student information system integration via PIMS data files provided by PDE
- Pre-ID verification/test setup
- Enrollment/materials ordering, including additional and accommodated materials
- Materials Receipt Notices and Materials Accountability Forms
- Corrections/attributions window
- Test administration information and manuals, including Coordinator's Handbooks and DFAs, both for paper/pencil and online testing modes
- Online testing resources (browser downloads; test scheduling/rostering, including assignment of accommodations; test administration tools; status reports and statistics)
- Online tutorials for students
- Classroom Diagnostic Tools
- Training presentations/materials and Assessment Updates
- Technology documents and manuals
- Restricted access to student and school results/summaries
- Link to Data Interaction (web-based reporting)
- Link to Pennsylvania Standards Aligned System (SAS)

DRC will continue to work with PDE to determine Pennsylvania-specific branding, available functions, and the types and formats of tools and resources provided in eDIRECT, as well as to define user access rules and criteria.

Single Sign-on System

By logging in with a single user ID through the password-protected eDIRECT system, authorized individuals may access all tools and resources designated for each assessment. Users will access the site using a single user ID and password; users will not be required to memorize multiple passwords or log out and log back in to access different areas. **Our goal is to make access to information as easy as possible without users having to go to multiple locations to find what they need.**

eDIRECT features an initial public access home page where authorized users will enter their login information to access the secure area of the site. As part of this home page, DRC can post materials and links to sites that can be accessed by the

general public, as well as school users who may not be authorized to log on. Public access materials can include assessment brochures, online testing tutorials, and other materials.

The following figure shows the eDIRECT home page for the current PSSA, Keystone Exams, and CDT programs.

eDIRECT Welcome Page

General Information ⌵

Minimum Browser Requirements Documents

Test Setup ⌵

DATA RECOGNITION DRC CORPORATION

Log On

Welcome to eDIRECT

Pennsylvania Department of Education (PDE) in partnership with Data Recognition Corporation (DRC) welcomes Pennsylvania educators to eDIRECT!

This website enables you to access links to program tools and provides information for the following Pennsylvania testing programs:

- Pennsylvania System of School Assessment (PSSA)
- Keystone Exams
- Classroom Diagnostic Tools (CDT)

To access program content, authorized personnel need to log on to the secure website with their email address and password. To log on, click the **Log On** link in the upper right of this page.

ONLINE TOOLS TRAINING SOFTWARE DOWNLOAD

To download publicly-accessible PA Online Tools Training (practice opportunities) copy the link below into Google Chrome. Note that Google Chrome is the only supported browser for this public version of the DRC INSIGHT test engine. The full versions of the Pennsylvania Online Assessment Software can be accessed via secure PA eDIRECT login.

<https://wbte.drctedirect.com/PA/portals/pa>

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Permissions-Based Access

The eDIRECT portal provides tiered access for all users involved in the administration of the Pennsylvania assessments, such as district and school test coordinators, technology coordinators, test administrators/teachers, PDE personnel, and any other PDE-approved users needing access to the system.

A robust user management tool allows administrators to add and edit users and assign user roles and permissions for each administration. Typically, district-level users are granted access to all student, teacher, and class information associated with their district, and can determine how this information will be managed. School-level users manage teacher, classroom and student-level school data. The flexibility of eDIRECT's tiered access approach means that it can be customized to PDE's specifications.

Confidentiality Agreement

To enhance the security of the Pennsylvania assessments and maintain the confidentiality of student data, new users will be prompted to review and agree to a security and confidentiality agreement upon logging into the eDIRECT system for the first time. The user must agree not to disclose any student information from the system to anyone other than a state, district, or school official as defined by the Family Educational Rights and Privacy Act of 1974 (FERPA). In addition, users will be directed to read and abide by FERPA.

4.F.7.a. District/School Content Filtering Systems and Firewalls

The eDIRECT system does not contain any restrictions or requirements regarding district/school content filtering systems and firewalls.

For online testing with DRC INSIGHT, we offer the following network configuration guidance:

- All testing devices require Internet access.
- All testing devices require access to DRC servers using HTTP/HTTPS protocols on ports 80 and 443; therefore all firewalls on the testing devices and the network are required to allow connectivity on ports 80 and 443.
- Access to specific URLs is required, so content filtering systems or other proxy/firewall software installed locally should whitelist these URLs
- Internet connection idle timeout settings need to be sufficient to allow students to complete testing.
- DRC INSIGHT traffic should bypass firewalls and proxies if possible.

4.F.7.b. Flexible System Design

The DRC INSIGHT testing engine and the eDIRECT assessment management portal have been **developed and maintained in-house**, giving DRC the flexibility to quickly and efficiently respond to client needs and providing full control over changes to software, database, and reporting functions.

4.F.7.c. Online Enrollment and Test Setup

DRC provides a flexible and user-friendly process for online enrollment and test setup. Student information from the Pennsylvania Information Management System (PIMS) is imported into eDIRECT via file transfer (please see *Subheading 4.D.3., Student Specific Demographic Labels* for more information on this process). All of the student records provided by PIMS are loaded and available within DRC's **Test Setup tool**. From here, LEAs are able to view all of the demographic information associated with the students from PIMS before placing them in test sessions for the production of precode labels (paper/pencil sessions) or test tickets (online sessions).

The Test Setup functionality within eDIRECT allows users to manage student and teacher information and create test sessions. Once the student data is imported from PIMS or loaded directly into Test Setup by an LEA, users organize students into student groups (CDT only) and test sessions. Student groups and test sessions can be created by class, grade, school, or any other variation. Through Test Setup, users can also update student accommodation information, print test tickets, and monitor student testing status.

Management of Teacher, Student, and Student Group Information

The **Teachers** page within Test Setup provides information regarding teachers within the system and the content areas with which they are associated. Teacher information is required for the CDT assessments to support the classroom-level reporting, and can be manually entered into the system or uploaded via data file. Users have the ability to make any necessary edits and can verify that all teachers who have classes involved in the test are in the system and that the correct teacher, test session, and students are associated with the appropriate test.

Manage Teachers

Manage Teachers

Edit Teacher
Upload Multiple Teachers

[Instructions](#)

** Indicates required fields*

Administration
2012/2013 Classroom Div *

District
Sample District - 412345

School
Sample School 1 - 01234

Last Name

First Name

PPID

Email

Find Teachers
Clear

| Teachers | | | | | | | |
|--------------------------|-----------------|-----------------|-----------|------------|----------|----------------------|--------|
| <input type="checkbox"/> | District | School | Last Name | First Name | PPID | Email | Action |
| <input type="checkbox"/> | Sample District | Sample School 1 | Teacher | Sample | 00000001 | TestSample@blank.com | |

1 Item(s) Displayed

Add Teacher
Delete Teacher
Export to Excel
Update Content Areas

Student information is maintained through the **Students** tab within Test Setup. The **Students** page displays student information by district, school, and administration and includes demographic data and accommodation information. District and School Assessment Coordinators are granted the permissions to add or edit students to make necessary changes and to view test sessions to which a student is assigned. A variety of sorting options enable the user to quickly pinpoint the student record(s) they are seeking.

Manage Students

Manage Students

Manage Students
Upload Multiple Students

[Instructions](#)

* Indicates required fields

Administration
2013 Spring Keystone Ex *

Last Name

Accommodation Content Area

Grade

Student Group

Online Test Status

District
Sample District - 412345

First Name

Accommodation Type

Demographic

Content Area

Online Students

School
Sample School 1 - 01234

PAsecureID

Accommodation

Teacher

Session

Find Students
Clear

View Student Test Sessions

Edit Student

[Instructions](#)

* Indicates required fields

Last Name
Anderson *

First Name
Laura *

Middle Initial

PAsecureID
5636650272 *

Student Detail
Accommodations
Student Groups
Test Sessions

| Session Detail | | | | | | | | |
|---------------------|---------------------|---------------------|-----------------------------|-----------|--------------------|--------------------|--------|--|
| District | School | Session Name | Assessment | Status | Begin Date | End Date | Action | |
| ABINGTON HEIGHTS SD | ABINGTON HEIGHTS MS | AbHeightsMS - MATH8 | General Mathematics | Completed | 7/24/2012 11:00 PM | 7/25/2012 12:00 AM | | |
| ABINGTON HEIGHTS SD | ABINGTON HEIGHTS MS | AbHeightsMS - READ8 | Reading/Literatur | Completed | 7/24/2012 11:00 PM | 7/25/2012 12:00 AM | | |
| ABINGTON HEIGHTS SD | ABINGTON HEIGHTS MS | AbHeightsMS - SCIB | Science | Completed | 7/24/2012 11:00 PM | 7/25/2012 12:00 AM | | |
| ABINGTON HEIGHTS SD | ABINGTON HEIGHTS MS | AbHeightsMS - WRIB | Writing/English Composition | Completed | 7/24/2012 11:00 PM | 7/25/2012 12:00 AM | | |

4 Item(s) Displayed

Save
Cancel

The **Student Groups** page (used for CDT only) is used to associate a group of students (such as a classroom) with a specific teacher. Users can easily add students to groups by choosing from a list of available students.

Manage Student Groups

The screenshot displays the 'Manage Student Groups' web application. The main interface includes tabs for 'Manage Student Groups' and 'Upload Student Groups'. A 'Find Student Groups' section contains dropdown menus for 'Administration' (2012/2013 Classroom Dir), 'District' (Sample District - 4123456), and 'School' (Sample School 1 - 0123456). Below these are input fields for 'Student Last Name', 'Student First Name', 'Teacher', and 'Group Name', along with 'Find Student Groups' and 'Clear' buttons. A 'Teacher' dropdown menu shows 'Anderson, John (1234567)' as the selected option. The 'Add Student Group' modal window is open, showing a 'Group Name' field with 'Algebra II' and a 'Teacher' dropdown with 'Sample, Teacher (1234567)'. The modal includes a 'Search for Available Students' section with filters for 'Student Last Name', 'Student First Name', 'PAsecureID', 'Grade', 'Demographic', 'Accommodation', 'Teacher', and 'Course Code'. A list of 'Available Students' is shown, including names like 'ABBOTT, ARLINDA' and 'ABBOTT, ASHLEE'. The 'Students in Group' list currently contains 'Student, Training (1234567890)'. At the bottom of the modal are buttons for 'Save & Add Another', 'Save & Add to Session', and 'Cancel'.

Management of Test Sessions

The **Test Sessions** page within Test Setup allows a user to assign assessments to a student, print test login tickets, and check student testing status. The test session, like the student group, may also be created by class, grade, and school. After test sessions are created, users can add/remove/edit students within a session at any time prior to testing.

Manage Test Sessions

Student Test Login Tickets

The student login ticket (test ticket) contains unique login credentials used by the student to access the testing software. For a selected test session, users can download and print a PDF document containing instructions, a roster of student tickets being printed, and the actual test tickets.

Printing Test Tickets

| Select | District | School | Session Name | Assessment | Status | Begin Date | End Date | Action |
|--------------------------|-----------------|-----------------|--------------|----------------------|-------------|------------|-----------|--------|
| <input type="checkbox"/> | Sample District | Sample School 2 | TestSession1 | Algebra I | Paper | 3/3/2013 | 5/31/2013 | |
| <input type="checkbox"/> | Sample District | Sample School 2 | TestSession2 | High School Literacy | Paper | 3/3/2013 | 5/31/2013 | |
| <input type="checkbox"/> | Sample District | Sample School 2 | TestSession3 | Biology | Paper | 3/3/2013 | 5/31/2013 | |
| <input type="checkbox"/> | Sample District | Sample School 2 | TestSession4 | Biology | Not Started | 3/3/2013 | 5/31/2013 | |
| <input type="checkbox"/> | Sample District | Sample School 2 | TestOne | Algebra I | Paper | 5/13/2013 | 5/24/2013 | |

The tickets are pre-formatted for printing on plain paper so they can be cut into individual tickets. Test tickets include the name of the administration, the student's name, the name of the assessment, the username (student's PAsecureID), a unique pre-generated password, and any system accommodations designated for the student (if applicable).

Sample Test Ticket

| |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>2014 Spring PSSA</p> <p>DONALD ANDERSON</p> <p>Reading/Math Grade 8</p> <p>Username: 4280925143</p> <p>Password: DASH9834</p> <p>Form: 01</p> <p>Accommodations: AU</p> |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Test Setup Tutorials

DRC provides several helpful video tutorials through eDIRECT that guide administrators through the Test Setup process. The tutorials demonstrate each step in the process, including:

- User Administration Setup
- Teacher Setup
- Student Setup
- Student Group Setup
- Test Session Setup

Please see *Section 6, Training* for more information on training and customer support available to administrators.

New or Moved Students

To accommodate new or moved students that will test online, the eDIRECT Test Setup functionality allows LEAs to take ownership of a student who was previously uploaded to another LEA and add them to an online test session. To ensure that eDIRECT users are aware that they are claiming a previously-uploaded student, the record is displayed with a “#” symbol and a message to alert the user that the student was uploaded by a different LEA.

4.F.7.d. Online Testing Status and Statistics

DRC offers a variety of test monitoring tools and statistics in eDIRECT that provide real-time testing status and statistics for each administration.

Tools for Monitoring Test Status

During the testing window, administrators can view testing status by test session and by student within eDIRECT, as shown below. Status is indicated as Not Started, In Progress, Completed, or Locked. The student-level detail includes information on questions attempted. This is helpful in determining whether a student did not complete a section and a make-up session is needed.

Status by Test Session and by Student

| District | School | Session Name | Assessment | Status | Begin Date | End Date | Action |
|-----------------|-----------------|----------------------|--------------------|-------------|------------|----------|--------|
| Sample District | Sample School 1 | TEST Writing Group 1 | Reading/Literature | Not Started | 8/4/2011 | 8/3/2012 | |
| Sample District | Sample School 1 | TEST Writing Group 2 | Reading/Literature | Not Started | 8/4/2011 | 8/3/2012 | |
| Sample District | Sample School 1 | TEST Writing Group 3 | Reading/Literature | Not Started | 8/4/2011 | 8/3/2012 | |

Testing Status

[Instructions](#)

Testing Status - TOut Session (Geometry Practice)

| Select | Last Name | First Name | User Name | Password | Status | Started | Completed | Action |
|-------------------------------------|-----------|------------|------------|----------|-------------|---------|-----------|--------|
| <input type="checkbox"/> | Muntz | Nelson | 1111111111 | FULL4907 | Not Started | | | |
| <input checked="" type="checkbox"/> | Powell | Janey | 6666666666 | WALL5517 | Not Started | | | |
| <input type="checkbox"/> | Simpson | Lisa | 3333333333 | RICE1990 | Not Started | | | |

eDIRECT users also have the option to view summary information about any of the testing that is occurring within their district, school, or class through the Test Session Status Summary page (shown on the next page). The status summary indicates the number of students by grade/content area that have not started testing, number of students in progress, and number who have completed testing.

Test Session Status Summary—Number of Students

| Sessions | | Status Summary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------|---------------------------|-------------------------|-------------------------|--|-----------------|--|--------|---------------|-------------|--------------|---------------------------|---------------------------|-------------------------|-------------------------|-----------------------------|--|--|--|--|---------------------|---|---|---|---|---------------------|---|---|---|---|---------------------|---|---|---|---|---------------------|---|---|---|---|-------------------------|--|--|--|--|-----------------|---|---|---|---|
| Instructions | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="2">Session Summary</th> </tr> <tr> <th>Status</th> <th>Session Count</th> </tr> </thead> <tbody> <tr> <td>Not Started</td> <td>8</td> </tr> </tbody> </table> | | | | | | Session Summary | | Status | Session Count | Not Started | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Session Summary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Status | Session Count | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Not Started | 8 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| <table border="1"> <thead> <tr> <th colspan="5">Student Summary</th> </tr> <tr> <th>Assessment ▲</th> <th># of Students Not Started</th> <th># of Students In Progress</th> <th># of Students Submitted</th> <th># of Students Completed</th> </tr> </thead> <tbody> <tr> <td colspan="5">- Content Area: Mathematics</td> </tr> <tr> <td>Mathematics Grade 3</td> <td>5</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Mathematics Grade 4</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Mathematics Grade 5</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td>Mathematics Grade 8</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> <tr> <td colspan="5">- Content Area: Reading</td> </tr> <tr> <td>Reading Grade 8</td> <td>1</td> <td>0</td> <td>0</td> <td>0</td> </tr> </tbody> </table> | | | | | | Student Summary | | | | | Assessment ▲ | # of Students Not Started | # of Students In Progress | # of Students Submitted | # of Students Completed | - Content Area: Mathematics | | | | | Mathematics Grade 3 | 5 | 0 | 0 | 0 | Mathematics Grade 4 | 1 | 0 | 0 | 0 | Mathematics Grade 5 | 1 | 0 | 0 | 0 | Mathematics Grade 8 | 1 | 0 | 0 | 0 | - Content Area: Reading | | | | | Reading Grade 8 | 1 | 0 | 0 | 0 |
| Student Summary | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Assessment ▲ | # of Students Not Started | # of Students In Progress | # of Students Submitted | # of Students Completed | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Content Area: Mathematics | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mathematics Grade 3 | 5 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mathematics Grade 4 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mathematics Grade 5 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Mathematics Grade 8 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| - Content Area: Reading | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Reading Grade 8 | 1 | 0 | 0 | 0 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

Status Reports and Online Testing Statistics








Pennsylvania currently receives an Excessive Logins Report that displays information about students who have more than two logins for a specific module or section of an online assessment. DRC also added the Daily Student Resets Report for the spring 2015 assessments in order to provide LEAs a way to monitor and document authorized resets. **As a value-added offering to PDE, DRC is pleased to offer several additional status reports for PDE and district use.** The full suite of Status Reports, which are available in eDIRECT, can be used to track testing activity for a given test administration and can be filtered by district and school.

Online Testing Status Reports

Status Reports

** Indicates required fields*

Administration: MSP SPRING 2012 * District: (All) School: (All)

| Reports | |
|---------------------------------------------|-------------------------------------------------------------------------------------|
| Title | Action |
| Daily Excessive Logins Report |  |
| Daily School Resets Report |  |
| Daily State Summary of Test Times Report |  |
| Daily Student Resets Report |  |
| Daily Student Status Report |  |
| District Report of Testing Status by School |  |
| Weekly District Report |  |

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[Home](#)

During testing, these reports are updated daily at the end of each testing day. More information about each report follows.

Online Testing Status Report Descriptions

| Status Report | Description |
|-------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Daily Excessive Logins Report | Displays information about students who exceed a specified number of logins (configurable) for a specific module or section of an online assessment. The report displays the number of times the student logged in for the day the report was run, as well the cumulative result of all attempted logins by the student, regardless of the day. |
| Daily School Resets Report | Creates an entry each day a school exceeds a specified number of resets (configurable). |
| Daily State Summary of Test Times Report | Displays district-wide data for each grade and content area. |
| Daily Student Resets Report | Displays information about students who have had their login reset more than a specified number of times (configurable). After the number of resets has been reached, the student appears on the report with the date the reset occurred. |

| Status Report | Description |
|----------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Daily Student Status Report | Each student that logs into a test appears on this report. This report shows, on a daily basis, the times the test was started and submitted; whether or not the test ticket has been invalidated; and a comment field to manually enter comments on the printed report. |
| Cumulative Student Status Report | Displays all students in a test session, regardless of whether they have started the test session. This report shows the test status for each student, including the times the test was started and submitted; whether or not the test ticket has been invalidated; assigned accommodations; and a comment field to manually enter comments on the printed report. |
| District Report of Testing Status by School | Displays the number of tests started and ended for a district and school, or a grade and subject level. |
| Weekly District Report | Displays the number of tests started and ended at a district level for each week of testing. |

As a further value-add for Pennsylvania, DRC will provide access to Online Testing Statistics in eDIRECT. The Online Testing Statistics show the number of tests started and the number of tests completed for a given administration. The data can be viewed by program, subject, and grade, or by district and school. Data can also be exported in CSV format for use in a spreadsheet. Users can view the previous day's data or generate a set of cumulative data, as shown in the following figure.

Online Testing Statistics

The screenshot displays the 'Cumulative' section of the Online Testing Statistics dashboard. It features a navigation bar with 'Cumulative' and 'Yesterday' tabs. Below this, there are filters for 'Student / Grade' and 'District / Date'. The main content area is divided into four data tables, each with an 'Export' button to its right. The first table, 'All Tests', shows a total of 180,962 test started counts and 179,959 test ended counts. The second table, 'By Subject', lists counts for Mathematics (58,157 started, 57,824 ended), Reading (99,216 started, 98,675 ended), and Science (23,589 started, 23,460 ended). The third table, 'By Grade', shows counts for grades 03 through 08. The fourth table, 'By Subject and Grade', provides a detailed breakdown by subject and grade combination. A pagination bar at the bottom indicates 'Page 1 of 2 (14 items)' with navigation arrows. A copyright notice at the very bottom reads 'Copyright © 2008-2012 Data Recognition Corporation. Patents Pending.'

| All Tests | | | |
|-----------|--------------------|------------------|--------|
| Total | Test Started Count | Test Ended Count | |
| | 180962 | 179959 | Export |

| By Subject | | | |
|-------------|--------------------|------------------|--------|
| Subject | Test Started Count | Test Ended Count | |
| Mathematics | 58157 | 57824 | Export |
| Reading | 99216 | 98675 | |
| Science | 23589 | 23460 | |

| By Grade | | | |
|----------|--------------------|------------------|--------|
| Grade | Test Started Count | Test Ended Count | |
| 03 | 9756 | 9697 | Export |
| 04 | 12126 | 12019 | |
| 05 | 31149 | 30977 | |
| 06 | 40068 | 39776 | |
| 07 | 30578 | 30438 | |
| 08 | 57285 | 57052 | |

| By Subject and Grade | | | | |
|----------------------|-------|--------------------|------------------|--|
| Subject | Grade | Test Started Count | Test Ended Count | |
| Mathematics | 03 | 3867 | 3842 | |
| Mathematics | 04 | 2707 | 2671 | |
| Mathematics | 05 | 7781 | 7735 | |
| Mathematics | 06 | 15187 | 15078 | |
| Mathematics | 07 | 12091 | 12025 | |
| Mathematics | 08 | 16524 | 16473 | |
| Reading | 03 | 5889 | 5855 | |
| Reading | 04 | 9419 | 9348 | |
| Reading | 05 | 16268 | 16191 | |
| Reading | 06 | 24881 | 24698 | |

Page 1 of 2 (14 items) < Prev 1 2 Next >

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Online Testing Program Dashboard

As another new offering for PDE, DRC is excited to present our DRC INSIGHT Program Dashboard. The dashboard contains a variety of charts and figures that allow PDE to see testing activity in the Commonwealth during a specified timeframe. Some of the available dashboard tools are shown in the figure on the following page.

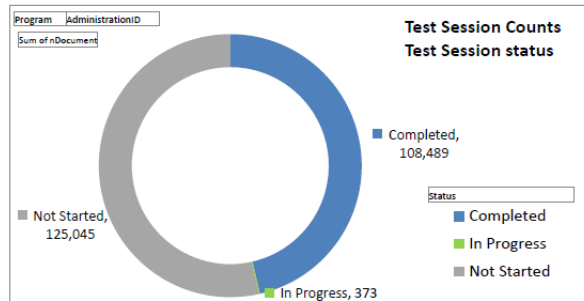
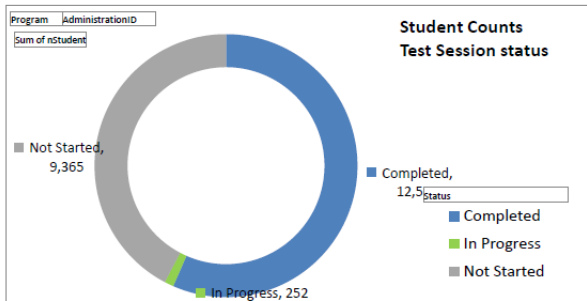
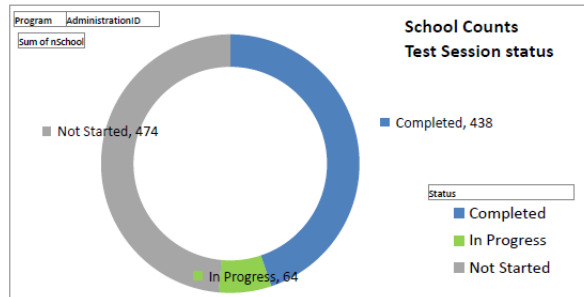
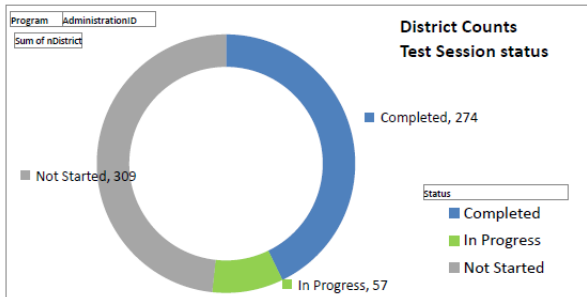
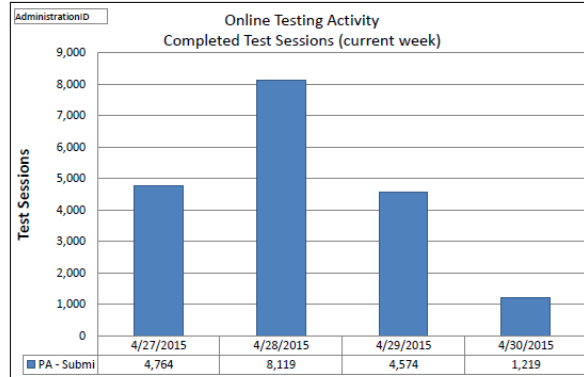
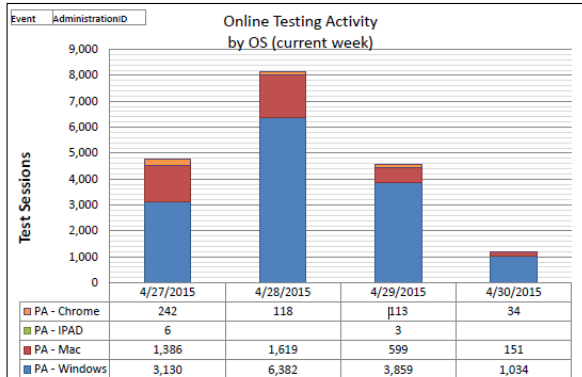
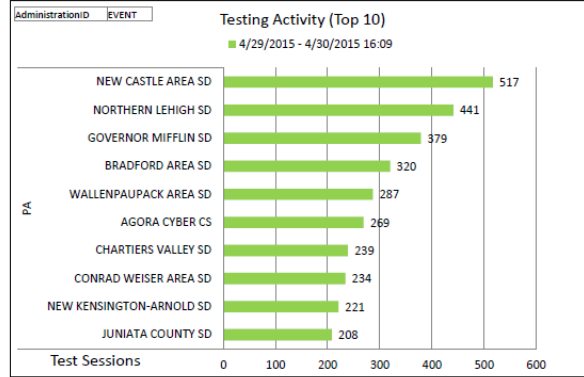
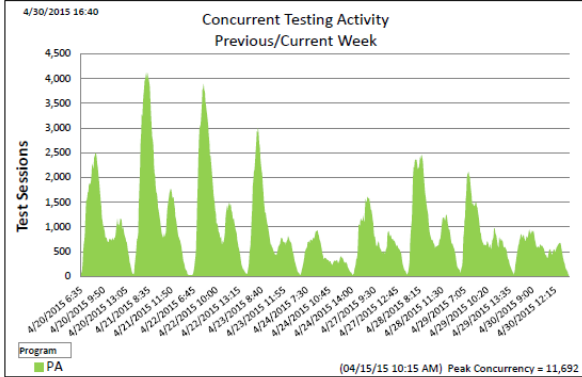
DRC would be pleased to discuss the Program Dashboard further if PDE is interested in this new offering. A full version of a sample Pennsylvania program dashboard report is given in *Volume III, Appendix D*.

DRC INSIGHT Program Dashboard for Pennsylvania



Program Dashboard

4/30/2015
4:40 PM



4.F.7.e. Test Codes, Accommodation Codes, and Demographic Information

DRC eDIRECT provides the ability to collect test codes, accommodation codes, and other demographic information by administration for online assessments before, during, and after testing. These data fields are customizable to meet PDE's needs.

Student demographic information collected during the PIMS collection window will be reflected within eDIRECT's Test Setup tool. Authorized users can enter and verify demographic data in Test Setup, as shown below.

Verify Student Demographic Data

Add Student

[Instructions](#)

* Indicates required fields

Last Name * First Name * Middle Initial PAsecureID *

Student Detail Accommodations Demographics Supp

Please check the 'I agree that the demographic data for this student is correct' checkbox after ensuring that the demographic data for this student is correct.

- Student's current enrollment status in the school of residence initially started AFTER October 1, 2012.
- Student's current enrollment status in the district of residence initially started AFTER October 1, 2012.
- Student's current enrollment status as a Pennsylvania resident initially started AFTER October 1, 2012.
- Student's current enrollment status in the school of residence initially started AFTER October 1, 2011 but ON OR BEFORE October 1, 2012.
- Student's current enrollment status in the district of residence initially started AFTER October 1, 2011 but ON OR BEFORE October 1, 2012.
- IEP
- Exited IEP program in last 2 years
- Title I
- Migrant Education Program

Save Save & Add Another Cancel

Accommodation information for students testing online is not currently collected in the PIMS system, so the District or School Assessment Coordinator will manually enter accommodation information within Test Setup. Accommodations that are built into the testing engine (such as audio, sign language, and color chooser), are updated prior to the student being assigned to a test session. All other accommodations, such as extended time, frequent breaks, etc., can be updated before, during, or after the student has completed the assessment.

Select Student Accommodations

Edit Student

[Instructions](#)

* Indicates required fields

Last Name * First Name * Middle Initial PAsecureID *

Accommodations

| Type | Accommodation | Literacy | Mathematics | Science |
|--------|------------------------|-------------------------------------|-------------------------------------|--------------------------|
| Online | Audio | <input type="checkbox"/> | <input checked="" type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - All | <input checked="" type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - Blue | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - Green | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - Orange | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - Pink | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Online | Color Chooser - Yellow | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

7 Item(s) Displayed

For students who are non-assessed, home-schooled, or have supplemental information needed, the District or School Assessment Coordinator will update the testing codes in the student’s profile via eDIRECT, as shown below.

Update or Change Student Testing Codes

Add Student

[Instructions](#)

* Indicates required fields

Last Name * First Name * Middle Initial PAsecureID *

Testing Codes

| | High School Literacy | Algebra I | Biology |
|------------------|--------------------------|--------------------------|--------------------------|
| Non-Assessed | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Court/Agency | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Absent Codes | <input type="text"/> | <input type="text"/> | <input type="text"/> |
| Optional Field 1 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Optional Field 2 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Optional Field 3 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| Optional Field 4 | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

4.F.7.f. Data Interaction Tool

DRC's partner, eMetric, will provide their Data Interaction™ dynamic data query and reporting tool for the Pennsylvania assessments. *Subheading 4.I.8.g., PSSA and Keystone Exams Data Query and Reporting Tool*, provides a complete description of Data Interaction™ including the system's ability to longitudinally store and access assessment data over many years.

4.F.8. DATA COLLECTION PROTECTION FEATURES

During a testing session, unplanned events or emergencies may occur that require a test be paused or ended and resumed at a later time. DRC INSIGHT offers provisions for students and test administrators in the event that an individual student or entire classroom needs to pause or exit the test during a testing session.

- **Pause and Resume Testing**—Students may pause testing if a short break is needed (e.g., restroom break, office visit). Once a student clicks the Pause button, the current test item will be removed from the screen to ensure the security of the question and answer. The student will then have a set number of minutes to resume the test. After the pre-determined number of minutes has passed, the student will automatically be logged out of the test.
- **Inactivity Timeout Feature**—The testing application includes an inactivity timeout feature that ensures test items and content are not compromised in the event that a student is unable or neglects to log out of a testing session. When a student's machine has had no activity (no mouse movement or typing) for a defined period of time (e.g., 20 minutes, or other configurable time period), the application will display an Inactivity Timeout warning message 1 minute prior to logging the student out of the test and closing the application.
- **Auto-save Feature**—During testing, responses are sent to a DRC server each time the student navigates away from an item or clicks the *Next* button to submit an answer. If a particular question takes the student longer than 45 seconds to answer, then the partial, incomplete responses are submitted at 45-second intervals until the student completes the item. This helps safeguard against students losing their work on longer items, such as extended-response items. In the event of an Internet interruption, student responses are encrypted and sent to the TSM (response caching) for the duration of the test, which will then send the responses to DRC servers when connectivity is restored.

4.F.9. ACCESS TO DATA COLLECTION SYSTEM

eDIRECT accommodates tiered access for all state staff involved in the administration of the each Pennsylvania assessment component, including assessment coordinators, administrators, PDE personnel, and any other personnel needing access to the system. These functions are controlled through **a variety of security levels to ensure a user can only view or edit data for which he/she is authorized**. Users must login with a pre-determined unique user ID and password to gain access to the system.

High-level administrator accounts control the permissions and level of access each sub-user will have. eDIRECT is a permissions-based system, meaning that users with administrative rights need to select what role a sub-user has and assign permissions to that individual. This allows the flexibility for users to have the same roles but different permissions. Each district can set up users with as much or as little permission as deemed necessary. A user's role and permission may be modified at any time.

A sample screenshot from the User Administration page within eDIRECT is provided below.

User Administration—Add User and Assign Permissions

The screenshot displays the 'User Administration' interface with the 'Add Single User' tab selected. The form contains the following fields and options:

- First Name:** John *
- Middle Initial:** [Empty]
- Last Name:** Smith *
- Email Address:** Johnsmith@email.com *
- Administration:** 2013/2014 Classroom Dis * (dropdown)
- User Role:** District * (dropdown)
- District:** 21ST CENTURY CYBER CS * (dropdown)
- School:** (All) (dropdown)
- Permission-set:** TestSetup - CDT - District (dropdown)

A tip box states: "Tip: When you select a permission, its description will display below the list".

Available Permissions:

- Administrator
- Administrator - Mass Assign Role
- Administrator - Set Password
- Documents - Delete
- Documents - Upload
- Documents - View
- eDIRECT Setup - Document and Report
- Enrollment - Primary Window
- Enrollment - Secondary Window
- Maintain Administration
- Maintain Administration - Copy Adminis

A 'Save' button is located at the bottom left of the form.

PDE will be granted access to and oversight of all aspects of online performance during the data collection windows, as well as access to captured data after the windows close. Access will be granted via unique, PDE-specific logins in eDIRECT.

DRC has a long history of providing timely and meaningful correspondence to District and School Assessment Coordinators to notify them of important systems, procedures, and reports. DRC often sends such correspondence to PDE prior to distribution to the LEAs, and we produce all such correspondence far enough in advance of the referenced system or report that PDE approval will easily be included in the process for all communications. DRC also regularly re-broadcasts PDE Penn*Links at the direction of PDE staff to ensure that all District Assessment Coordinators in our database are receiving the same information that PDE distributes to its list of assessment contacts.

DRC's process for ensuring secure student test access (i.e., ensuring that students take the online assessment under the correct name and login) is described in *Subheading 4.F.10., System Reliability and Mitigation Experience; End-to-End Test Security*.

4.F.10. SYSTEM RELIABILITY AND MITIGATION EXPERIENCE

4.F.10.a. Information Technology

DRC is committed to ensuring the availability, performance, reliability, and security of all information technology deployed for Pennsylvania's computer-based assessments. In the following pages, we have provided a comprehensive draft plan for the deployment and operation of information technology, including:

- Information Systems Development
- Information Technology Infrastructure
- Online Testing System Specifications
- System Deployment and Operation
- System Capacity and Scalability
- Metrics for System Performance
- Disaster Prevention and Recovery
- End-to-End Test Security

DRC looks forward to finalizing the Information Technology Plan for Pennsylvania's assessments with PDE upon award.

Information Systems Development

DRC's K-12 clients appreciate our ability to tailor technology solutions to meet their needs, while still maintaining superior quality and timely delivery.

DRC's Information Systems (IS) Department is an accomplished provider of the technology needs required for today's K-12 assessment systems, including software development, web-based product design, electronic reporting and delivery, database management, end-user reporting, data warehousing, network and security management, and technology configuration. Working with state department of education clients, we develop, implement, and refine customized software solutions. **We provide user-friendly applications that make the assessment process—from online enrollment to assessment delivery to report interpretation—easier for educators, parents, and students.**

For each new project, DRC works with our clients to customize our solutions to the unique needs of their program. We offer the combination of our proven excellence in designing and implementing customized solutions to meet expectations, and our in-depth understanding of the complexities of designing web-based systems that integrate a variety of tools, resources, and information. We have a cadre of highly qualified professionals who are experienced and will work collaboratively with PDE to address all system requirements, as well as the needs of educators, students, and other stakeholders.

Our services to PDE for this project will rely greatly on the talented professionals in our IS Department. DRC has invested heavily in developing our in-house technology resources, and we are pleased offer PDE our **extensive team of highly experienced, full-time Information Systems personnel, including:**

- Software Developers
- Database Administrators
- Software Quality Assurance Analysts
- Business Analysts
- Corporate Information Technology Specialists
- Production Support Specialists
- Management and Project Managers

These professionals know first-hand the complex nature of the Pennsylvania assessments. Our strong business analysis, application development, networking, and software quality assurance resources provide us with the expertise and capability required to support PDE in meeting the needs of this project.

Software Development Methodology

DRC's systematic development and solution-based approaches ensure our clients of timely and accurate system delivery. Our disciplined approach is requirements-driven and iterative in nature. A significant component to this successful approach is the quality activities that are integrated into each step of the process. All system requirements and software programs are thoroughly documented to ensure testability and compliance.

Our software development process comprises the following high-level steps.

- **Requirements Gathering:** The requirements gathering phase is an iterative process that drives the remainder of the development process by providing the specific details of the system.
- **System Development:** The system development phase is an iterative process that takes the larger project and divides the work into manageable pieces (iterations). All software components are unit tested and integration tested prior to moving them to system testing.
- **System Testing:** This phase includes the system testing, load testing, and performance testing functionality. Testing is well documented to the overall requirements and executed using repeatable scripts, which allow iterations to be tested quickly and efficiently.
- **System Implementation:** During the system implementation phase, the system is migrated to a production environment. This phase includes all training, system maintenance, and support plans and documentation.

More information on each development phase is provided below.

Requirements Gathering

DRC clearly documents and verifies all system functionality, security, and performance requirements. We will work with PDE to define the detailed requirements for specific system components, based on a shared understanding of PDE's decisions regarding the system. Several deliverables will be updated and/or created from the detailed requirements. These documents will serve as the systems' scope and will be used to validate overall functionality:

- Requirement specifications
- Application designs and technical specifications
- Risk analysis and requirement matrices
- High-level test plans

From the requirement specifications, architects and lead developers design the features with formal design documents. These documents may specify the architectural approach, interfaces, object definitions, database overviews and models, and procedural designs as necessary.

Software quality is built into each phase of our process, including the requirements gathering phase. System test plans are generated from the requirements, ensuring that the development teams and testing teams are building software and test cases from the same set of requirements. These test plan documents contain enumerated test cases for the primary functionality, configuration functionality, and error handling functionality.

System Development

In addition to maintaining the existing functionality of the online testing system, DRC will develop new system features, as described in *Subheading 4.F.2.a., Web-Based Online Test Delivery System; System Modifications for Pennsylvania Assessments*. DRC's development process follows the principles of the agile development methodology. The iterative nature of our system development process allows the development teams to break up larger tasks into smaller pieces of work. The work is prioritized and documented to ensure that the most critical components are delivered first. This allows us to deliver pieces of the end result sooner, giving PDE the opportunity to review requirements as they are being implemented and to respond with feedback and changes without waiting for the final full result to be delivered. All code is reviewed during this phase to ensure that it adheres to the documented designs and requirements.

Software quality is built into the system development phase with unit testing and integration testing. Unit testing allows each requirement of the component to be tested, while integration testing allows the component to be tested in conjunction with other parts of the system.

System Testing

DRC's Software Quality Assurance (SQA) staff will apply industry-standard software quality assurance methodologies throughout the project. These methodologies serve as ongoing guidelines during the development process, including design, development, testing, and ongoing operational support. DRC's SQA Team will monitor development to ensure system reliability, maintainability, usability, and adaptability.

Please see *Subheading 4.F.6, Application Testing* for a complete description of our SQA approach for online testing.

System Implementation

Our system implementation phase ensures that the system is ready for the end user—i.e., Pennsylvania students and school and district personnel. We ensure that all related documentation and training information is complete and thorough to ensure a smooth implementation. This documentation is reviewed internally and externally prior to the release of the system. Prior to release, the system is configured for production use in the UAT (user-acceptance testing) environment to confirm the final configurations by our knowledgeable staff, who compare the final system's configurations against the specifications. PDE representatives will

have the ability to use the fully configured system prior to its release to validate the overall behavior of the system.

Information Technology Infrastructure

DRC has a robust information technology infrastructure supporting large-scale testing programs, including all hardware and software required to deliver online assessments. Please see our draft Infrastructure Plan provided under *Subheading 4.F.2.b., Infrastructure Plan.*

Online Testing System Specifications

DRC INSIGHT is a secure, web-based system that operates on a web browser. Our system is compatible with multiple operating systems, including Apple Mac OS X, Microsoft Windows, and Linux operating systems. We also support testing on iPads, Chromebooks, Windows tablets, and Android tablets. Our system can be used in several configurations, including standard, single-user devices; remote connectivity configurations; and virtual networks and/or thin client environments.

Complete system requirements and specifications are provided under *Subheading 4.F.2.d. and 4.F.2.e., Testing Device Requirements.*

System Deployment and Operation

DRC has established user-friendly processes and support resources for the deployment of online testing in schools and districts. Please see the following sections of our proposal for a comprehensive look at our deployment processes and resources.

| Deployment Process/Resource | Proposal Subheading |
|------------------------------------------------------------------------|----------------------------|
| Online testing system deployment schedules | 4.J.1.c. |
| Online assessment implementation plan | 4.F.1.b. |
| Technology readiness and planning tools | 4.F.1.c. |
| System readiness check and browser installation | 4.F.1.c. and 4.F.2.c. |
| Connectivity and content management (PAIUnet and caching capabilities) | 4.F.1.d. and 4.F.2.c. |
| Online testing tutorials and student training/practice opportunities | 4.F.5. |
| Online user guides and administration manuals | 4.D.4. |
| Customer service and technical support | 4.M. |

System Capacity and Scalability

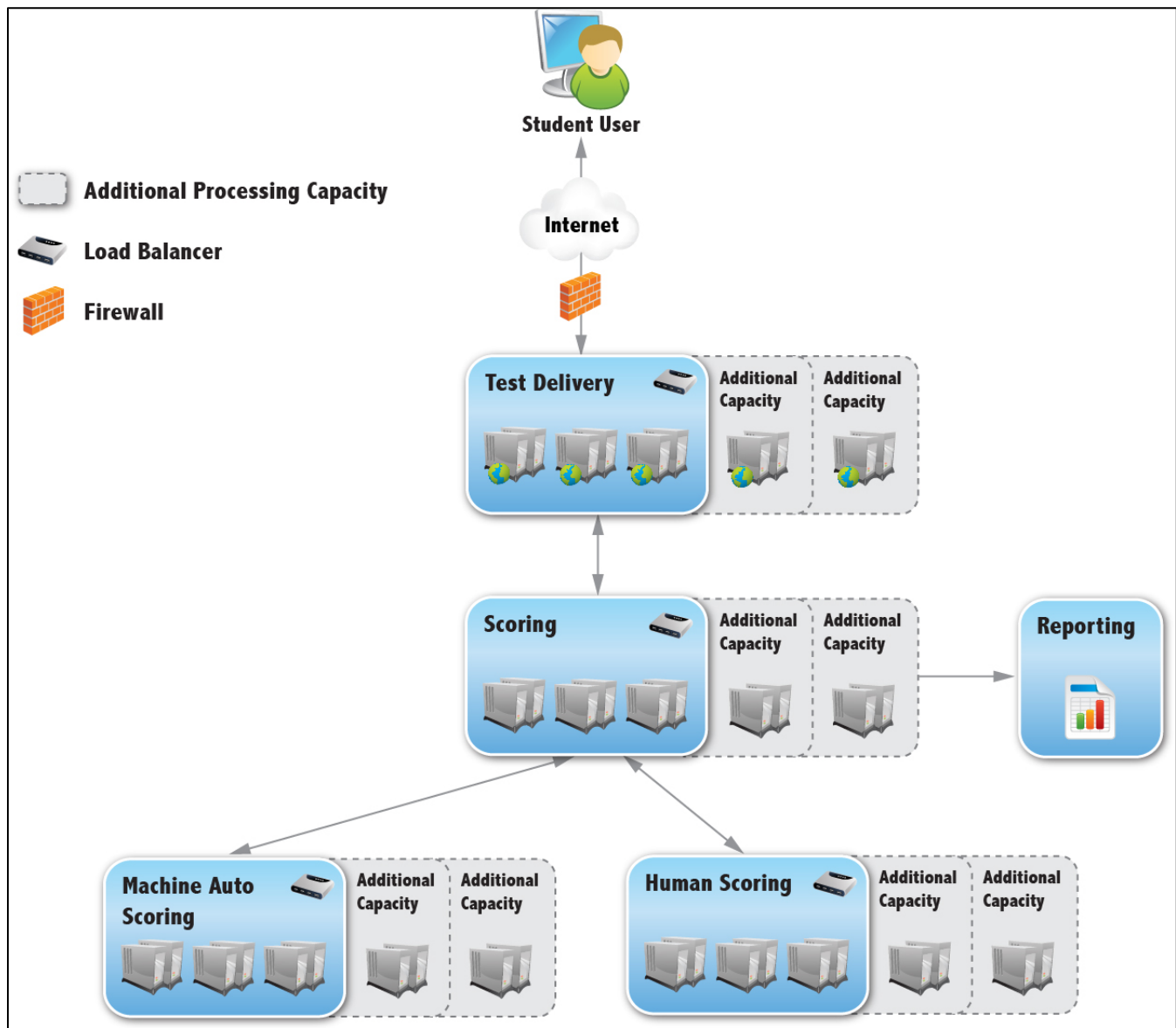
DRC understands the vital importance of ensuring system availability and minimizing wait time during high-stakes testing. Providing adequate capacity within our online assessment system is a demand that DRC continues to meet successfully for our clients. We are dedicated to funding the latest hardware and technology to ensure that we meet and exceed our operational requirements. Our technical environment has grown substantially over the past years, and continues to expand. We routinely add application servers, database servers, and other technical capabilities to stay ahead of the needs of our clients' programs.

DRC INSIGHT was designed to be highly scalable, ensuring we will meet our clients' current and future performance requirements. DRC works with each client to understand their needs, and we thoroughly tests our system capacity to ensure that it will accommodate all programs. We build a detailed capacity requirements model that illustrates all testing activities, administration windows, and the number of planned tests across all client states, so that we can identify the peak expected load on the system. Based on the capacity requirements model, **DRC builds and tests our infrastructure to support over 300% of the peak need required.**

To prepare for the recent spring 2015 testing season, DRC scaled and successfully load tested our system to prove it was prepared to deliver 1 million tests per day (200,000 tests per hour). To date in the 2014–2015 school year, our system has successfully delivered more than 8.5 million online assessments.

Each aspect of DRC's architecture is horizontally scalable. Database servers expand in size and in the number of servers available to our clients. Application servers and web servers scale the same way, in size and in number. The network also scales in bandwidth with burstable, on-demand capacity. This combination allows the entire online system to scale horizontally at any layer, as well as vertically as a whole. The following diagram illustrates how different system components scale when needed to handle additional volume.

Integration and Scalability of the Online Testing System



DRC carefully monitors current usage and capacity requirements across all of our clients' programs to plan for future needs. **We run performance tests at three to five times the expected rate** to demonstrate that our system will perform well above the required capacity without error. DRC has excess capacity within our data center (virtualized infrastructure) and can quickly add more resources to our load-balanced solution when needed to ensure smooth student data handling and system downloads.

Please see *Subheading 4.F.6., Application Testing* for a complete description of DRC's system performance testing process.

Metrics for System Performance

DRC's approach for ensuring reliable system performance begins with a vigilant monitoring plan. As online testing participation and complexity has increased, so has the need for actionable monitoring information. We take a multi-faceted approach to system monitoring for DRC INSIGHT and related systems.

Corporate Technology System Monitoring

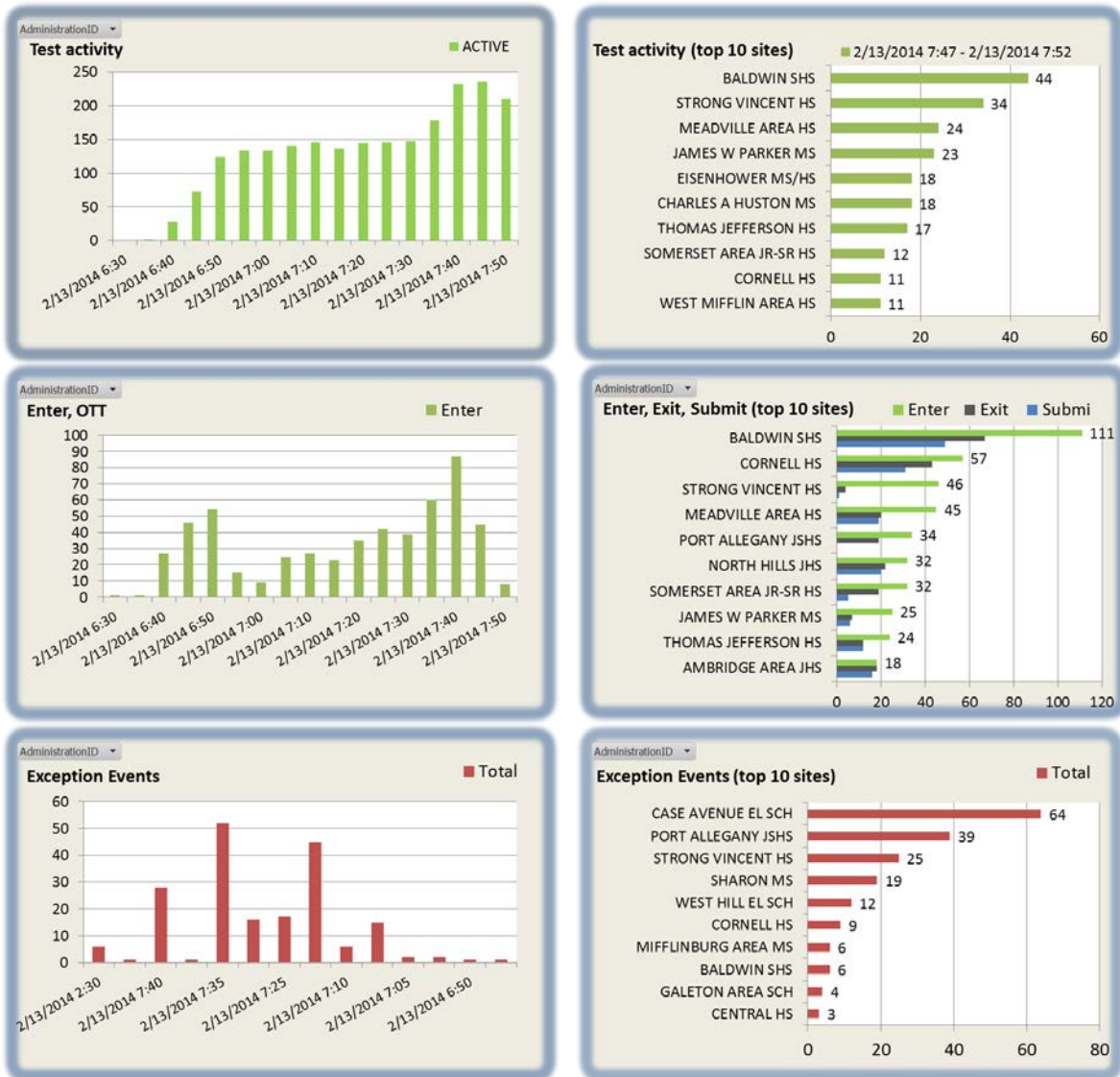
DRC actively monitors all production infrastructure and responds immediately to any issues. Network and server host status are monitored through multiple channels. DRC monitors web system availability 24 hours a day, and is notified immediately about availability or performance issues within the production environment. Technical support staff are available 24 hours a day, 7 days a week via an on-call notification system.

Online Testing System Monitoring

DRC's Level 2 support staff monitors statewide online testing activity during the testing window, looking for unusual activity. Any unusual activity is immediately researched and corrective action is taken when deemed necessary. In cases where DRC detects unusual testing activity for a school, DRC's customer service team will attempt to reach out to the district/school to see if assistance is needed to resolve technical issues they may be encountering during testing. **DRC's online testing clients appreciate our personalized approach to monitoring testing activity at the school level, and proactively reaching out to schools who may need assistance.**

Shown on the following page is an example of the Test Monitoring Dashboard used by DRC. The dashboard provides statewide and school testing activity in real time. In contrast to the Program Dashboard intended for PDE use (see *Subheading 4.F.7.d., Online Testing Status and Statistics; Online Testing Program Dashboard*), the Test Monitoring Dashboard is an internal tool used by DRC's Level 2 technical support staff to continually monitor testing on the ground, so that we can quickly reach out to schools when needed.

DRC Test Monitoring Dashboard for Level 2 Technical Support Staff



System Status Updates

DRC’s System Status page provides information to state and district staff on the operational status of our online systems. The System Status page is linked from the eDIRECT portal and can be accessed at any time to view the current status of online systems as well as view updates and announcements. A sample System Status page for another DRC client is shown on the following page. We would be pleased to work with PDE to activate the System Status page for Pennsylvania.

Sample System Status Page

home > system status

Michigan Online System Status

| System | Status | Message |
|-------------|----------------|---------|
| eDIRECT | Fully Operable | |
| DRC INSIGHT | Fully Operable | |

Contact Us
Call DRC Customer Support
1-877-560-8378
Email DRC Customer Support
MISupport@datarecognitioncorp.com

Related Links
mi.drceirect.com/default.aspx
www.michigan.gov/mde

DATA RECOGNITION
DRC
CORPORATION | [DRC Website](#) | [Privacy Policy](#) | [Trademarks](#) | Copyright © 2015 Data Recognition Corporation. All rights reserved.

Disaster Prevention and Recovery

DRC has developed and implemented standardized back-up and recovery systems for our business data. This includes regular back-up of data, reports, files, and systems. In addition, we have disaster recovery plans in place for recovering data in case of a physical disaster (such as fire or tornado) or a hardware/software failure in our systems.

DRC’s disaster prevention and recovery procedures deliver contingency plans in case of emergency. Our clients can feel confident about the safety of assessment data, knowing it is protected by industry best practices for data center facilities, technology infrastructure, and security practices.

Safeguards for System Hardware

DRC has multiple safeguards in place to protect system hardware software and to ensure that DRC’s computing environment, including servers and communications hardware, deliver high availability and performance.

- DRC’s web-based systems include redundant web, application, and database servers.
- Servers utilize load-sharing, virtualization to deliver scalability and performance.
- Data is protected by utilizing RAID (Redundant Array of Independent Disks) subsystems to minimize the effect of a failed disk.
- DRC’s servers are housed in data centers which are constructed of concrete floors, walls, and ceilings and are fully climate-controlled environments. The data centers meet industry standards and best practices for climate control, fire suppression, power and cooling as well as for physical security.
- Access to the data centers is controlled through a card access system and is restricted to a limited number of authorized technology support staff only. A log is maintained documenting each time a data center is entered, by whom, and for what purpose.
- In the event of a disaster at either location, the other location can take over full production operations.
- DRC uses storage area network (SAN) devices for maximum speed, flexibility, and redundancy in our data storage solution. Servers are connected to the SAN to ensure minimum interruptions due to hardware failures. The SAN facilitates disk space reallocation to provide space for applications or servers as needed.
- Both server and network hardware will continue to function without interruption if the utility power is disrupted. The servers use load-sharing, virtualization, and redundant power supplies and implement RAID (Redundant Array of Independent Disks) subsystems to minimize the effect of a failed disk. The data centers all have Uninterruptible Power Supply (UPS) systems and backup diesel generators. The diesel generators are testing monthly.

Please see *Subheading 4.E.7., Test Security; Back-up and Disaster Recovery* for more information on our hardware backup and recovery processes.

Redundancy Benefits of a Datacenter Co-location Site

DRC INSIGHT is hosted on DRC hardware installed at a datacenter co-location site. The co-location site is a tier 3 hosting facility which provides multiple disaster recovery benefits:

- **Internet Connectivity Redundancy.** DRC leverages fully redundant Internet access with a third standby connection available as required. Internet access has never been interrupted.

- **Power Redundancy.** The co-location site is connected to two separate power grids, and has redundant diesel generators and redundant UPS battery systems.
- **Cooling Redundancy.** Cooling redundancy comes in the form of multiple Liebert cooling units; all far under maximum capacity to handle multiple cooling unit failures.

Using the co-location datacenter also allows us to create a redundant network for the DRC INSIGHT application in case of a networking hardware failure. This redundancy of hardware between DRC's data center and the co-location data center helps to ensure that the user experience with DRC INSIGHT is uninterrupted.

Response Caching for Interruptions/Loss of Connectivity during Testing

The impact of Internet interruptions or loss of connectivity at the school or district level is minimized through the use of DRC's TSM for content and response caching. In the event that a school experiences an unexpected interruption or outage with their Internet service, the caching service ensures that a student can continue testing if Internet or network issues occur. If the connection with DRC's servers is lost during testing, the student responses are encrypted and sent to the TSM for the duration of the test; responses are then sent to DRC servers when connectivity is restored.

Please see the previous *Subheading 4.F.2.c., System Specifications* for more information on DRC's TSM caching capabilities.

Contingency Plans

The first line of defense for protecting IT systems is to prevent, or guard against, the possibility of system interruption or failure to begin with. DRC's prevention measures include comprehensive system pre-testing, robust system monitoring, data backup and redundancy measures, and response caching, as described previously in this proposal. DRC also recognizes that IT management best practices should include contingency plans to address issues that may arise in spite of preventative planning.

DRC will work closely with PDE to develop contingency plans for situations that may arise during testing. As requested in the RFP, this includes plans to address system inoperability for some or all schools during the testing window, as well as issues that result from infrastructure and hardware challenges in schools and districts. Below, we provide some initial recommendations.

- **Targeted technology readiness planning:** Technology readiness in schools is a critical component of a successful online testing experience. DRC is ready to provide a comprehensive technology readiness program, including trainings, diagnostic tools, and reports that help schools and districts ensure they are ready for testing (described fully in *Subheading*

4.F.1.c., *Evaluation of Readiness for Online Assessment*). These tools will be especially helpful for schools and districts to detect infrastructure or hardware issues or bottlenecks before testing starts. DRC can work with PDE to target such schools or districts that may need more in-depth readiness planning prior to testing.

- **Changes to the testing window:** In cases where certain schools or districts may need more time to complete testing, DRC can work with PDE to accommodate changes in the testing schedule to allow more time for sites that need it. For example, sites with a low device-to-student ratio or sites with low available bandwidth may need additional time in the testing window to complete testing.
- **Overage of paper materials:** In the unlikely event that the system is inoperable and a scheduling accommodation cannot be made, DRC can work with PDE to explore the option of sending overage paper materials, so that affected students could test on paper instead of online.

In our current contract with Pennsylvania, DRC has demonstrated our commitment to respond quickly and flexibly to unexpected situations in order to mitigate the impact on testing. Some examples include:

- DRC worked directly with a high school that was experiencing difficulties with testing on their wireless network. After an extensive investigation determined that the problem did not arise from DRC systems, we sent several technology experts, including a CISCO expert, to the high school to install monitoring equipment on their network, which helped them identify the source of the problem.
- Due to the numerous snowfalls during the winter of 2013–2014, Pennsylvania schools experienced an unusual amount of delays and school closures. This impacted student learning opportunities and school schedules. DRC worked with PDE to accommodate changes in the testing schedule for the entire Commonwealth as well as additional schedules for specific LEAs.
- DRC worked directly with a school that was experiencing difficulties with testing. DRC’s Tier 1 and Tier 2 support staff conferenced with the school’s technology staff and determined that the problem did not arise from DRC systems. After lengthy discussions on how the data was being sent between DRC and the LEA, it was discovered that test monitor software, installed on a teacher’s profile and used to monitor student’s everyday work, was interfering with students’ responses. Once this monitoring software was removed, students were able to successfully complete testing.

We look forward to working with PDE to finalize our contingency plans for the Pennsylvania online assessments.

End-to-End Test Security

DRC guarantees that we will safeguard assessment data, follow best practices, and minimize risks. We have proven quality controls and security procedures integrated throughout all of our operational processes, including end-to-end data protections for systems that process, store, and transfer data to and from external users. DRC's online testing system provides end-to-end services ranging from student data upload to test administration to transmission of student responses to reporting. Throughout all points in the data transfer process—from the user, across the Internet, to DRC's databases and back—data are secured through leading encryption technologies and security measures.

Component-to-Component Security

DRC's online testing solution incorporates multiple systems, including the DRC IDEAS item banking system, the DRC eDIRECT administrative system, and the DRC INSIGHT test engine. All of DRC's systems are securely hosted and maintained in DRC data centers on DRC hardware; require user authentication to access; and employ secure data transfer protocols for the sharing of data—both among system components and between system components and outside users.

User Authentication and Authorization

Secure Student Access

Students are required to provide a valid username and password to access the system. The test administrator will provide each student with a Student Test Login Ticket, which contains a student username and a unique, pre-generated password. Passwords are generated by combining a common four-letter word (from a pre-specified pool) with a random four-digit number. These tickets are generated and printed from the eDIRECT system. A separate, unique password is generated for each assessment, ensuring that students can only access the content designated for that test. Some assessments have multiple sections, and the test ticket is valid for all sections of that assessment and cannot be reused for other tests. As an additional security measure, upon logging in, a Student Verification Page prompts the user to verify their profile information, including any assigned accommodations, prior to initiating the test.

Because login tickets are secure material, DRC recommends they be printed as close to the date of testing as possible and kept secure until given to the test administrator for distribution.

Secure Administrator Access

The eDIRECT administrative system is controlled through a variety of security levels to ensure a user can only view or edit data for which he/she is authorized. Users must login with a pre-determined unique user ID and password to gain access to the system. High-level administrator accounts control the permissions and level of access for each sub-user.

To promote the security and confidentiality of student data, new eDIRECT users are prompted to review and agree to a security and confidentiality agreement upon logging into the system for the first time. The user agrees not to disclose any student information from the system to anyone other than a state, district, or school official as defined by the Family Educational Rights and Privacy Act of 1974 (FERPA).

As an additional security feature, if a newly created user account is not activated by the user within a certain timeframe, the account will automatically expire and must be manually reset. In addition, users will automatically be locked out of their accounts after a pre-set number of failed login attempts, and will be prompted to contact DRC's Customer Service Team to re-access the account.

Assessment Item-level Security

The following features of the DRC INSIGHT testing interface ensure that test items and content are not compromised during testing.

- **Desktop lockdown**—During testing, DRC INSIGHT completely locks down student computers, preventing copying, pasting, or printing of screen images. The system also blocks access to other applications and prevents interference from automatic software processes such as virus scans. Further, dual monitor usage will automatically inactivate the second monitor while in testing mode.
- **Prevention of test submission from multiple machines**—This feature prohibits two students from using the same login at the same time. When more than one login is detected, a warning message will appear and the student is directed to ask for assistance.
- **Pause feature**—Students may pause testing if a short break is needed (e.g., restroom break). Once a student clicks the Pause button, the current test item will be removed from the screen to ensure the security of the question and answer. If a test is paused and not resumed within the same day, the test is locked and special intervention is required to unlock the test so the student can resume the test.
- **Inactivity timeout feature**—The system will time-out and close the test after a defined period of inactivity (e.g., no mouse movement or typing for 20 minutes). The length of time is configurable. The application will display an inactivity count-down clock and timeout warning message prior to logging the student out of the test and closing the application.

Student Response and Score Data Security

In high-stakes assessment, security of test content and student data is of paramount importance. Throughout all data transfers—from the student computer, across the Internet, to DRC's databases and back—test content and student responses are secured through a combination of methods, including:

- Use of kiosk mode to “lock down” the student testing device
- Encryption technologies
- Secure Sockets Layer (SSL) protocol through Hypertext Transfer Protocol Secure (HTTPS)

Test content is encrypted at the host server, and remains encrypted throughout all network transmissions; content is decrypted only once the student login is validated. Decrypted test content on the student workstation is stored only in memory during each test session. Once the session is ended (the test is completed or the student logs out), computer memory is purged to ensure security of test content is maintained.

When the DRC caching service is used, test content is stored locally within a school’s or district’s network. All data that resides in the TSM’s caching service is encrypted and is not decrypted until it reaches the student’s computer.

Data Storage

Throughout all data processing steps, DRC ensures that client data remains confidential and secure. We will securely store all registration data; school and district personnel information; and student information, including student performance data for online testing. Electronic images and data, including scoring files, will be securely stored according to a retention schedule determined by PDE. The archival system will allow efficient and easy retrieval of student testing data. All Pennsylvania data will be stored in a secure database environment, and we will incorporate rigorous quality assurance activities throughout registration, delivery, scoring, and reporting of tests to ensure the highest level of data quality, integrity, and security.

4.F.10.b. and 4.F.10.c. Cyber Security

DRC has carefully reviewed Pennsylvania’s policies and standards pertaining to information technology, including all security standards. DRC agrees to maintain network system and application security that conform to current security standards. We do not have any exceptions to the policies and standards to identify in our proposal.

DRC is known within the educational assessment community for our unwavering commitment to meeting the highest standards for quality and security. With more than 35 years of experience managing confidential client data, we have fine-tuned our security systems, disaster-recovery processes, and data security and confidentiality procedures to be the best in the industry. As a process-focused organization, we continually seek improvement in all of our quality and security practices. **We view security as more than just an IT process. At DRC, security is an integral DRC program and an overall business approach.**

DRC's online systems have all been designed to provide the level of security demanded by today's high-stakes assessment programs. With the advent of online testing, states are particularly concerned about how we protect student data (a requirement under the federal Family Educational Rights and Privacy Act). To assure clients of our commitment to information security, **DRC's information security policies and procedures are based on the National Institute of Standards and Technology (NIST) criteria (NIST Standard 800-53)**. This is a nationally recognized standard for information security practices. In addition, DRC is actively configuring our systems and processes to comply with the **ISO 27001 information security system standards**. ISO 27001 is the most internationally recognized information security standard in the world. Plans are in place to achieve formal, certified compliance towards ISO 27001 in 2015.

In addition to our excellent security protocols for statewide assessment programs, DRC is a full-service research partner for the Federal Government. We are well known among Federal agencies as a low-risk, high-quality partner, as evidenced by the fact that clients such as the U.S. Department of Defense, U.S. Department of Veterans Affairs, Defense Health Agency, and the Internal Revenue Service trust us to complete some of their most important research programs and protect highly sensitive client data.

- For our work with the U.S. Department of Defense (DoD), DRC's Survey Services' systems are compliant with the National Institute of Standards and Technology (NIST) Risk Management Framework (RMF), and we manage our Information Systems under the NIST RMF policies and procedures. NIST RMF compliance encompasses a stringent set of security requirements in order to process and store DoD data. DRC is one of only a few full-service survey research firms with this high-level of certification.
- For the Defense Finance Accounting Service (DFAS), DRC prints and ships financial documents including W-2 Forms, 1099 Forms, and Account Statements, and Pay Visibility Statements for active and retired military personnel living in the U.S. and abroad. DRC's work for DFAS requires exceptional commitment to ensuring data security. Shipping addresses are highly confidential because at times they contain the locations of Navy ships. DRC has met all of the security requirements for this program and client.
- DRC prints customer satisfaction surveys for the Internal Revenue Service (IRS). The data files for printing and mailing contain tax return information and personally identifiable information (PII). DRC has been audited and approved by the IRS for meeting the stringent security requirements of this contract.
- DRC is also compliant with Health Insurance Portability and Accountability Act (HIPAA) security requirements for work with our healthcare clients.

DRC will apply our extensive expertise and experience in meeting the most stringent security requirements for Pennsylvania. Our industry-leading security credentials are summarized below.

DRC's Security Standards and Certifications

- Adherence to federal Family Educational Rights and Privacy Act (FERPA) regulations for the security and confidentiality of student data
- Adherence to National Institute of Standards and Technology (NIST) Standard 800-53
- Compliance with ISO 27001 information security system standards (formal certification in progress for 2015)
- Compliance with NIST RMF for work with the U.S. Department of Defense
- Annual Federal Information Security Management Act (FISMA) audits for printing and distribution services contract with the Internal Revenue Service
- Compliance with Health Insurance Portability and Accountability Act (HIPAA) security requirements for contracts with healthcare clients

DRC's robust security policies and industry-leading certifications have been in place for many years, and we continue to raise the bar. Below, we detail specific security assurances for the Pennsylvania assessments.

Security of Personally Identifiable Information (PII)

DRC has the ability to isolate each client's data from all other clients' data to ensure privacy is maintained at all times. In particular, DRC realizes the importance of keeping Personally Identifiable Information (PII) data secure at all times. We follow stringent procedures to protect PII data and frequently verify these procedures to confirm adherence. Electronic databases are secured from "hacking" through the use of robust hardware and software. Data that contains PII information is only transferred using client-approved, secure, encrypted methods. DRC's full-time IT Security Administrator and IT Security Team focus on keeping client data secure and auditing current security processes and practices to ensure they are being implemented and followed.

Online Testing System Security

DRC recognizes that ensuring security is of utmost importance in maintaining the technical quality, perceived fairness, and integrity of any testing program. We have integrated security features and procedures throughout the DRC INSIGHT system to ensure the highest level of security for all aspects of the Pennsylvania assessments. Our security assurances apply in both high-capacity and low-capacity settings, meaning that security is ensured regardless of a school's or district's network capacity.

An overview of DRC’s online testing security features follows. More information on each of these features was provided previously under *Subheading 4.F.10., System Reliability and Mitigation Experience; End-to-End Test Security.*

- **Secure Access:** Using a secure test ticketing process, students must provide a valid username and password to access the online test. Upon logging in, students are asked to verify their profile information prior to initiating the test. Administrative users must also provide a valid username and password in order to access student information in the eDIRECT system. Access to data in eDIRECT is controlled through a variety of security levels to ensure a user can only view or edit data for which he/she is authorized.
- **Secure Test Delivery:** DRC’s testing interface ensures that test items and content are not compromised during testing:
 - For desktop computers and laptops, the system uses “kiosk mode” to lock down student testing devices and prevent copying, pasting, or printing of screen images. The system also blocks access to other applications and prevents interference from automatic software processes such as virus scans. Dual monitor usage will automatically inactivate the second monitor while in testing mode.
 - For iPads, our system uses the “Guided Access” feature to deliver tests securely. Features such as spell check, auto-correct, auto-complete, and auto-capitalization are disabled through the device settings.
 - For Chromebooks, our system runs in Single App Kiosk Mode to lock down the device properly.
 - For Android devices, DRC is actively working with Google as they develop a secure testing environment. Our system will run in this secure deployment to lock down the device properly.
 - A “Pause” button allows students to pause testing if a short break is needed. When paused, the test item is removed from the screen to ensure the security of the question and answer.
 - The system automatically times out and closes the test after a defined period of inactivity (e.g., no mouse movement or typing for 20 minutes)
- **Data Transfer Security:** DRC uses multiple methods to ensure secure data transfer, including encryption technologies and Secure Sockets Layer (SSL) protocol through Hypertext Transfer Protocol Secure (HTTPS). Test content is encrypted at the host server, and remains encrypted throughout all network transmissions; content is decrypted only once the student login is validated. Decrypted test content on the student workstation is stored only in memory, which is purged once the test session has ended.

- **Procedural Security:** DRC provides training and documentation to school and district test coordinators and test administrators to ensure consistent security measures are implemented and followed during online testing. Standardized testing procedures ensure all students are tested under similar conditions in all classrooms.

Additional guidance on operating system, network, web browser, and virtual computing security can be found under *Subheadings 4.F.2.c. through 4.F.2.h.*

Monitoring System Behavior for Security Anomalies

DRC uses a **test monitoring dashboard** that provides a real-time view into statewide and school testing activity, allowing us to monitor online activity during the testing window and look for unusual events or patterns. Any unusual activity is immediately researched and corrective action is taken when deemed necessary. DRC also has the ability to monitor all of our data centers and investigate network/server issues remotely through the various tools that we have in place. **We monitor our systems 24 hours a day**, and are notified immediately about performance issues with any web application or web database server. Please see *Subheading 4.F.10.a., Information Technology; Metrics for System Performance* for more information.

In addition, DRC provides online testing status reports in eDIRECT that allow district and state users to track testing activity for a given test administration. Under the current program, we provide Pennsylvania with an **Excessive Logins Report** that identifies students who have logged in more than two times to a specific module or section of an online assessment, as well as a **Daily Student Resets Report** that identifies any test tickets that have been unlocked/reset. For the new contract, we are pleased to offer several additional status reports for Pennsylvania. Please see *Subheading 4.F.7.d., Online Testing Status and Statistics; Status Reports and Online Testing Statistics* for a complete description of these reports.

Preventing Infiltration

In addition to the online testing security measures described above, DRC utilizes multiple security controls that relate to our hardware, data, and network technologies. Highlights of our Information Technology (IT) security controls include:

- Full-time IT Security Administrator, who oversees implementation and operational aspects of technology security.
- Data centers are constructed of concrete floors, walls, and ceilings and meet industry standards and best practices for climate control, fire suppression, power and cooling as well as for physical security. Access is controlled through a card access system, restricted to a limited number of authorized technology support staff.

- Full array of security technologies, including audit trails, firewalls, intrusion protection, vulnerability scanning, anti-virus, source-code security, Secure Sockets Layer (SSL), and monitoring.
- Penetration testing to identify potential vulnerabilities and solutions in order to reduce or eliminate the vulnerabilities before they can be exploited.
- Passwords—which must be changed regularly—are required for all employees to access any data. Data and electronic files accessible only to authorized personnel.

DRC also has backup and disaster recovery procedures in place for the safeguarding of data, reports, files, and web-based systems. Please see *Subheading 4.E.7., Test Security* for a complete description of DRC's IT security measures and disaster recovery measures. In addition, a copy of DRC's Emergency Response Management Plan (Executive Summary) has been provided in *Volume IV; Appendix N*.

4.F.10.d. Tracking and Managing System Errors and Defects

During the software development process, DRC's Information System team maintains careful controls on their work through use of industry-standard work management and defect tracking processes. Requests for new features are documented in detail in our work management system. This system not only provides our development and testing teams a detailed description of the work to be done, it also tracks the status of that work and the associated code that is added or changed in response to that work, allowing us a clear and comprehensive view of all work being completed. When defects are uncovered during the software testing, a new work item is created detailing the defect and steps to recreate it. Because the defect is created in the same system that manages all other work items, we can ensure that all issues are carefully managed and addressed. The Information Systems team coordinates issue review meetings with our Education Project Management and Test Development partner teams. These reviews allow us to determine the priority of resolution for issues, allowing us to focus on the most critical issues.

Once the system is in production, issues are recorded through DRC's Service Management tool as incidents. Incidents are logged into the system with a description of the issue based on the symptoms described by the client. The incident is assigned a priority based on impact and urgency of the issue as described within DRC's standards. DRC's Level 2 Support will search the support knowledgebase for solutions and/or attempt to duplicate the issue. Troubleshooting steps are recorded within the incident. At times, Level 2 Support will conference with the client in an effort to collect more information, troubleshoot, and reach resolution. If resolution is known, the incident will be routed back to Level 1 for resolution confirmation and incident closure. In situations where Level 2 cannot resolve the issue, they will engage Level 3 resources to resolve the issue.

In situations where an incident is classified as a Critical priority, a quick response team will be called. This is a team of cross-functional Level 2, Level 3 and senior leadership resources, assembled to efficiently diagnose, troubleshoot and resolve critical incidents.

4.F.10.e. Security Plan and Security Audits

DRC recognizes the importance of documenting our security practices so that all parties have a shared understanding of the processes in place for Pennsylvania's assessment program. We are also committed to performing regular, third-party audits to ensure our security processes are properly and consistently implemented and meet industry best practices. We will continue to work with PDE under the new contract to provide a comprehensive Pennsylvania Security Plan and conduct formal security audits using a third-party auditor.

Security Plan

DRC worked with PDE in 2012 to develop a comprehensive security plan for Pennsylvania assessments, which described best practice security processes for the following:

- Test and Item Design
- Test Development and Maintenance
- Test Publication
- Test Administration
- Test Scores and Results
- Physical Security
- Information Security
- Back-up and Disaster Recovery

We would be pleased to continue providing a similar security plan to PDE under the new contract. We will work with PDE to update and maintain the security plan as often as needed.

Security Audits

To assure clients of our commitment to information security, DRC is annually audited against the National Institute of Standards and Technology (NIST) security Standard 800-53. DRC has engaged an independent, third-party Information Security firm to perform the annual audits of our environment. In our recent audit, the third-party firm conducted penetration tests that attempted to gain unauthorized access to our network over a multiple-day period. No audit findings were identified in these recent penetration tests. DRC will continue to perform regular third-party audits throughout the life of the contract.

4.F.10.f. Service Level Expectations

DRC has reviewed Appendix J: Service Level Agreements of the RFP. Per page 67 of the RFP, Offerors are allowed to propose modifications to the Service Level Agreements. Please see *Volume IV; Appendix T, Service Level Agreements* for DRC's proposed modifications.

4.F.11. ONLINE ASSESSMENT CHALLENGES AND REMEDIES

4.F.11.a. Past Issues/Challenges/Problems/Mistakes

Below, DRC has provided information on the issues that have occurred with online assessment administrations over the past five years.

Nebraska State Accountability – Writing

- In 2014, a connectivity error message occurred randomly statewide. When students logged in again, they resumed testing. DRC modified engine code to prevent reoccurrence.
- A disappearing/missing student responses issue affected 496 students in 2014. Students reviewed their responses and made modifications. DRC modified engine code to quickly resolve this issue.
- A system outage of 40 minutes occurred in 2014, affecting approximately 1,000 students. The database was unblocked and testing resumed after 40 minutes. DRC immediately modified processes to prevent future incidents.

Pennsylvania Voluntary Model Curriculum, Classroom Diagnostic Tools (CDT), and Keystone Exams

- In 2013, a rejected item was presented in the CDT, affecting 809 students. The item was removed from completed tests and tests were rescored. DRC deployed new software and additional quality steps to prevent future occurrences.
- Missing diagnostic scores/incorrect scores (in CDT) affected 263 students in 2013. DRC re-ran CDT results for impacted students. DRC modified software and added additional quality process steps.
- A DRC INSIGHT service disruption for 90 minutes occurred during the Spring 2015 Keystone Exams testing window. The root cause was a database field that had reached the maximum allowed value. DRC adjusted the database field to allow for a significantly greater number of response records. We performed a complete review of the Pennsylvania DRC INSIGHT database to ensure that no other fields were at risk. DRC also added monitoring steps to match data field thresholds.

South Carolina End-of-Course Examination Program

- In 2013, incorrect items were presented in Algebra forms due to mathematics symbol conversion corruption, affecting 584 students. DRC

updated the test items with the correct mathematics symbols, republished the online test forms, rescored tests for affected students, and updated letter grades reported on Preliminary Score Rosters. To prevent reoccurrence, DRC added quality steps and enhanced the online test forms production review process.

Washington Measurements of Student Progress

- In 2013, the Equation Builder tool was not provided for one 4th grade math item, affecting 28,000 students. Students could use keyboard symbols (/) or type the text “divided by” to explain their work. DRC added tools verification to forms review for both internal and client reviews to prevent reoccurrence.
- The Equation Builder tool was missing square root and exponent tools in 8th grade math form, affecting 41,000 students in Spring 2013. The item was removed from scoring. DRC added tools verification to forms review for both internal and client reviews to prevent future issues.

4.F.11.b. Preventative Steps

DRC takes our commitment to quality control and accuracy very seriously. We have never had a failed project or contract terminated for default, and there are no claims against DRC relating to our performance.

We can assure PDE that the noted issues represent unique situations that occasionally occur over the course of the testing process, and do not reflect on DRC’s ability to meet our contractual obligations and ultimately deliver accurate, timely results for high-stakes assessments.

With each incident noted above, DRC immediately investigated the cause, corrected the issue, and took measures to prevent future occurrences.

Please see *Section 4, Prior Experience* for more information on our past performance, including references from our current clients.

4.F.12. COMPUTER ADAPTIVE TESTS (CAT) SYSTEM FOR THE CDT

DRC has collaborated with the Pennsylvania Department of Education in the successful design and full implementation of the CAT algorithm and associated tools supporting the CDT program. These tools are fully integrated and aligned with the Standards Aligned System (SAS) and enable educators to identify students’ academic strengths and areas of need as well as provide links to classroom resources.

The CDTs feature a number of tests. Tests in Mathematics, Algebra I, Geometry, and Algebra II have been available since October 2010 for students in grades 6 and above. Tests in Reading/Literature, Science, Biology, and Chemistry have been available since April 2011 for students in grades 6 and above. Tests in Writing /English Composition have been available since October 2011 for

students in grades 6 and above. Tests in Mathematics, Reading, Science, and Writing have been available since April 2014 for students in grades 3 through 5.

This section details the operational CDT test designs and configurations of the CAT algorithm as it currently operates and as it was developed collaboratively by DRC, PDE staff, and PDE consultants, including the CDT Core Team and educators throughout the Commonwealth of Pennsylvania. The test design elements include the number of diagnostic categories, the number of operational items to administer per diagnostic category, and the number of embedded field test items. Operational CAT algorithm elements include entry point, item selection criteria, test navigation, and termination.

4.f.12.a. CAT Functionality and Algorithm

CDT administration requires the specification of an entry point for the CAT algorithm to begin selecting items to be administered. All CDTs other than Reading Lower Grades (for students in grades 3 through 5) and Reading/Literature begin with a small “locator” section, in which one or two items per diagnostic category are administered. The order of the diagnostic categories is random. The two CDTs in the reading content area are slightly different because they are passage-based. Those, too, have a small “locator” section, but they may not contain one or two items for each diagnostic category because not all passages have an item for each diagnostic category.

DRC INSIGHT’s CAT algorithm is designed to administer items targeted for the individual student based on performance. With no prior information about a student, the starting point in each diagnostic category is an item of average difficulty. For CDT tests that are not course-specific (Mathematics Lower Grades, Mathematics, Science Lower Grades, Science, Reading Lower Grades, Reading/Literature, Writing Lower Grades, and Writing/English Composition), the student’s grade is considered in selecting an item of average difficulty. For CDT tests that are course-specific (Algebra I, Geometry, Algebra II, Biology, and Chemistry), an average item from the course will be selected regardless of the student’s grade.

If a student has previously taken the CDT, the prior CDT scores are used to give the CAT algorithm a “head start.” In this case, the first one or two items in each diagnostic category are selected to match the characteristics of the prior information rather than an average item. For example, if a student previously took the CDT Mathematics test and scored very high in “Numbers and Operations,” then the first item selected in that diagnostic category will be more difficult than the grade-level average.

The CAT algorithm includes a randomization component when selecting items to control item exposure. That is, one item is selected from among a set of items that are near the targeted item difficulty. This is especially important at the beginning of the CDT when no prior information is available. Randomization of items and diagnostic categories ensure that students will not see the same set of items in the same order even when all of the students are assigned items of average difficulty.

To ensure that the algorithm operates as intended, DRC has developed a DRC INSIGHT Simulation Tool that allows us to observe and evaluate “what if” scenarios. In this manner, there are no surprises, and, perhaps most important, DRC is able to present options to PDE staff as a means to zero in on maximum-benefit solutions.

4.f.12.b. Item Selection Criteria

Rasch Model

Once the initial set of items has been administered, the CAT algorithm is designed to administer items targeted for the individual student based on performance. In targeting items, the CAT algorithm uses Rasch ability estimates from the current test session and considers a number of factors, including test blueprint, response probability, item pool refinement, and passage-related concerns. Each of these is discussed in detail on the following pages.

CDT item pools are scaled using the Rasch model (Rasch, 1960) and are vertically linked across grades and courses within a content area. The CAT algorithm has access to all item parameters in the item pool. After each item response, Rasch ability estimates and standard errors are calculated via maximum likelihood estimation (MLE) for the total test and each diagnostic category. In the case of zero (all items incorrect) and perfect (all items correct) scores, a correction factor is applied before computing the relevant maximum likelihood estimates.

After the locator section of the CDT, but before a student has taken many items in each diagnostic category, the total Rasch ability estimate is used in item selection. This is because total and diagnostic category ability estimates tend to be highly correlated and the total estimate does not change as dramatically as diagnostic category estimates given one additional item. Using the total estimate at this point prevents students from experiencing extreme fluctuations in the difficulty of items.

While use of the total Rasch ability estimate makes sense early in the test, the goal of the CDT is to be diagnostic, and some student’s exhibit clear strengths and areas of need in different diagnostic categories. Therefore, after four or five items have been administered in a diagnostic category, the corresponding Rasch ability estimate for that diagnostic category is used in item selection. This ensures, for example, that a student struggling in “Biological Sciences” while at the same time excelling in “Earth and Space Sciences” will be administered easier “Biological Sciences” items and more challenging “Earth and Space Sciences” items.

Test Blueprint/Content Matching: DRC INSIGHT’s CAT algorithm closely resembles a modified constrained CAT (MCCAT) design (Leung, Chang, & Hau, 2003). The general idea is that the CAT algorithm is configured with an upper and lower bound that specifies the minimum and maximum number of items that will be administered to students for both total and diagnostic categories. In other words, both content distribution and statistical information are taken into account.

Response Probability: DRC INSIGHT’s CAT algorithm selects items where the student has a defined probability of answering correctly; this is based on the Rasch ability estimate and the item’s difficulty. The most efficient way to run a CAT is to select items where this response probability (RP) is 0.5. That is, select items where the student has a 50% chance of getting the item correct. This RP produces the smallest standard error for any given number of items. While an RP of 0.5 is the most efficient way to run a CAT, the RP is a configurable element within the DRC INSIGHT system. Currently, for CDTs designed for students in grade 6 and above, the RP is set at 0.5. This is based on the desire for low standard errors at the diagnostic category level and the grade level of students testing. As part of the CDT training, students are told that the test is computer adaptive and designed to challenge them. For CDTs designed for students in grades 3 through 5, the RP is set at 0.65. This RP results in higher standard errors for the same number of items. However, there was concern that younger students may not have much experience with tests designed to be so challenging and could conceivably give up on a test that is perceived to be “too hard.”

Item Pool Refinement: The CAT algorithm has configurable elements that allow for refinement of the item pool used in item selection. The two configurable elements are:

- **Restrict pool**—The ability to restrict the available item pool by grade/course at various points in the test. For example, Chemistry items are not available for the first 20 items of a CDT Science test.
- **Favor items**—The ability to favor items that are close to the student’s grade when evaluating items near a student’s estimated score. For example, if a student is in grade 8 and the item selection routine finds appropriate items (in terms of difficulty) in grades 4, 5, 6, 7, and 8, item selection can favor items at or close to grade 8. It is possible that no items near a student’s grade are appropriate in terms of difficulty. In such a case, the CAT algorithm selects items further away from the student’s grade, but that are appropriate based on item difficulty.

The difference between restricting the pool and favoring items is that when the pool is restricted, some items may NOT be selected. With favoring, all non-restricted items are eligible for administration, but they are made more or less LIKELY to be selected based on their closeness to the student grade.

Passage Related Considerations: As previously mentioned, the CDTs in the reading content area are passage-based. CDT passages have between one and seven associated items. The CAT algorithm does not require that all items associated with a passage be administered. Instead, it evaluates all possible combinations of items within a passage. Item sequencing within a passage is preserved when items are presented to the student. For example, if a six-item passage is selected and items 1 and 4 are NOT administered, then the items administered in order will be 2, 3, 5, and 6.

The configurable elements of passage-based CAT include:

- **Passage minimum percent**—Define the minimum percentage of the items associated with a passage to be used. For example, if the passage minimum percent is set at 80, then the selection routine will consider combinations such as 1 of 1 (100%), 4 of 5 (80%), 5 of 6 (83%), and 6 of 6 (100%). It will not consider combinations such as 1 of 2 (50%), 3 of 4 (75%), 3 of 5 (60%), etc. Near the end of a test, the passage minimum percent constraint may be loosened in order to meet content constraints such as the number of items per diagnostic category.
- **Passage evaluation criteria**—Multiple factors are considered when evaluating and ranking each passage combination to determine the best combination to administer to a student. They include:
 - Percent of items associated with the passage used; the higher the percent, the higher the combination is ranked
 - Number of items associated with the passage used; the higher the number, the higher the combination is ranked
 - Distance between items' difficulties and the student's estimated score; the smaller the distance, the higher the combination is ranked
 - Distance between the items' grade levels and the student's grade level; the smaller the distance, the higher the combination is ranked

Different weights may be assigned to each of the factors. For example, if all of the weight is put on number of items used, then the algorithm will select the passages with the most associated items and administer all of them until the maximum number of items is reached.

Simulation Tool

DRC utilizes a comprehensive simulation tool to evaluate all content and psychometric specifications to be implemented within the CDT CAT algorithm. The simulation tool mimics an actual test administration using computer generated students with known ability levels. The simulations test the functionality of the adaptive testing system and CDT item pools across the full range of student proficiency in the following areas:

- **Test Blueprints**—An essential requirement of adaptive testing is that each test administration must meet the test blueprint and associated test specifications in order to assure the comparability of student scores. We use the simulation tool to verify that student administrations are fully aligned to the test blueprint and any other key aspects of the test specifications are implemented appropriately.
- **Measurement Error**—One of the primary advantages of adaptive testing is that student ability can be measured more effectively when test administrations are individually tailored to each student. We will confirm that the measurement error associated with each test administration matches our expectations and is consistent across the complete range of student ability.

- **Test Information**—Adaptive testing is designed to select items or sets of items, subject to a variety of content requirements and psychometric targets, tailored to each student’s ability. Our simulation tools can evaluate how effectively we were able to construct an optimal assessment for each student by comparing the point of maximum test information and the ability of each simulated student across the full range of student proficiency.
- **Recovery of True Ability**—The simulation tool is designed to mimic operational test administrations and includes simulated test administrations of “students” sampled from the full range of student ability. Because we know the true ability of the student within a simulation, we can evaluate the ability of the DRC INSIGHT testing system to produce an estimate of student ability that is close to the “true” ability of the student. Over repeated simulations, we can assess the accuracy and stability of the estimation and confirm how well the examinee ability is estimated.
- **Item Pool Evaluation**—The successful implementation of a testing program using adaptive testing is driven by the ability of the item pool to support all of the content and psychometric requirements associated with form selection. The simulation tool can be used to analyze whether the pool has sufficient depth and breadth for reporting student performance. In particular, the simulation can indicate the areas in which the pool may not have sufficient depth to meet the content requirements or psychometric targets and provide insight about where the pool should be enhanced to make it adequate for a computer-adaptive administration.

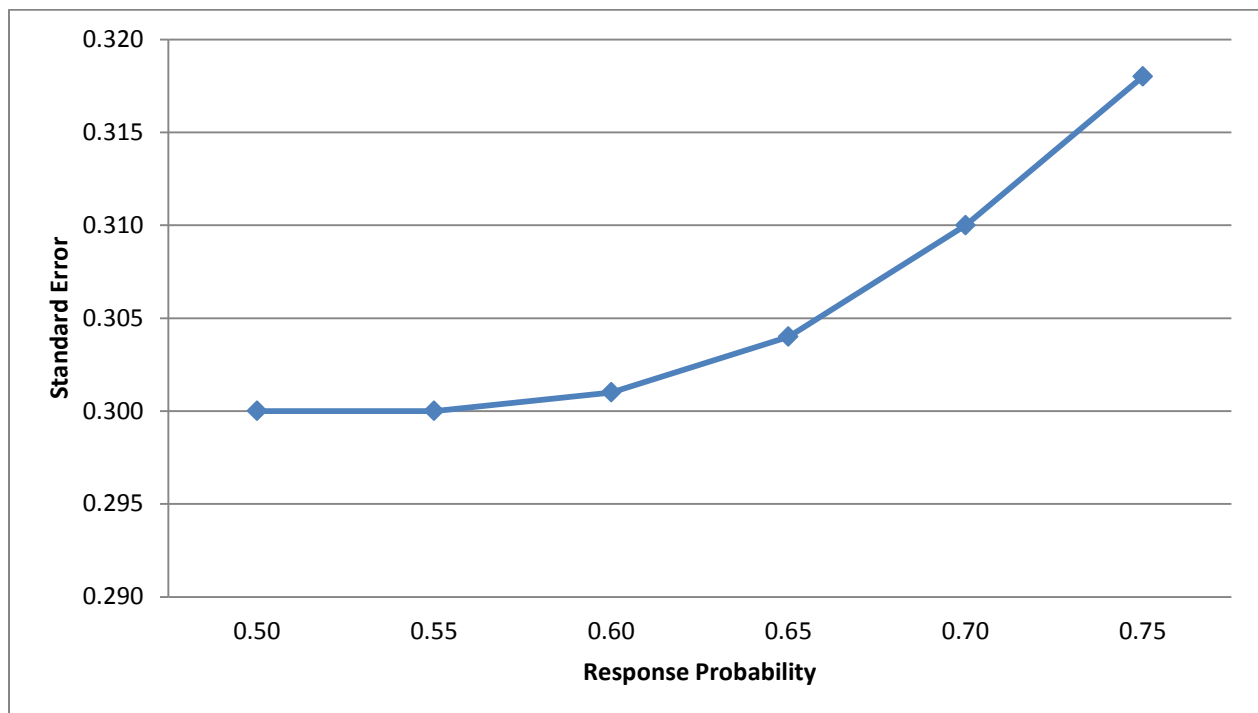
For example, before CDT tests for students in grades 3 through 5 became available in spring 2014, DRC used the simulation tool to provide PDE with information to assist in determining the final CAT configurations. The table that follows shows the average person standard errors for total test and each diagnostic category for six response probabilities (RP) in simulations of CDT Mathematics Lower Grades with 52 items. The following figures show average standard errors as a function of response probability.

**Average Standard Errors for Various Response Probabilities—
Mathematics Lower Grades**

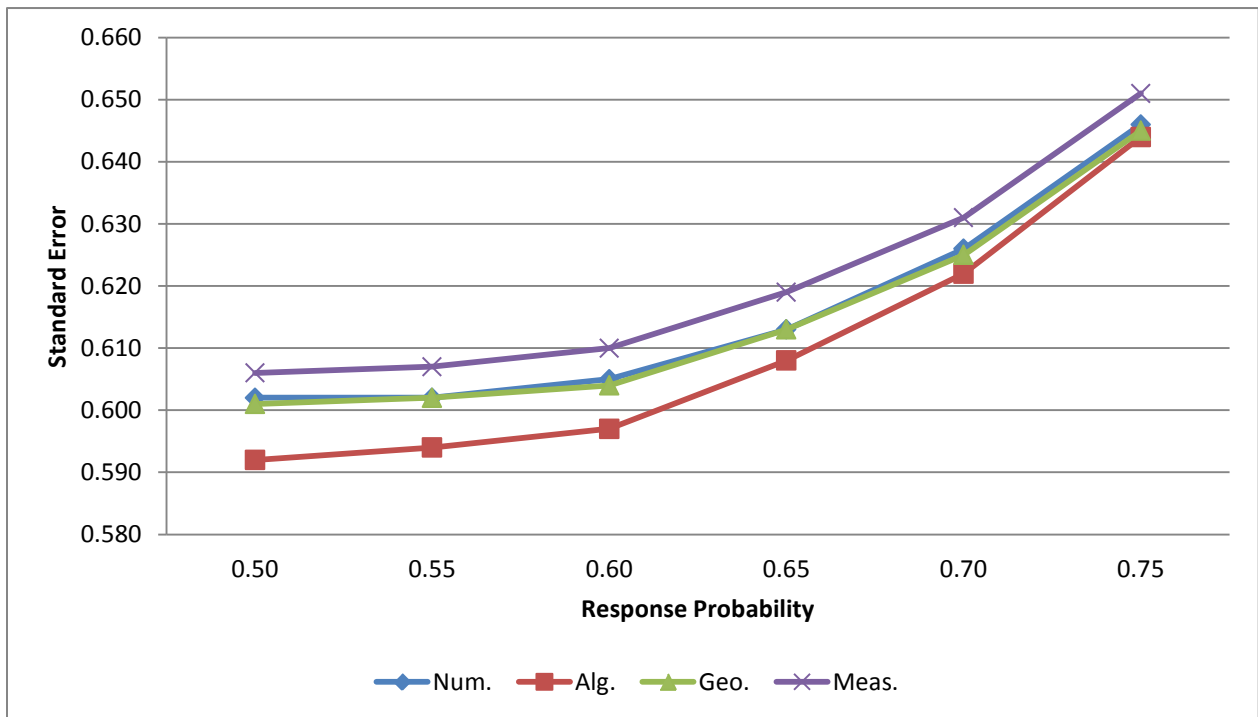
| Number of Items | Response Probability | Total | DC 1 | DC 2 | DC 3 | DC 4 |
|----------------------|----------------------|-------|-------|-------|-------|-------|
| 52 total (13 per DC) | 0.50 | 0.300 | 0.602 | 0.592 | 0.601 | 0.606 |
| 52 total (13 per DC) | 0.55 | 0.300 | 0.602 | 0.594 | 0.602 | 0.607 |
| 52 total (13 per DC) | 0.60 | 0.301 | 0.605 | 0.597 | 0.604 | 0.610 |
| 52 total (13 per DC) | 0.65 | 0.304 | 0.613 | 0.608 | 0.613 | 0.619 |
| 52 total (13 per DC) | 0.70 | 0.310 | 0.626 | 0.622 | 0.625 | 0.631 |
| 52 total (13 per DC) | 0.75 | 0.318 | 0.646 | 0.644 | 0.645 | 0.651 |

As expected, increasing the RP increases the standard error (reduces the precision of the score estimate). Differences in standard errors at the diagnostic category level for the same response probability are a reflection of differences in the diagnostic category item pools.

Average Standard Errors for Various Response Probabilities—Mathematics Lower Grades Total Test



**Average Standard Errors for Various Response Probabilities—
Mathematics Lower Grades Diagnostic Categories**



Increasing response probability incrementally from 0.50 leads to increases in standard error. At both the total and diagnostic category level, the increase in standard error is gradual at first and becomes more pronounced around 0.65. For this reason, the RP was set at 0.65 for CDTs designed for students in grades 3–5.

4.f.12.c. Test Navigation

Many versions of computer-adaptive tests do not allow students to skip items in the test or back up to previously answered items and change answers due to some complicating factors. For example, if students are allowed to back up and change answers, Rasch ability estimates are re-calculated when answers are changed. This additional information can be used to select additional items, but would not change previously selected items. For example, suppose a student is on item twenty-five and goes back to change the answer to item eleven from wrong to right. The total and corresponding diagnostic category Rasch ability estimates would go up. That additional information can be used in selection of items twenty-six and beyond. However, items twelve through twenty-five are not reselected even though different items may have been selected if item eleven was initially answered correctly. When it comes to items twelve through twenty-five, “the train has left the station.” Further complicating matters, if students are allowed to back up in the test, additional considerations must be put in place to ensure that the answer to one item does not cue another. Similarly, if students are allowed to skip items, the CAT algorithm would need to select additional items without any additional information (no change to Rasch ability estimates). Taken

to the extreme, a student with no prior CDT scores who skipped every item starting with the first would get an entire test of average items. It would not be adaptive at all.

Currently, all CDT tests except Reading Lower Grades and Reading/Literature do not allow skipping items or backing up and changing answers. On CDTs in the reading content area, students are allowed to skip items within a passage. For example, when presented with a passage and five associated items, the student does not have to answer questions one through five in that order without skipping. If a student tries to navigate to the next passage without answering all of the items associated with a passage, the test engine will prompt the student to answer all items and will not move on to the next passage until all are answered.

Termination Criteria

DRC's CAT algorithm allows for both a fixed- or variable-length test. With fixed length, the test ends when a student has taken a pre-defined number of items total and in each diagnostic category. With variable length, the algorithm stops administering items from a diagnostic category when one of two conditions is satisfied:

- A student has taken at least a pre-defined minimum number of items in that diagnostic category and the standard error is below a pre-defined threshold

OR

- A student has taken a pre-defined maximum number of items in that diagnostic category

The test ends when one of the two conditions above is satisfied for each of the diagnostic categories. Note that with both fixed- and variable-length tests, there is no requirement that the pre-defined number of items in diagnostic categories be equal.

4.f.12.d. CAT Configuration Example—CDT Mathematics Upper Grades

On the following pages, CAT configuration examples are provided for Mathematics, Reading Lower Grades, and Biology. Configurations for the ten remaining CDTs (Mathematics Lower Grades, Algebra I, Geometry, Algebra II, Reading/Literature, Science Lower Grades, Science, Chemistry, Writing Lower Grades, and Writing/English Composition) are in *Volume IV; Appendix Q, CAT Configuration Examples*. All examples are based on the CDT tests available in the 2014–2015 school year.

Mathematics (Upper Grades) CAT Configuration, 2014–2015

The test has four diagnostic categories. Each student takes between 12 and 15 operational items per diagnostic category for a total test of 48 to 60 operational items. With no prior information about a student, the starting point in each diagnostic category is an item of average difficulty by grade level. For example, a

grade 7 student will start with an item near the average difficulty of grade 7 items. Items are selected where the response probability is 0.50, meaning a student has a 50% chance of answering correctly. The CAT algorithm stops administering items in a diagnostic category when one of two conditions is satisfied:

- A student has taken at least 12 operational items in that diagnostic category and the standard error is below 0.60
- A student has taken 15 operational items in that diagnostic category

Functionality is used to restrict the pool and to favor items close to a student's grade. The pool restrictions are that no Algebra I items will be administered in the first 5 items, no Geometry items will be administered in the first 10 items, and no Algebra II items will be administered in the first 20 items.

Simulations were run with this configuration. On average:

- A total of 52 operational items are administered—about 13 per diagnostic category
- Standard error for the total score is 0.30
- Standard errors for the diagnostic categories are in the range of 0.60 to 0.63

The Mathematics CAT configuration for the 2015–2016 school year will mirror the current configuration with one exception—it will include embedded field test items to replenish the item pool. Five field test items will be randomly assigned to fixed positions within the operational test. The positions of field test items will be unknown to students and spread throughout the operational test. Field test items will not be clustered at the end in an effort to avoid any fatigue effect when placing the items on the operational scale.

Reading Lower Grades CAT Configuration, 2014–2015

The test has five diagnostic categories. Each student takes between 10 and 12 operational items per diagnostic category for a total test of 50 to 60 operational items. With no prior information about a student, the starting point in each diagnostic category is an item of average difficulty by grade level. For example, a grade 4 student will start with an item near the average difficulty of grade 4 items. Items are selected where the response probability is 0.65, meaning a student has a 65% chance of answering correctly. The CAT algorithm stops administering items in a diagnostic category when one of two conditions is satisfied:

- A student has taken at least 10 operational items in that diagnostic category and the standard error is below 0.77
- A student has taken 12 operational items in that diagnostic category

Functionality is used to run CAT with passages and favor items close to student's grade. There are no pool restrictions.

Passage minimum percent is set at 66%. That is, whenever possible, only passage combinations that use 66% or more of the associated items are used. (Near the end of a test, the passage minimum percent constraint may need to be loosened in order to meet content constraints.) Many simulations were run to arrive at this percent. On the one hand, testing time and reading load should be minimized. Therefore, students should not have to read long passages for only one or two items. On the other hand, using all items associated with a passage may not be desirable since some items are far from a student's estimated score. Given a limited number of items, those that are either too easy or too hard should not be used.

In evaluating and ranking passages, the percent of items associated with the passage is not used. Simulation results indicate that if it is factored into evaluations, students take many short passages because 1 of 1 (100%) and 2 of 2 (100%) are ranked higher than 5 of 6 (83%) and 4 of 5 (80%), for example.

Simulations were run with this configuration. On average:

- A total of 55 operational items are administered—about 11 per diagnostic category
- A total of 16 passages are administered
- Standard error for the total score is 0.31
- Standard errors for the diagnostic categories are in the range of 0.75 to 0.80

Note that the standard error is higher in reading than the other content areas. This is because reading is passage-based. Rather than selecting one targeted item at a time, the item selection routine evaluates and selects multiple items associated with a given passage. In general, items selected in this manner are not as close to the targeted response probability as standalone items selected one by one.

The Reading Lower Grades CAT configuration for the 2015-2016 school year will mirror the current configuration with one exception—it will include embedded field test items. The field test items will be evidence-based selected response (EBSR) items written to existing operational passages. If an administered operational passage has an associated EBSR it is eligible for field testing. DRC will work with PDE to determine the maximum number of EBSRs to be administered per test.

Biology CAT Configuration, 2014–2015

The test has four diagnostic categories. Each student takes between 12 and 15 operational items per diagnostic category for a total test of 48 to 60 operational items. With no prior information about a student, the starting point in each diagnostic category is an item of average difficulty. Items are selected where the response probability is 0.50, meaning a student has a 50% chance of answering correctly. The CAT algorithm stops administering items in a diagnostic category when one of two conditions is satisfied:

- A student has taken at least 12 operational items in that diagnostic category and the standard error is below 0.60
- A student has taken 15 operational items in that diagnostic category

Functionality is used to favor items close to Biology. There are no pool restrictions.

Simulations were run with this configuration. On average:

- A total of 52 operational items are administered—about 13 per diagnostic category
- Standard error for the total score is 0.30
- Standard errors for the diagnostic categories are in the range of 0.60 to 0.62

The Biology CAT configuration for the 2015-2016 school year will mirror the current configuration with one exception—it will include embedded field test items to replenish the item pool. Five field test items will be randomly assigned to fixed positions within the operational test. The positions of field test items will be unknown to students and spread throughout the operational test. Field test items will not be clustered at the end in an effort to avoid any fatigue effect when placing the items on the operational scale.

CAT Comparability Study

DRC INSIGHT's CAT algorithm is the system currently in place for the CDTs. As such, the CAT system we have proposed will match current functionality and features and results will be comparable to the current system used by the Commonwealth. Prior to the start of each school year, the DRC INSIGHT simulation tool will be used to ensure that each of the thirteen CDTs is performing as expected in terms of blueprint adherence, simulation scores and standard errors, and recovery of true ability estimates.

Summary

DRC INSIGHT's CAT algorithm meets or exceeds all of the specifications in the RFP and is the current test engine for the operational CDT. It was first implemented in October 2010 and has run efficiently and effectively to this day. Further, DRC conducts ongoing development and maintenance of its system to meet the growing needs of the CDT. For example, the flexibility of the system will allow for field testing of evidence-based selected response items in fall 2015 and operational use of this new item type in spring 2016. We are confident that we will continue to provide exemplary performance and customer service through the length of this contract.

4.G. Processing and Scoring of Test Materials (PSSA and Keystone Exams)

We believe that our experience and expertise in the areas of materials processing, image scanning, and performance assessment scoring is unsurpassed in the industry. Our commitment to quality and accuracy, combined with decades of experience and expertise, will allow us to provide exceptional, error-free scoring services for the Pennsylvania assessments. **Our production, packaging, receiving, processing, scanning, and handscoring processes are ISO 9001:2008 certified.** All processing, scanning, and scoring occur at DRC's fully secure facilities (please see *Subheading 4.E.7., Test Security*, for detailed information on our robust security features and processes).

DRC takes pride in our ability to tailor processes to meet each of our clients' needs, and looks forward the opportunity to continue providing customized processing and scoring solutions for PDE. DRC has successfully processed and scored millions of test materials for large-scale statewide assessments, including the following states:

- Alabama
- Alaska
- Louisiana
- Nebraska
- Ohio
- Oklahoma
- Pennsylvania
- South Carolina
- Washington

4.G.1. SCANNING/IMAGING AND SCORING

We understand and acknowledge all of the general processing and scoring requirements outlined in the RFP. DRC is fully equipped to handle all of these elements. The detailed descriptions of our state-of-the art processing and scoring systems and procedures that follow will provide PDE assurance of DRC's capability to provide the highest level of service in the industry, including the following requirements that are specific to Pennsylvania. Additionally, DRC is uniquely positioned to continue to provide processing and scoring processes that are specific to Pennsylvania.

- DRC is keenly aware that a student's best score for the Keystone Exams must be based on a combination of all test modules the student has taken for a given subject. For the Keystone Exams, a student's **best scaled score** and overall performance level is calculated using all past test events. For example, if a student's module 1 score in one administration is their highest score for that module, but their highest score for module 2 was in a subsequent retake opportunity, the calculated highest or best total score is based on module 1 from the first administration and module 2 from the retake.

- DRC, in collaboration with PDE, established the initial requirements for the Keystone best score calculation, and the processing and scoring steps outlined in this section all support the continuation of the precise and successful methodology DRC has implemented for PDE.
- DRC understands PDE's request to combine module scores from separate test events and has already collaborated with PDE to define new processing rules to calculate total exam scores and performance levels for students whose module scores come from different test events (e.g., Module 1 paper/pencil and Module 2 online). DRC successfully implemented the new process for the 2014–2015 Winter Keystone Exams and will continue to employ this and many other student level processing rules that have been specifically tailored to meet the unique needs of the Keystone Exams program.
- DRC worked with PDE to revise its allowable PSSA testing accommodations so that a student who takes the online assessment can respond to a constructed-response item (writing prompt or TDA) in a paper/pencil booklet and have a test administrator transcribe those responses back into the student's online session. A new report was added to eDIRECT for the districts to track and document valid reasons for a student's test ticket to be unlocked. DRC understands PDE's request to have such accommodations processed without transcription. We have a long history of defining and implementing creative solutions to meet the special handling requests for the PSSA and are well positioned to offer a solution that best meets PDE's request. Upon award, DRC will collaborate with PDE to establish rules that will allow for student level processing to handle mixed-mode responses for a single student score.
- DRC is well aware of PDE's requirements for the retention and destruction of secure materials and recently modified and documented the current policy to address concerns related to reviewing booklets from sites identified as having high erasures. DRC will revise the policy to indicate that answer booklets must be kept for a minimum of five years, and we will continue the long-standing requirement that no secure materials are destroyed without PDE approval.
- We are also experienced with the requirement to offer rescoring and reviews requested by the field. To that end, DRC has streamlined processes for retrieving images and booklets from storage and has well-documented procedures that include PDE approval of all requests and a PDE-approved cost that is passed on to the districts. PDE is included in all steps of the rescore/review request, and no images are released or booklets rescored without PDE's explicit approval. In conjunction with the rescore/review process, DRC is aware that electronic images of the student booklets or online tests must be stored for a period of time that will be mutually agreed upon between PDE and DRC. Similar to the documentation for booklet retention/destruction, DRC recently provided

PDE with our policy for storing electronic images. This document will be updated upon PDE's designation of the storage requirement for electronic images.

With over 35 years of impeccable service, DRC's Processing and Scanning Department provides client-tailored processes and solutions, reliable and efficient processes; and adherence to stringent quality control procedures. In the past 14 years of image scanning and scoring, DRC has met our internal handoff deadlines and has successfully delivered results for our clients. All of our statewide assessment contracts utilize image scanning and scoring. In the past year, DRC image scanned and scored over 6.9 million student response documents consisting of more than 207 million pages (103.5+ million sheets).

DRC Processing and Scanning Statistics

- Over 27 million secure materials received and processed annually
- More than 250,000 materials processed daily
- 25 in-house IBML ImageTrac scanners
- Weekly scanning capacity in excess of 19.3 million sheets

Our Operations lead personnel are directly involved in all processing and scanning activities, leveraging their 20-plus years of experience with student response data capture at DRC. They are committed to maintaining accuracy, increasing efficiency, expanding the use of technology, providing comprehensive staff training, and implementing high-standard quality assurance procedures with DRC's processing, scanning, and scoring environments.

DRC's state-of-the-art proprietary scanning system is highly configurable and fully scalable, which provides **the flexibility** needed **to accommodate each of our state client's needs**. DRC's customized scanning programs are capable of selectively reading documents and electronically formatting scanned information. The IBML ImageTrac scanners are capable of scanning single- or multiple-color documents. All custom scanning programs go through quality review before testing materials arrive. Our image scanning operators have extensive experience performing tasks related to scanning and the maintenance of image scanning equipment.



During the scanning stage, student responses to constructed-response (CR) items and writing prompts will be captured as images and loaded into the Image Scoring System. The **use of image scanning and scoring technology** at DRC **mitigates the inefficiencies of traditional paper-based packeting** of CR and writing prompt student responses.

Duplicate copies of the images will be preserved for use during the image scoring process. Booklet counts and page integrity will be maintained throughout the

scanning process by storing data in a Relational Database Management System (RDMS). A relational database significantly increases system flexibility and provides for robust data analysis capabilities.

Pre-Editing Quality Control Procedures

Quality control procedures are critical to DRC's document scanning process. All image scanning programs will go through quality review before testing materials arrive at our facilities. Throughout the scanning process, batches will be checked for quality and scanning accuracy by experienced Document Processing staff. All scanners are calibrated and cleaned on a regularly scheduled basis to ensure accurate and consistent scoring. DRC also has an on-site field service engineer to resolve any technical issues as they arise.

DRC's scanning process produces comprehensive, detailed information, including:

- Student demographic data.
- Student multiple-choice response data.
- TIFF images of complete documents.
- Identifiers to link the TIFF images to the student demographic data.

Our quality control procedures for document scanning are highlighted below.

Pre-Editing Quality Control Procedures

- PDE-approved Scope of Work Agreements (SOWA) will be established. All processing and scanning staff will adhere to the requirements contained in the SOWA.
- As scanning occurs, a unique serial number is printed on each sheet of paper. This serial number ties documents together and maintains sequencing within batches.
- The scanners pick up pre-defined processing criteria related to pre-printed barcodes, multiple-choice items, and student demographic and identification information. CR and writing prompt student responses are scanned; images are then separated out for image-based handscoring.
- As documents are scanned, the scanner is monitored to ensure that images meet DRC's strict quality standards.
- Regularly scheduled calibration and scanner cleaning processes will be conducted to ensure image and read-level quality and consistency.
- All scanned images will pass through a software clean-up program and process. After image clean-up, a random sample of images is presented for image quality approval. If any image fails to meet DRC's quality standards, the entire batch of documents is rescanned.
- Page-scan verification is performed to ensure that all pre-defined portions of a document were correctly captured. A flatbed scanner is used to capture responses and images for any missing pages. These images are then added to the image data file and merged with the appropriate document.

Editing

After scanning, the documents are processed through a computer-based editing program to detect potential errors in specified response fields. Marks or omits that do not meet the pre-defined editing standards are flagged and routed to the Document Processing editing staff for resolution.

Using unique serial numbers printed on the documents during scanning, the editors compare the actual documents to online data. Corrections are then made to the data file according to pre-defined, program-specific guidelines. The editing staff follows strict quality control procedures to produce clean data files that can be submitted for scoring and reporting functions.

Editing Quality Control Procedures

- Edit specifications will be developed mutually by PDE and DRC.
- Experienced editors meticulously review any potential irregularities detected during scanning and make necessary corrections online to the image data file, referring to the actual document as required.
- Editors determine if the marks are valid (based on assessment requirements) or non-correctable.
- All items flagged during document scanning are presented to editing staff for first-time entry.
- Any changes made to scanned values and all items entered the first time are double-keyed for verification by editing quality staff.
- Once verification by editing quality staff is completed, a quality control report is generated for review during post-editing.
- After all corrections for a batch have been entered and verified, the correction file is stored in a relational database for reference.

Post-Editing

A final edit is performed to confirm that all requirements for final processing have been met. Once the data pass all the pre-defined editing processes, the images of the student responses to CR items and writing prompts are extracted into files for scoring. The CR and writing prompt student response images will be routed through the DRC Imaging Workflow System to handscoring terminals at DRC's Scoring Center for scoring by qualified readers (please see *Subheading 4.G.2*, for more information on DRC's plan for handscoring for the Pennsylvania System of Assessments). Images are stored so that they can be efficiently retrieved on the basis of student and school identification information, scores, and item information. Upon completion of processing, scannable documents are boxed for security purposes and final storage.

Post-Editing Quality Control Procedures

- During this processing step, the actual number of documents scanned will be compared to the number of scannable documents assigned to the box during Material Receipt. Any count discrepancies between Material Receipt and documents scanned will be resolved at this time.
- Suspect student pre-IDs, district and school numbers, and documents IDs are reviewed for additional verification.
- All editing quality control reports are reviewed to ensure all changes were processed accurately.
- All corrections during post-editing are made electronically and a new validation report is generated to confirm the changes have been processed accurately and the report is clean.
- After all final processing requirements have been met, the batch is released for CR item and writing prompt scoring and student-level processing.

Test Decks

Prior to any Pennsylvania test materials returning to DRC, the Software Quality Assurance staff perform extensive tests using **mock student data** to ensure all scanned data (including demographic data and multiple-choice responses) are captured and accurately stored in a secure database environment. Each record in the database is independently verified against the test decks for validation.

The analysts will follow a software testing methodology that thoroughly evaluates and verifies the scanning and scoring system and verifies each scanner is configured and setup for the applicable Pennsylvania assessment program. This process includes validating test decks, which are composed of answer documents with and without mock student and school pre-id information for each form/version of the test. The test decks are specifically gridded to include a variety of possible student response permutations and combinations.

The test decks are processed completely through DRC's systems to verify the following:

- Readability of security, student, and school barcodes.
- Data capture of pre-gridded and barcode information.
- Accurate capture of district and school codes.
- Consistent data capture on all scanners.
- Accurate scan positions on all documents and forms.
- Scanner calibration and hardware functionality.

Following the validation of the mock student data, when the first live tests are returned to DRC, the Software Quality Assurance staff also perform a validation of all production data (live student data) processed through the system. **Each student record is verified for accuracy** to ensure high-quality data file development and reporting. Please see *Subheading 4.J.1.a., Quality Assurance (QA) and Quality Control*, for a detailed discussion of DRC's approach to quality control.

Processed Document Storage

Upon completion of processing, scannable documents are boxed for security purposes and final storage in secure facilities that are climate- and pest-controlled, allowing for the preservation of the documents. All student response documents that are returned from LEAs will be stored for possible re-scoring for a designated period to be agreed upon by DRC and PDE. DRC understands that re-scoring may be required for a variety of reasons, including security breach investigations, audits, manual rescoring, or contractor error resolution. In the unlikely event that any materials have been inaccurately processed, DRC agrees to reprocess them without additional cost.

Processed scannable documents can be retrieved quickly and efficiently as the need arises, either during or upon completion of processing. Project-specific box labels are created containing the following information, as applicable: unique customer and project information, material type, batch number, pallet, box number, and the number of boxes for a given batch. Boxes are stacked on project-specific pallets. Each pallet is labeled with a list of all the batches it contains.

Before each pallet is delivered to the Materials Distribution Center for final secure storage, a quality check is done to ensure accurate boxing and pallet content labeling. DRC proposes to store all Pennsylvania assessment materials by district/LEA. All material will be retrievable upon request of PDE. Materials will be securely destroyed only after written authorization is received.

Scoring Procedures

Our experience providing scoring for Pennsylvania's testing programs gives DRC **a unique understanding of the activities and coordination required for data processing and scoring of the PSSA and Keystone Exams**. Additionally, DRC scans and scores over 4.5 million student answer documents annually for numerous assessment programs around the country. DRC understands the activities and coordination required for data processing and scoring of Pennsylvania assessments, and has the proven experience and capabilities needed to score the tests accurately.

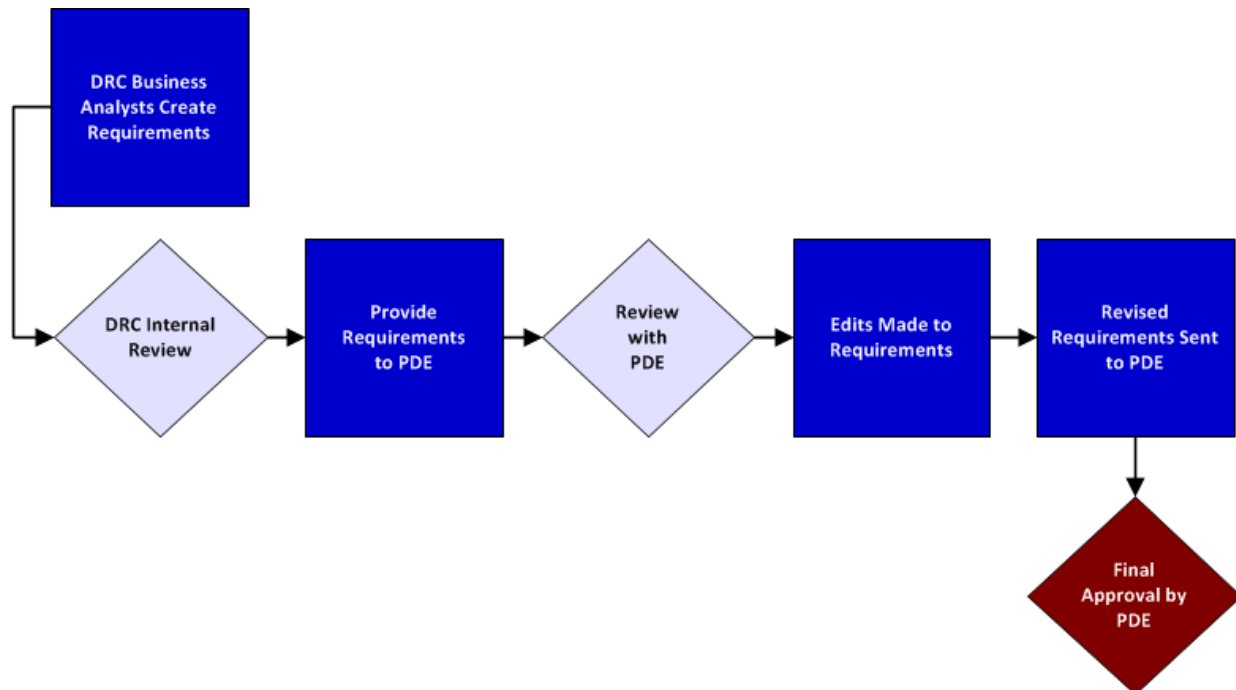
Scoring Requirements Documentation

We prepare and verify the requirement documents for the scoring of test booklets/answer documents well in advance of the receipt of test materials. These specifications contain detailed scoring procedures, along with the procedures for

determining whether a student has attempted a test and whether they should be included in statistics and calculations for computing summary data.

Once the requirement documents are complete, they will be reviewed with PDE. After all changes and edits have been made, the final requirement documents are sent to PDE for final approval. Our process is outlined in the following figure.

Scoring Requirements Documentation Process



Mark Discrimination

The Image scanners used by DRC utilize high-quality color cameras capable of capturing images up to 300 DPI. Gray-scale images are captured using 256-level gray-scale (8 bits per pixel) format. DRC's image scanning system produces sufficient image quality to permit distinguishing between various marks/darkness levels and allows DRC to store electronic responses that emulate the quality of the original paper response. The flexibility of DRC's image scanning system allows for erasure marks to be easily captured based on specified criteria. DRC's scanners are calibrated multiple times daily to ensure that scanners accurately and consistently capture student responses.

All marks on a student answer document are captured at the time of scanning. Marks for multiple-choice responses will be assigned a read level. Each response bubble is scored based on two factors: darkness (how darkly the bubble is marked); and pixel coverage percentage (how much of the bubble is marked). Using darkness and pixel coverage, each bubble is assigned a value based on industry standards. The value is assigned to one of three ranges: unmarked or very lightly marked; lightly marked; or clearly marked or darkly marked. Then, each question is assigned a response based on the value for each of its bubbles:

- If only one bubble is marked, then the response is set to that bubble
- If two bubbles are marked and one is lightly marked and the other is clearly marked, then the response is set to the clearly marked bubble
- If two demographic bubbles are marked and both are lightly marked or both are clearly marked, then the response is marked for review by a human editor

DRC proposes to work with PDE to define mark discrimination criteria.

Score Key Quality

The integrity of item, form data, and score keys is evaluated in several ways. Test development specialists, psychometric staff, software quality assurance analysts, and independent national content experts check the score keys through a series of validation procedures at varying junctures. Score key quality procedures apply to both paper/pencil and online student response scoring, and include:

- **Verify for accuracy**—Score keys are verified for accuracy based on multiple reviews by test development specialists, psychometric staff, and software quality assurance analysts. All item data and score keys are reviewed and approved by each group prior to scoring Pennsylvania tests.
- **Take the test**—Multiple staff with specific content knowledge take each form of the test and compare their results against the score keys on the test maps. The score keys and strand information is again verified during this step.
- **Score key file import**—DRC imports the approved keys received into our scoring system. Once the keys are successfully imported, software quality assurance staff re-verify the keys used by the scoring engine.
- **Database accuracy**—All items are scored in the system using the correct and incorrect item distractors. The database is validated to make certain the distractor captured in scanning was saved correctly and that the item was given a correct or incorrect answer.
- **Automated system checks**—The scoring engine has automated system checks built-in to validate score keys and proper merging of multiple-choice and constructed-response items. Additionally, the software quality assurance team performs independent checks on this data.
- **Item Analysis**—Psychometricians conduct classical item analysis on multiple-choice items to identify items that are not performing as expected. Items with potential mis-keys are verified by content experts.

Evaluation of Student Score Data

To provide PDE with the highest level of accurate test results, **DRC conducts a thorough evaluation of all scored data**. File formats and data elements are validated against client-approved layouts, specifications, and processing requirements. Detailed test scripts are executed to confirm accuracy. Some of the steps include quality verification of:

- Answer keys/test maps
- Raw scores
- Raw-to-scale score conversions
- Scale-score comparisons to performance achievement levels
- Disaggregated data
- Processing rules for individual student and summary level data

The quality assurance steps involve processing sample student records through the data processing and scoring system. Each student's data record is carefully reviewed and evaluated to ensure it was **scored with 100% accuracy**.

To reduce the risk of human error, our Software Quality Assurance programmatic test routines are used to thoroughly evaluate each student's data record that is produced for use in final data files and reports. As a separate check to reduce the risk of programming errors, a sample of student scores are calculated by hand, including the aggregation of data into summary scores.

Merging Multiple-Choice and Constructed-Response Scores

All student answer documents returned to DRC will be scored. Multiple-choice items and demographic information will be image scanned and the original scanned data will be converted into a master student file. Likewise, all student response and demographic data submitted through the online testing application, DRC INSIGHT, will be converted and stored in the master student data file. Scanned document record counts will be verified against the counts from Document Processing to ensure that all students are accounted for in the scanned data file. Additionally, a detailed review of the materials return error-tracking log will be performed to ensure any discrepancies are resolved before proceeding with the scoring routines. Both paper/pencil and online student responses to CR items and writing prompts will also be sent electronically to DRC handscoring centers for scoring by trained, qualified readers.

The scanned paper/pencil and online multiple-choice responses will be scored against the appropriate answer key, indicating correct and incorrect responses. In addition, the student's original response string is stored for data verification and auditing purposes. We will prepare and refine the requirements documents for the scoring of answer documents well in advance of the receipt of test materials. These specifications will contain detailed scoring procedures, along with the

procedures for determining whether a student has attempted a test and whether they should be included in statistics and calculations for computing summary data. DRC will ensure that all answer keys have been approved by PDE and verified for accuracy prior to the scoring of any student responses. Student scale scores and achievement levels will be determined prior to the production of final data files and reports.

Students' responses to CR items and writing prompts will be scored at DRC scoring centers by trained, qualified readers (please see *Subheading 4.G.2., Scoring*, for more information on DRC's plan for handscoring for the Pennsylvania System of Assessments).

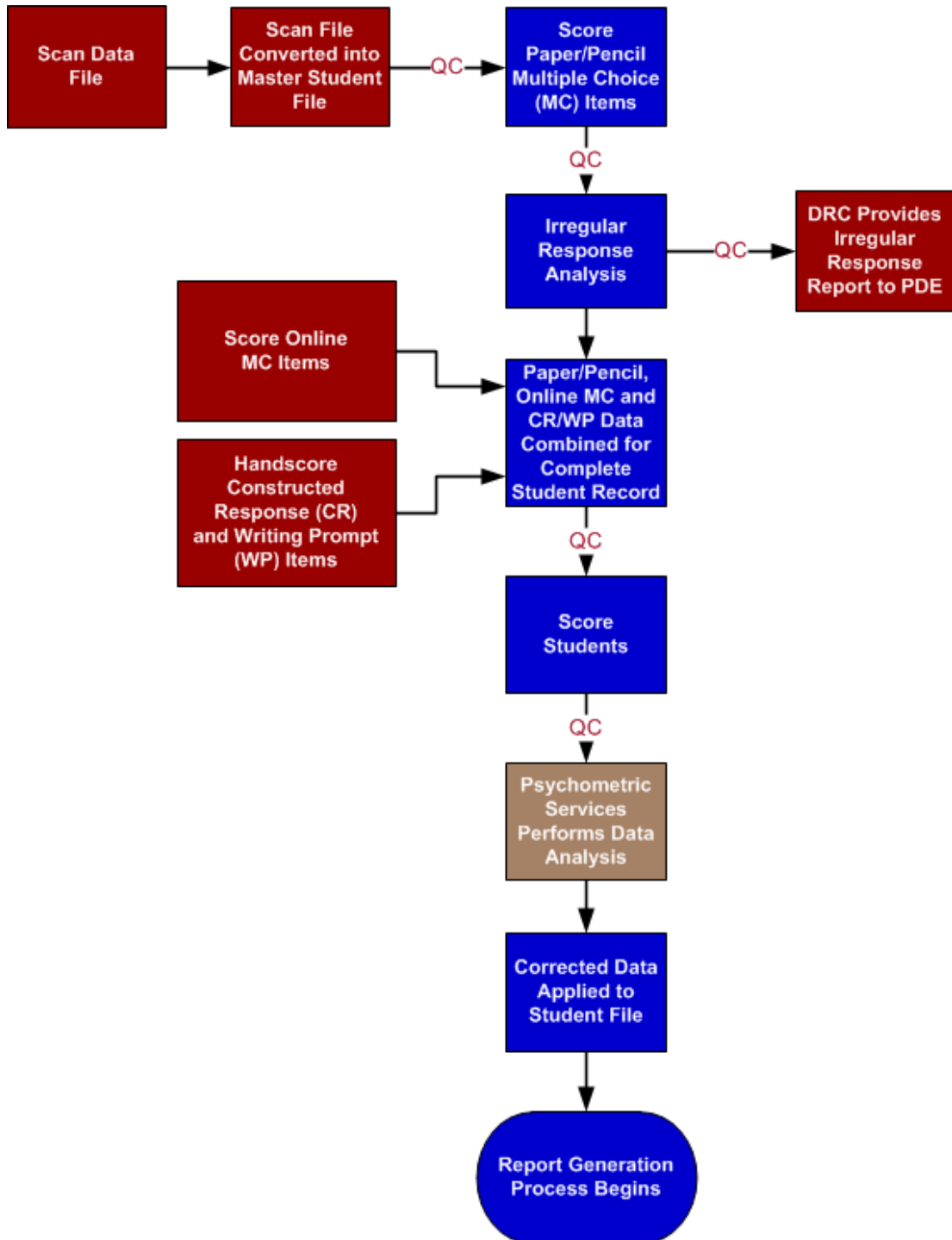
As appropriate, data and scores for a student's paper/pencil MC responses will be systematically matched to the student's CR and writing prompt scores and/or online MC scores. Matching will occur through the use of the student's multiple-choice data by a unique document ID (lithocode) and/or a series of criteria (e.g., student ID number, first/last name, district/school, birthdate) determined in collaboration with PDE during the requirements gathering process for scoring and reporting. This process allows DRC to create a **single, accurate, reliable data record for each student assessed** by linking all score and demographic data for a specific student, including data and scores collected during scoring of multiple-choice, CR items, writing prompts, multiple test booklets, and/or online responses.

DRC's strict quality procedures will result in accurate scoring. We are prepared and **accustomed to handling programs with multiple forms, modalities, and assessments** at each grade level and have built-in solid check-points and reviews throughout the entire scoring process. **We have not encountered any situations where student scores have been matched incorrectly using our process and established quality control procedures.**

Once the scored master student file is deemed 100% accurate, DRC's psychometrics staff will perform additional detailed analysis on the data files prior to PDE's review and approval process. Standard quality inspections will be performed on all data files, including the evaluation of each student data record for correctness and completeness. Please see *Subheading 4.I.4., Data Files* through *Subheading 4.I.7., PSSA and Keystone Exams Data File Process*, for detailed information on data file processes. Student results are kept confidential and secure at all times. DRC will maintain security of all individual test results. Individual test information shall be made available only to PDE, authorized school district personnel, and other entities identified and authorized by PDE. Please see *Subheading 4.E.7., Test Security*, for DRC's test security features and processes, including those related to student confidentiality and data security.

The figure below outlines DRC's scoring process, including merging student data from multiple scoring sources.

Process for Merging Student Data and Scores



4.G.2. SCORING

Constructed-Response Items

DRC has over 30 years of experience providing state clients with exceptional quality in all aspects of scoring across multiple content areas, grade levels, and item types. Our Performance Assessment Services (PAS) team has successfully scored numerous statewide, large-scale performance based assessments including programs in Alabama, Arkansas, Delaware, Florida, Kentucky, Louisiana, Nebraska, New Jersey, North Carolina, Ohio, Oregon, Pennsylvania, South Carolina, Utah, and Washington. Our PAS handscoring team brings a tremendous amount of experience scoring constructed-response items to Pennsylvania, and we have total confidence in our ability to continue to do a superior job with the Pennsylvania System of School Assessment (PSSA) and the Keystone Exams.

Our highly skilled and experienced handscoring staff is dedicated to providing accurate and on time results and they understand that consistency is essential, both within and across assessment administrations. Our handscoring team understands that the work outlined in this RFP requires careful planning, thorough and thoughtful systems designs, and sound execution of agreed upon procedures; we are confident our handscoring team continues to be exceptionally well suited to these tasks.

DRC confirms that all Pennsylvania open ended/CR responses will be scored one time with a minimum read-behind rate of 10% for inter-rater reliability purposes. We are confident that one professional reading is sufficient, due to our stringent and consistent quality control measures at all of our scoring sites. DRC documents our constructed-response scoring process in the annual Technical Report.

Further, DRC acknowledges that PDE will not use Artificial Intelligence (AI) machine scoring in the near future. However, DRC will continue to include constructed-response items that can be autoscored (machine scored, but not using an AI engine) in the mathematics assessments. Human scorers will be used to verify the accuracy of autoscores.

The DRC Handscoring Team

DRC offers experienced handscoring personnel who are unsurpassed in the industry. Our scorers are dependable, accurate, and instrumental in meeting strict reporting deadlines. DRC proposes to continue to work closely with PDE to ensure that all Pennsylvania students' responses are assessed using the scoring guidelines and anchor sets that have been developed in collaboration with PDE and Pennsylvania teachers. The proposed handscoring staff possesses abundant experience scoring across a wide range of content areas and grades.

The ELA team has a tremendous depth of understanding of all constructed response item types including writing prompts. Our experience with writing

includes analytic trait scoring, domain/dimension scoring, and focused holistic scoring. Our handscoring ELA content specialists also have experience working with scoring guidelines that require students to use evidence from text-based passages when responding to a prompt. As the current assessment vendor for Pennsylvania, our proposed ELA handscoring and test development content specialists have worked very closely with PDE content staff members and Pennsylvania educators to develop scoring guidelines for the most recent reading, writing, and text-dependent analysis items that are part of Pennsylvania's Core Standards (PCS). We have conducted rangefinding and scoring on these item types and have a solid understanding not only of the logic behind the standards but also of the associated scoring guidelines and their interpretation. We are confident that this knowledge will translate into continued success applying accurate scores to these responses.

DRC has worked collaboratively with Pennsylvania to align mathematics items to the PCS. Our proposed mathematics content specialists have a deep understanding of the PSSA and Keystone Exams scoring guidelines, as evidenced by their experience facilitating numerous rangefinding meetings and overseeing mathematics handscoring.

Our proposed science handscoring team includes the content specialist who has held this role for the last four years. He has facilitated all science rangefinding sessions for both the PSSA and the Keystone Exams and has overseen all Pennsylvania science handscoring activity. Our other proposed member of the science team has extensive experience overseeing PSSA science handscoring projects and has led science rangefinding efforts for other large-scale testing programs.

Our clients will confirm that DRC consistently meets our handscoring deadlines and maintains our focus on quality throughout the handscoring process. We believe that our experienced personnel, precise training materials, and thorough quality control measures are all essential to the success of each handscoring project we take on. We would welcome the opportunity to continue providing Pennsylvania with this excellent service under this new contract.

We are very proud of the fact that we have been able to utilize most of the same key personnel for each content area. For example, having the same person attend rangefinding for the past ten years is invaluable when it comes to maintaining Pennsylvania scoring standards and ensuring consistency from one year to the next. This continuity has been one of the central reasons that DRC's handscoring staff has been able to meet stringent deadlines with accurate results.

DRC's proposed handscoring management team for the new contract includes:

- **PSSA and Keystone Exams Handscoring Advisor—Dr. Holly Baker,**
Vice President, Education Solutions

- **PSSA and Keystone Exams Handscoring Advisor—Mr. David Payne**, Senior Director of Performance Assessment Services, currently oversees Keystone Exams
- **PSSA and Keystone Exams Handscoring Senior Project Manager—Mr. Nick Hook**, currently oversees PSSA handscoring
- **Keystone Exams ELA Handscoring Specialist—Ms. Melinda Peulen**, currently serves as the Keystone Literature handscoring specialist and also led the handscoring activities for the Keystone Composition field test
- **PSSA ELA Handscoring Specialist—Mr. John Kobe**, currently serves as the PSSA ELA reading and text-dependent analysis handscoring specialist
- **PSSA ELA Handscoring Specialist—Ms. Annie van der Merwe**, currently serves as the PSSA ELA writing handscoring specialist
- **PSSA and Keystone Exams Mathematics Handscoring Specialist—Ms. Dorie Rieger**, currently serves as the PSSA and Keystone Exams mathematics handscoring specialist
- **PSSA and Keystone Exams Mathematics Handscoring Specialist—Ms. Roberta Lawler**, currently serves as a Pennsylvania mathematics handscoring specialist
- **PSSA and Keystone Exams Science Handscoring Specialist—Mr. Mark Szulczewski** currently serves as the PSSA and Keystone Exams science handscoring specialist
- **PSSA and Keystone Exams Science Handscoring Specialist—Ms. Vickie Lane** currently serves as a PSSA and Keystone Exams science handscoring specialist

All of these individuals will have significant roles in future work with Pennsylvania. More importantly, the majority of these professionals have worked on the Pennsylvania programs for numerous years and have overseen all handscoring procedures including facilitating rangefinding, creating training materials, and monitoring scorers. All of our content specialists participate in the work to define the scoring guidelines for each constructed-response item and writing prompt. They work collaboratively with DRC’s test development staff and with PDE. Their qualifications are provided in *Section 5, Personnel*, while résumés are provided in *Volume II; Appendix A, Résumés*.

ISO Certification

DRC’s handscoring processes, people, and facilities have been ISO 9001 certified since 2007. Some of the fundamental criteria of the ISO 9001 standard are:

- Adhering to a set of procedures that cover key processes within the handscoring process.

- Keeping proper records.
- Regularly reviewing individual processes and the quality system itself for effectiveness.
- Facilitating the continual improvement customers expect.

Certification means that an independent ISO auditor traveled to each of our scoring centers and interviewed program managers, content specialists, scoring directors, team leaders, and scorers at each site. The auditor concluded that all scoring centers were adhering to the same processes for record keeping, training/qualifying, and monitoring of scorers.

DRC's handscoring division recently passed a recertification assessment to the latest version of ISO 9001 (called ISO 9001:2008), which extends our certification to 2016. Our staff is very proud of this achievement, and it should give PDE confidence that all scoring centers follow the same steps for each process described below.

DRC Scoring Facilities

DRC has conducted in-state scoring in Pennsylvania since 2003. If PDE desires, DRC will provide in-state scoring under the new contract.

DRC maintains geographically diverse scoring sites from which Pennsylvania responses will be scored. Scoring sites have ample square footage divided into several large, open scoring rooms. Additionally, each site has numerous small offices that are used for conferences and small-group training. Every site maintains a large break room equipped with coffee, vending machines, and refrigerators, as well as additional amenities.

Scorer workstations are designed for comfort and ease of use. Large flat-screen monitors display crisp images and reduce eyestrain and glare. Scorers can view an entire student response page without scrolling. Ergonomically-correct, adjustable chairs, tables, and keyboard/mouse trays keep our scorers comfortable and focused. DRC management makes certain that the reading rooms are kept very quiet during scoring. The scoring facilities are accessible to the physically challenged and are convenient to major highways and airports.

At each of our sites, the DRC Scoring Facility Technical Coordinator resolves any technical issues that may arise. Additionally, a Scoring Site Manager and a Human Resource Director attend to human resource and facility management needs. Together with the Scoring Project Manager, these scoring site personnel form a support team dedicated to maintaining day-to-day operations and allowing the Scoring Directors to focus exclusively on maintaining consistently accurate scoring.

Handscoring Security

DRC strictly maintains the security and confidentiality of all items and student responses. Each scoring center is a secure facility. Access to each facility is limited to staff and to visitors accompanied by authorized staff. All scorers are made aware that no scoring materials may leave the scoring center and must sign legally binding confidentiality agreements before work begins. To prevent the unauthorized duplication of secured materials, scorers are not able to print from their imaging stations. Scorers only have access to student responses they are qualified to score. No demographic data is available to scorers at any time.

For the image scoring process, each handscoring site is connected to the DRC main operation facility with multiple T1 transmission lines. The main operation facility has secure database servers and multiple applications that support the handscoring processes. Daily tape backups are done for production databases and images, with tapes being rotated off-site for disaster recovery purposes.

Hiring of Scorers

DRC selects scorers who are articulate, concerned with the task at hand, and, most importantly, flexible. Our scorers must have strong content-specific backgrounds; they are educators, writers, editors, and other professionals. They are valued for their experience, but are required to set aside their own biases about student performance and accept the scoring standards of the client's program.

With the excellent and well-educated labor pools available near all our scoring facilities (stemming, in part, from the numerous colleges and universities in the areas), DRC is able to tailor our scorer staff to the client's program. All of our scorers, Team Leaders, and room Scoring Directors for the PSSA and the Keystone Exams will have a minimum of a four-year college degree and a demonstrated ability to write.

The DRC Human Resources Director is dedicated solely to recruiting and retaining our scorer staff. Applications for scorer positions are screened by the Handscoring Project Manager, the Human Resources Director, and recruiting staff to create a large pool of potential scorers. During the screening process, preference is given to candidates with previous experience scoring large-scale assessments and with degrees emphasizing the appropriate content areas. At the personal interview, scorer candidates are asked to demonstrate their own proficiency at writing by responding to a DRC writing topic and a mathematics problem with correct work shown. All of this results in a highly educated and diverse workforce. Our personnel files for scorers and Team Leaders include evaluations for each project completed. We use these evaluations to place individuals on projects which best fit their professional backgrounds, their college degrees, and their performance on similar projects at DRC.

Our Scoring Directors, Team Leaders, and scorers are temporary employees hired on a per-project basis. Scoring Directors are promoted from within DRC and earn

their positions by demonstrating quality work as scorers and Team Leaders on previous projects.

Rangefinding

For the majority of handscoring efforts, rangefinding represents the first step towards applying accurate, consistent scores. Consistent, accurate training materials are usually attributable, in part, to a successful rangefinding session. Conversely, a murky line between two score points can often be traced back to inconsistent decision making at rangefinding. DRC is proud of our rangefinding practices and our consistent ability to facilitate successful rangefinding sessions for an array of clients. DRC is firmly committed to establishing accurate scores that reflect the intent of each item and demonstrate consistency both within and across grades and administrations.

For this effort, DRC understands that rangefinding meetings will be held in Pennsylvania and that we will be responsible for travel, food, and lodging expenses. Historically, we have held a majority of these meetings in Harrisburg or the surrounding area; however, we have also held rangefinding meetings in State College, Pennsylvania. The content-specific committees for these meetings will be composed of PDE staff, DRC content specialists and Scoring Directors, and Pennsylvania educators. We are happy to continue to provide input during the selection process of rangefinding committee members each year, and DRC fully understands that PDE has final approval on the list of invited participants. Committee members will be selected from a pool of applicants from across the Commonwealth. DRC has a team of full-time travel and meeting planning professionals who will ensure that all arrangements for refreshments, food, and travel reimbursements for committee members will be handled seamlessly. DRC handscoring staff will ensure that all materials are printed and error-free.

DRC's content specialists and Scoring Directors will prepare for rangefinding and anchor paper selection meetings by using our Image Handscoring System to access student field test responses. They will use the scoring guidelines to select a representative sampling for each score point. These responses will then be assembled into sample sets and duplicated for all rangefinding participants.

We propose that each rangefinding meeting begin by reviewing and discussing the scoring guidelines. When an understanding of the scoring guidelines has been established, participants will score and discuss each response until a consensus is reached. Facilitators will move through each of the rangefinding sets until there are a sufficient number of responses to construct anchor and training sets. Only responses with a high level of agreement will be used to train our scorers. DRC staff will make careful notes of scoring decisions for use in training the scorers.

DRC acknowledges the need to maintain security of materials at all times. No secure materials will be released to rangefinding committee members, and no materials may be removed from DRC facilities. As part of the introductory orientation and training, DRC recommends that Pennsylvania security guidelines

be discussed with committee members during the opening portion of each session and obtain signed security agreements from all rangefinding committee members before materials are distributed. DRC will retain these agreements for the duration of the contract.

Developing Training Materials after Rangefinding

Once rangefinding is complete, DRC will utilize the rangefinding responses to develop training materials for scoring field test responses. DRC is known throughout the industry for our thorough and precise training materials. DRC will be responsible for the creation of all anchor sets (annotated responses representing each score point), as well as all training, qualifying, validity, and recalibration sets. Training materials will include a mix of paper (hand-written) and online student responses to ensure scorers are familiar with responses in both modes.

Prior to field test scoring, Scoring Directors will select anchor and training papers from the sets of rangefinding responses. All notes generated during the rangefinding process will remain with each response selected, either in the annotation (for anchor papers) or in the Scoring Director's notes (for training papers). DRC will submit copies of training materials to the state assessment staff for approval prior to their use. Any training material created by DRC will also be provided to PDE in PDF format for archival purposes.

Scoring Guides with Anchor Responses

Each constructed-response item will require item-specific training materials, including a scoring guide comprised of the item-specific scoring guidelines (or writing prompt mode-specific scoring guidelines) and 2–5 annotated anchor responses per score point. Anchor papers are selected to illustrate particular scoring concepts. These responses will help ensure that scorers are able to make accurate and consistent scoring decisions for the response types they are likely to encounter. All anchor papers are annotated to explain how they exemplify each score point or, in the case of writing, each score point for a particular trait. The anchor set will serve as the scorers' constant reference.

Training Sets

For each field tested constructed-response item, DRC will also develop 1–2 training sets of 10 student responses. These training papers will further hone each scorer's ability to discern the different score-point levels in an accurate and consistent manner. When reviewing training papers from the front of the scoring room, the Scoring Director will utilize the notes generated during rangefinding to ensure that scorers reach scoring decisions in a manner consistent with the decision-making process utilized at rangefinding. DRC will provide PDE with copies of anchor and training sets for approval before scoring the field test responses.

Operational Training and Qualifying Sets

Prior to scoring operational assessments, DRC will pull forward the field test training materials (anchor and training set[s]) for each item selected for operational administration. DRC will supplement these field test training materials with 1–2 more training sets of 10 student responses and 2–3 qualifying sets of 10 student responses. These supplemental responses will be culled from exemplar papers generated during field test scoring. All exemplar responses are reviewed by the Scoring Director. The supplemental training and qualifying materials will further scorers’ understanding of how the range-finding and field test responses were scored in order to ensure accurate and consistent scoring.

Validity Sets

In addition to anchor, training, and qualifying sets, DRC will select responses for use as validity sets during operational scoring. These responses are “blind” to the scorers; scorers cannot distinguish validity responses from live responses. Validity reports compare scorers’ scores to pre-determined scores and can help detect potential room drift as well as individual scorer drift. The distribution of validity responses will be higher at the beginning of the scoring window and will decrease as agreement levels reveal a strong understanding and application of the scoring guidelines by the scorers.

Recalibration Sets

DRC proposes to select recalibration responses throughout the course of scoring operational assessments. Recalibration sets are designed to help refocus scorers on how to properly use the scoring guidelines to score responses. They are selected to help illustrate particular points and familiarize scorers with the types of responses commonly seen during operational scoring. DRC typically creates recalibration sets of 5–10 responses and distributes them to all of the scorers on each item every Monday morning. After the scorers take the recalibration set, the Scoring Director will review it from the front of the room, using scoring guidelines language and the anchor responses to explain the reasoning behind each response’s score. DRC will employ extra recalibration sets as needed.

Training of Scorers

For all assessments scored at DRC scoring centers, DRC provides Team Leaders who will assist the Scoring Directors with scorer training and monitoring. The Scoring Director will direct this training. Team Leader training will follow the procedures that are used in the scorer training (detailed below), but will be more comprehensive due to the training and monitoring responsibilities required of Team Leaders. During their training, Team Leaders will be required to annotate all of their training responses with official Pennsylvania annotations. To promote room-wide scoring consistency, it is imperative that each Team Leader imparts the same rationale for each score assigned. Training in this manner results in each scorer assigning the correct scores for the correct reasons. Once the Team Leaders

have qualified, they will prepare for the arrival of their teams of scorers. Teams will consist of approximately 10 scorers.

Scorer training will begin with a room-wide presentation and discussion of the scoring guide by the Scoring Director. Next, the scorers will practice by scoring the responses in the training sets. Afterward, the room Scoring Director and/or Team Leaders will lead a thorough discussion of each set.

After the scoring guide and all training sets have been discussed, scorers must demonstrate their ability to apply the scoring criteria by qualifying (i.e., scoring with acceptable agreement with true scores) on at least one of the qualifying sets. Any scorer who does not qualify by the end of the qualifying process will not be allowed to score actual Pennsylvania student work. DRC's qualifying standards are 70% for a four-point item and 80% for a two-point item. Stringent training and qualifying records are kept and are available to our clients at any time.

Lastly, DRC understands that there will continue to be Spanish handscoring for mathematics and science in grades 3 through 8 and for Algebra I and Biology. The Scoring Director responsible for overseeing this handscoring is a Spanish language speaker with a strong mathematics and science background who has worked with DRC on Spanish scoring for the past three years. All Spanish PSSA scorers at DRC are bilingual and hired specifically to score the Spanish portion of the assessment. Scorers are required to meet the same training and scoring standards set for the scorers of the English version of the assessment.

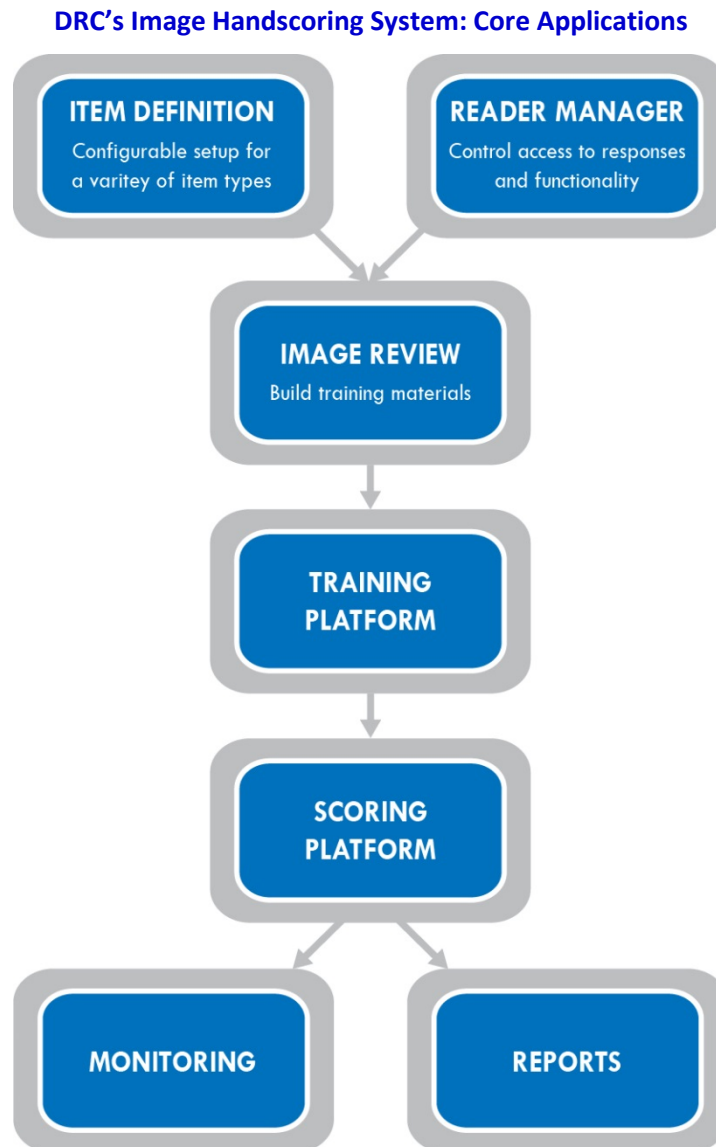
Image Handscoring

DRC's Image Handscoring System (IHS), now in its 13th year of use, has proven to be a highly efficient, accurate, and nimble platform for scoring large-scale assessments for our state clients. We have used it to provide millions of accurate and timely scores for student responses from large-scale assessments. Our proven experience with a wide variety of subjects, grades, item types, and scoring rules offers clients the assurance that our platform is robust enough to meet the needs of their programs.

DRC's IHS allows readers to score through a secure online platform, providing easy connectivity from multiple scoring locations with minimal hardware requirements, which allows us to quickly scale up and down the number of readers using the system. Student responses are electronically routed to qualified readers, ensuring that each reader is assigned a random workload that allows the project to be processed in the most efficient manner possible.

Applications within the Image Handscoring System

DRC's IHS includes a set of interlinking applications to manage all aspects of image handscoring. The core applications described in this proposal are outlined in the following diagram.



Item Definition

The Item Definition application provides a configurable setup to define the items that will be scored. The IHS is designed with flexibility in mind so that it can work well with numerous types of items and quality control needs. In order to allow for an array of item types to be imported into the system, there are a host of customizable parameters for each item being scored, including item names, score-point ranges, rubric models (e.g., single-scored items, trait-scored items, multi-part items), nonscore values, and scoring rules.

To meet the needs of various quality control requirements, the item definition functionality applies a set of client-defined scoring rules. When two readings are required, the IHS ensures that all responses are properly routed to two separate readers who are qualified to score the item. Readers do not know if they are reading a response for the first or second time; all first and second readings are, in

effect, “blind.” This process ensures that all responses will receive the appropriate number of independent readings.

Reader Manager Application

The Reader Manager application allows us to add readers, team leaders, and scoring directors to the system and control their access to responses and functionality. IHS automatically supplies the readers with unique log-in identification numbers and passwords. We have full control over the level of access each person will have in the system and full control over who can and cannot access student responses.

Image Review Application

There are two ways to provide training materials for the IHS. We may either import existing training materials or use the Image Review application to search through responses loaded into the system and assign them to rangefinding and training sets. To search through responses, scoring directors apply filters—such as grade, subject, item, and score(s)—to call up a body of responses meeting specific criteria.

Image Review Search Function

Image Review Search

| | | |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------|------------------|
| Grade | <input type="text"/> | Filter by Score |
| Subject | <input type="text"/> | Component |
| Question | <input type="text"/> | |
| Lithocode | <input type="text"/> | |
| Priority | <input type="text"/> | |
| Date | <input type="text" value="MM/DD/YYYY"/> | |
| <input type="checkbox"/> Flagged <input type="checkbox"/> Selected for Range Finding <input type="checkbox"/> Selected for Exemplar <input type="checkbox"/> Include Non-scores <input type="checkbox"/> Include Non-exact/Single Reads | | |

After applying the appropriate filters, scoring directors browse through the pool of responses that match the filter criteria. As they are browsing, scoring directors select specific responses for Rangefinding, Training, Qualifying, Recalibration, and Validity. Once scoring directors have select pools of responses, they apply “true scores” (scoring keys) to the responses and assign them to specific sets (e.g.,

“Training Set 1 for Grade 5 Mathematics Item 10”). Each set may be arranged in a specific order of responses.

DRC’s Image Review provides a simple, yet powerful tool to prepare for range-finding and create training materials.

Training Platform

DRC’s IHS includes a dynamic training platform that readers access in preparation for scoring. The following text describes the platform; a full description of the training process is included later in this section.

In order to flexibly address program requirements, the IHS supports a variety of different types of training materials, including scoring guides (items, passages, rubrics, anchor responses, etc.), training sets, and qualifying sets. The IHS provides these sets to each reader in a predetermined sequential order that is defined by the client. Readers may refer back to any training materials they have already reviewed, but they may only move forward along the path we established.

Each set of training material has a number of parameters that we set in order to shape the training experience for readers, such as the number and order of student responses included in each set. Additionally, we are able to set up some sets, like scoring guides, for review and reference (i.e. “read only”). Other materials, like training sets and qualifying sets, can be set up as interactive test modules which require readers to review and score each response using the scoring guide as a reference.

To monitor reader performance, scoring directors may run on-demand training and qualifying reports that offer live data on each reader’s performance.

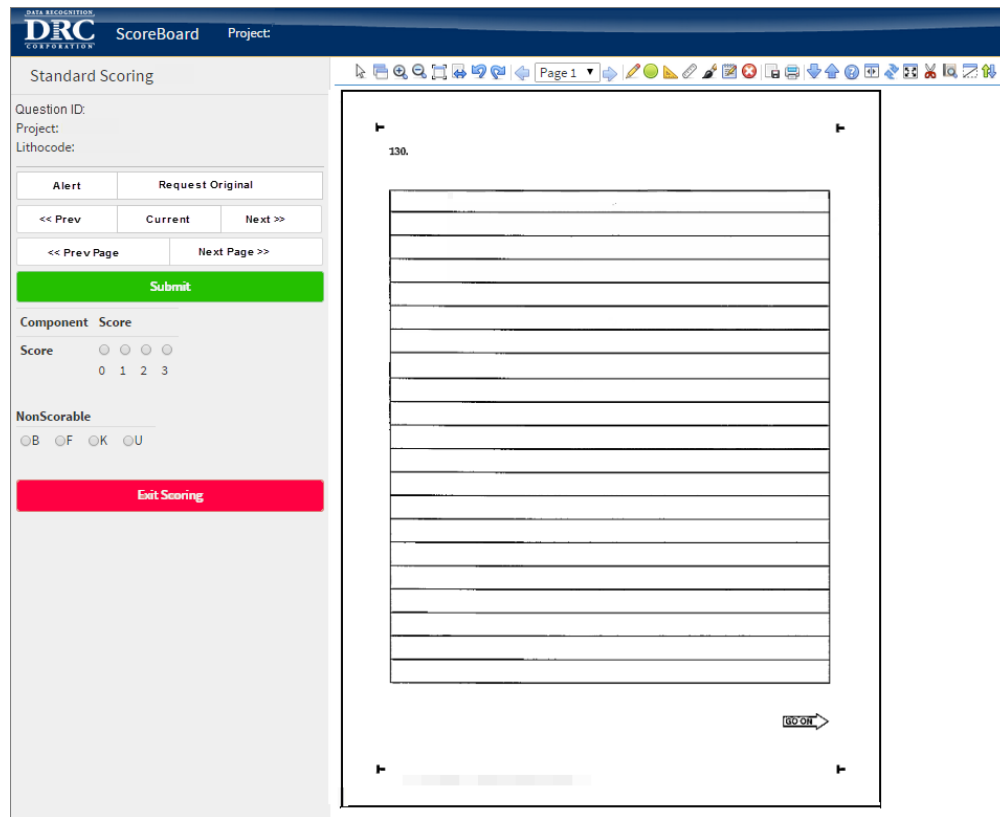
We are also able to import annotated copies of each training set and qualifying set that will be available to readers throughout the entire scoring session. Annotated copies may include rationales that reference scoring guideline language and anchor responses to explain the reasoning behind each response’s score. Annotated copies may also include marked-up versions of the responses that direct readers’ attention to certain features of a response by underlining or circling parts of the student response.

Once readers have been set as “qualified” for an item within the system, they may move to live scoring. Scoring directors have complete control over the process of who is qualified ensuring that all readers have demonstrated scoring proficiency (e.g., scored a sufficient number of responses correctly on a qualifying set) before viewing any live responses.

Scoring Platform

The Scoring Platform provides readers with a full suite of tools while scoring responses. The following screen shot shows the scoring screen that readers use.

Reader Scoring Screen



The system provides scorers with the ability to view full-page images from multiple perspectives, such as zoomed in/out, flipped, or rotated, to correctly interpret written responses. However, the images remain intact within the various viewing capabilities and cannot be modified by the scorers. Additionally, the Image Handscoring functionality applies a set of process rules and client-defined read-behind criteria.

The IHS functionality requires scorers to forward all non-scorable responses to the Scoring Director. Only the Scoring Director is able to assign non-scorable codes. Scorers will “alert” any responses that indicate potential issues related to the student’s safety. The alert process is described more fully below.

Each handscoring site is connected to the main DRC operations facility with multiple T1 transmission lines. The operations facility has secure database servers and multiple applications that support the scanning, editing, scoring, and handscoring processes. Database backups and archived images are stored off-site on tape media for disaster recovery purposes. Each DRC scoring site has a server and a local area network (LAN). Scorers, Team Leaders, and Scoring Directors connect to the LAN via hundreds of PC workstations and use locally resident software to view and score student responses. Authorized on-site DRC personnel (e.g., content specialists, project managers) can access the LAN to recall images of any student document.

Quality Control of the Handscoring Imaging System

Software quality assurance analysts test the imaging system to verify that all handscoring programs are compliant and in place for performance assessment personnel prior to the transfer of production images. Images produced from test scan files are randomly distributed to handscoring computer terminals, where quality assurance analysts score the test images using the Pennsylvania handscoring criteria and specifications. Throughout this testing cycle, multiple quality checks are executed to ensure that the data integrity for each student record is intact and accurately reflected in the scoring database.

The handscoring quality control reports are also tested by quality assurance analysts during this process to ensure that the performance assessment personnel will be able to track scorer reliability, score point distribution, and item status throughout the handscoring phase of the assessments.

Please see the subheading titled *Handscoring Quality Control*, further along in this section, for additional details.

Scoring Procedures

We believe that our training, scoring, qualifying, and monitoring processes, described in this proposal, are the best in the industry. All of these processes were used to score previous Pennsylvania assessments, and DRC currently uses them to score other similar large-scale assessments. We will uphold the same level of dedication to accuracy and quality under this new contract.

- The Scoring Director will explain in detail the directions for use of the computerized handscoring system. All scorers will follow along using the Imaging Handbook, created specifically for DRC scorers.
- The student responses are routed to scorers by grade and item/prompt. Images of responses are sent to designated groups of scorers qualified to score those items/prompts. Only qualified scorers have access to student response images. The scorers will read each response and enter the correct scores. After the scores are entered, a new response image will appear.
- All responses will receive the appropriate number of readings. When two readings are required, our imaging system ensures that all responses are properly routed to two separate scorers who are qualified to score the prompt. Scorers do not know if they are reading a response for the first or second time; all first and second readings are, in effect, “blind.”
- Ongoing quality control checks and procedures are employed to monitor and maintain the quality of the scoring sessions. If any unusual data are observed, DRC will investigate and resolve any issues.
- Routing and scoring of images continues until all student responses have received the prescribed level of first and, if appropriate, second readings.

- DRC’s Image Handscoring System allows for on-demand retrieval of specified images (e.g., specific batch files, specific grades, specific students) should the need arise during or subsequent to the handscoring process.

Monitoring Scorers

During the handscoring process, the room Scoring Directors will meet with their Team Leaders each morning to review the statistics generated from the previous day’s work. If scoring patterns are apparent among scorers, each Team Leader will deal with these issues on an individual basis. Our imaging system allows a Team Leader to determine read-behind rates (frequency of monitoring) for each scorer. If the scorer needs scoring guidelines clarification, or is scoring tentatively, can increase the number of read-behinds on an individual basis. The imaging system randomly selects which images the Team Leader will read behind.

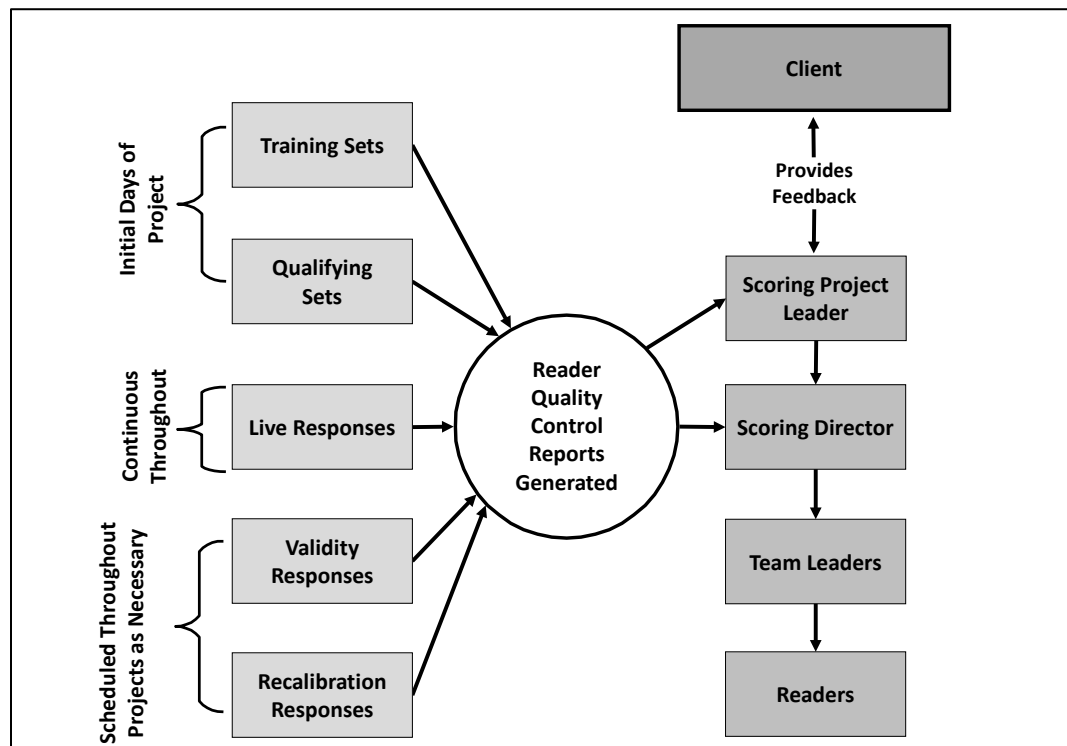
We also will study the inter-scorer agreement. If a scorer falls below an acceptable rate of agreement, the Team Leader will re-train the scorer. If a scorer fails to improve after re-training and feedback, DRC will remove the scorer from the project.

DRC does not report on scorer performance after the fact, as some contractors do. We believe that scorers with less-than-acceptable scoring patterns must be identified immediately and those patterns corrected. DRC has worked diligently to devise effective monitoring reports and procedures to accomplish both detection and correction. If a scorer is terminated or is given the opportunity to re-train, our imaging system erases all scores previously given by that scorer and re-deals those images to other, qualified scorers.

Handscoring Quality Control

DRC has consistently been able to ensure high-quality and consistent handscoring for all of our clients. To accomplish this, DRC relies on a palette of highly effective handscoring quality assurance tools. DRC’s handscoring staff—from the team leader level through upper management—is exceptionally adept at using our various handscoring reports, tools, and metrics to ensure scoring quality and consistency.

Handscoring Quality Control Process



Accurate and consistent results are the backbone of all handscoring activities. The following methods used by DRC guarantee scoring quality:

- **Anchors** are pre-scored student responses used to define and exemplify the score scale from the scoring guidelines. For each score point, anchors will be selected to reflect the range of performance represented by that score based on the judgment of the rangefinding committee members. The anchors, which will be included in the scoring guide, will be used to clarify the scoring scale during scorer training.
- After an **intensive training** session, as described earlier in this proposal, qualifying rounds will be conducted by Scoring Directors.
- **Qualifying** responses impart similar lessons and highlight similar scoring decisions to the anchor and training responses which have been pre-scored through rangefinding. The qualifying responses will be divided into sets and scored independently by each scorer trainee. The data from these qualifying rounds will be used to determine which scorer trainees will be qualified for actual scoring.

- **Validity and recalibration** responses will be used throughout the scoring session to monitor the scoring by comparing each scorer's scores to pre-determined scores. Validity/Recalibration sets are used to re-focus scorers on the Pennsylvania scoring standards by comparing the pre-determined score to that assigned by the scorer. In addition, these examples may be used by the Scoring Director or Team Leaders for a re-training session.
- Team Leaders will conduct routine **read-behinds** for all scorers.
- **Inter-rater reliability and score point distribution reports** are another method of rating scoring quality. To monitor scorer reliability and maintain an acceptable level of scoring accuracy, DRC will closely review reports that will be produced daily. The reports document individual scorer data, including scorer number, number of responses scored, individual score point distributions, and exact agreement rates. DRC will investigate any issues and resolve any problems these reports identify.

Handscoring Quality Control Summary Reports

DRC has developed a number of quality control reports for our handscoring projects. Because we can produce these reports on demand, we can assure PDE that immediate action will be taken to resolve scoring discrepancies within minutes (when necessary) of the first and/or second reading. DRC proposes to prepare numerous reports to monitor the quality and effectiveness of various aspects of the project. We will work with PDE to determine which reports are desired for the Pennsylvania assessments. Our handscoring quality control reports are described in the following table.

Sample handscoring reports prepared by DRC are included in *Volume IV; Appendix H, Sample Handscoring Reports*.

Handscoring Quality Control Reports

| | Report Specifics |
|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scoring Summary Report | <p>DRC’s Scoring Summary Report provides daily and cumulative inter-rater reliability results, score point distribution data, and production volumes for each reader and item.</p> <p>Inter-rater Reliability Monitors how often scorers are in exact agreement with each other and ensures that an acceptable agreement rate is maintained. This report provides daily and cumulative exact and adjacent inter-scorer agreement and the percentage of responses requiring resolution (only if required). The calculations for this report are as follows:</p> <ul style="list-style-type: none"> ■ Percent Exact—total number of responses by scorer where scores are equal divided by the number of responses that were scored twice. ■ Percent Adjacent—total number of responses by scorer where scores are one point apart divided by the number of responses that were scored twice. ■ Percent Non-Adjacent—total number of responses by scorer where scores are more than one score point apart divided by the number of responses that were scored twice, when applicable. <p>Score Point Distribution Monitors the percentage of responses given each of the score points. For example, for items on a 0–4 point scale, this daily and cumulative report shows how many 0s, 1s, 2s, 3s, and 4s a scorer has given to all the responses he or she has scored at the time the report is produced. These percentages can be compared to room-wide percentages to detect potential individual scoring issues.</p> <p>Production Volumes Indicates the number of responses read by each scorer each day so that production rates can be monitored. Additionally, it includes totals for each item, so that progress toward completion can be monitored.</p> |
| The Item Status Report | Monitors the progress of handscoring. This report tracks each response and indicates the status (e.g., “needs a second reading,” “complete”). This report ensures that all discrepancies are resolved by the end of the project. |
| The Responses Read by Reader Report | Identifies all responses scored by an individual scorer. This report is useful if any responses need rescoring due to potential scorer drift. |
| The Read-Behind Log | Used by Team Leaders/Scoring Directors to monitor scorer reliability. Team Leaders randomly select and read scored responses from each team member daily. If the Team Leader disagrees with the scorer’s score, remediation occurs, either with the Team Leader or the Scoring Director. This has proven to be a very effective form of feedback because it is implemented with items live-scored by individual scorers. |

| | Report Specifics |
|-------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Validity Reports | Can be generated on demand throughout the scoring process. All validity reports compare pre-determined scores to scorers' scores for validity responses. These reports can be run at the individual, team, or room level in order to detect individual, team, or room-wide scorer drift. |

Validity and Annual Scorer Drift Studies

DRC has conducted annual drift studies for the PSSA operational items for the past several years. Our Psychometric Services Department will continue to work with the Handscoring Team to conduct annual scorer drift studies. These studies look at both internal consistency within year and consistency across years.

DRC applies a system-based approach for maintaining scoring accuracy and closely monitors scorers' consistency for all of our clients, including Pennsylvania's PSSA and Keystone Exams assessments. One key element to this approach is the use of validity papers as part of the scoring validation process. The use of validity papers is designed to ensure that scoring standards are **maintained within years and across years**. Specifically, the objective is to make sure that scorers assess student responses in a manner consistent with scoring rubrics specified for a testing program, both within a single administration and across consecutive administrations.

The validation process is currently employed on all PSSA and Keystone Exams core constructed-response items, and on all operational writing prompts.

The validation process begins with the selection of scored responses from the initial field test for all open-ended constructed-response items and writing prompts. The content Handscoring Team will construct a set of exemplar papers with responses that are representative of each score point. The exemplar set contains examples of each score point at three levels of strength (e.g., weak 2 point response, mid 2 point response, strong 2 point response). Forty validity papers are drawn from the pool of exemplars such that the complete spectrum of response is represented. The scores on validity papers are considered true score.

The validity papers are then utilized to monitor test scorer accuracy. The responses for the validity papers are scanned into the imaging system and dispersed intermittently to the scorers. Scorers are unaware that they are being dealt pre-scored validity responses and assume that they are scoring live student responses. This helps bolster the internal validity of the process. It is important to note that all scorers who receive validity papers have already successfully completed the training/qualifying process.

Next, the scores that the scorers assigned to the validity papers are compared to the true scores in order to determine the validity of the scorers' scores. For each item, the percentage of exact agreement and the percentage of high and low scores

are computed. This data is assessed by scorer and is accessed through the Validity Reader Detail Report. Both of these reports may be run as daily or cumulative reports.

The Validity Reader Detail Report is used to identify particular scorers for re-training during the scoring session. If a scorer on a certain day generates a lower rate of agreement on a group of validity papers, it is immediately apparent in the Validity Reader Detail Report. A lower rate of agreement is defined as anything below 70% exact agreement with the true scores. Any time a scorer's validity agreement rate falls below 70 percent, the Scoring Director is cued to examine that scorer's scoring. The Scoring Director will identify the type of validity papers the scorer is scoring and the scorer is re-trained. If it is determined that the scorer had been scoring live papers inaccurately, then his/her scores are purged for that day, and the responses are re-circulated and scored by other scorers.

The cumulative Validity Item Detail Report is utilized to identify potential room-wide trends in need of correction. For instance, if a particular validity response with a true score of 3 is predominantly given a score of 2 by scorers within the room, that trend will be revealed in the Validity Item Detail Report. To correct a trend of this sort, the Scoring Director will look for student responses similar to the validity paper being scored incorrectly. Once located, these responses will be used in room-wide re-training, usually in the form of an annotated handout or a short set of papers without printed scores given to scorers as a recalibration test.

Our experience has shown that the use of validation papers is the most accurate way to pinpoint individual and room drift throughout the scoring of responses to constructed-response items and writing prompts. It is important to note that if an item/prompt is re-used on another operational form, the same set of validity papers will be used to maintain scoring accuracy. The use of the same set of validity papers provides even further stability to the score validation systems. DRC includes a synopsis of our annual score validation process with rater (or scorer) agreement results in each Technical Report.

In addition to validity, DRC has conducted annual drift studies for the PSSA operational items for the past several years. DRC's Psychometric Services Department has incorporated the evaluation of rater drift for open-ended items on the PSSA. Similar to the validity process above, DRC selects a sample of 1000 previously scored papers stratified on score point with a minimum of 100 papers per score point. The sample is selected such that the raw score distribution matches the previous population within a tolerance of 0.5% at each raw score point to further ensure that the sample of previously scored papers is representative.

The previously scored responses for the sample will then be randomly distributed to the current scorers in a controlled fashion. These papers are dealt in calculated quantities and times based on the group of scorers and the daily scoring schedule to ensure that the distribution of previously scored papers dealt to scorers is

essentially uniform. Once the previous responses have been re-scored by the current scorers, DRC evaluates the degree to which the pools of scorers are scoring more leniently or severely (i.e., rater drift). Adjustments for the rater drift are made for each operational constructed-response linking item as part of the calibration and equating analyses. These adjustments are typically quite small for PSSA open-ended items, further supporting the validation procedures that are in place for the testing program. Our Psychometric Services Department will continue to work with the Handscoring Team to conduct annual scorer drift studies. Specifically, we are proposing to continue the rater drift evaluation within the PSSA until drift adjustments are judged to be negligible by PDE, TAC, and DRC. Rater drift evaluation will also be thoroughly documented in the annual Technical Report.

Report of Constructed-Response Scoring Process

DRC's handscoring team will continue to supply documentation of the constructed-response scoring process in the annual Technical Report. This documentation will include pertinent information on all scoring procedures as well as resulting score data. Please refer to *Subheading 4.H.1.e., Technical Report (TR)* of this proposal for more information about the annual Technical Report.

Handling Unusual Responses and Disturbing Responses

Unusual or aberrant responses that cannot be assigned a score will receive a non-scorable code. Our handscoring and test development teams recently collaborated with PDE to ensure consistency of non-scorable codes across content areas. Prior to scoring, DRC will work closely with PDE to define what specifically constitutes a non-scorable response for each item type. During scoring, DRC will contact the designated PDE representative to obtain a ruling on responses that cannot be assigned a score based on our understanding at that point.

To handle possible alert papers (student responses indicating potential issues related to the student's safety and/or well-being that may require attention at the local level), DRC's imaging system gives scorers the ability to alert (flag electronically) questionable student responses. An alerted image is routed to the Scoring Director, who will determine if it is alertable. Next, the alert is reviewed by the Handscoring Project Advisor, who then forwards student's response to DRC's Pennsylvania Project Management Team if the response warrants an alert. The response is then sent to PDE for direction; PDE is given district/school information, but is not provided with any student-identifying information. If PDE finds the alert to be legitimate, Project Management then sends correspondence to the LEA and copies PDE on the correspondence. Please be assured that at no time during scoring do any scoring personnel have access to demographic information on any students participating in the assessment.

4.H. Psychometric Analysis Procedures and Data Forensic (DF) Psychometric Analysis

DRC's Psychometric teams will continue to be led by **Dr. Mayuko Simon** (PSSA), **Dr. Ann Hu** (Keystone), **Ms. Pam Hermann** (CDT), and **Ms. Christie Plackner** (Data Forensics). Additionally all programs will be supported by both **Dr. Marc Julian** and **Mr. David Chayer**. DRC's Psychometrics Services team looks forward to continuing the successful relationship and providing quality psychometric work for the Commonwealth of Pennsylvania.

Our proposed Psychometrics Team's commitment to quality and excellence is devoted to assuring our research designs and analytic procedures meet the professional measurement standards articulated in the *Standards for Educational and Psychological Testing* (AERA, NCME, & APA, 2014). Our psychometric staff is responsible for the design and implementation of all scaling, equating, reliability, and validation activities required to support high-quality, large-scale assessment programs. Moreover, as experts in educational measurement and assessment, our goal is to facilitate sound policy making by providing complete, accurate, unbiased information regarding the scientific and psychometric aspects of large-scale assessment.

4.H.1. PSYCHOMETRIC ANALYSES

We recognize one of the significant challenges faced by PDE is the management of multiple testing programs (i.e., PSSA, Keystone Exams, and CDT) that require multiple modes of delivery (i.e., paper/pencil, CBT fixed-length, and computer-adaptive testing [CAT]), using multiple item/task formats, at multiple time points for different purposes and audiences. DRC has been actively engaged in developing and maintaining comprehensive psychometric infrastructure in collaboration with PDE to successfully meet these challenges. We look forward to continuing our successful working relationship with PDE, providing comprehensive psychometric analysis and support of the Pennsylvania System of Assessments. What follows is a detailed discussion of our plan for psychometrics, research, and technical activities of the PSSA, Keystone Exams, and CDT tests, including the plans for conducting relevant data forensic analysis.

4.H.1.a. Operational and Field Test Analysis

For the Pennsylvania System of Assessments, DRC recognizes that PDE has high expectations for the technical analyses and that they meet the *Standards for Educational and Psychological Testing* as well as best practices in high-stakes educational testing. In general, our analysis plans for each testing program consists of three types of analysis:

- Classical test theory-based item analyses, including p -values, point-biserial correlations, distractor analyses, and differential item functioning (DIF)

- Item response theory-based analyses, including Rasch item calibration, model/data fit analyses, dimensionality, equating, and scaling
- Post-administration scoring and reporting

The specific analytic methods that will be implemented are driven by the specific requirements of each testing program. Each level of analysis is discussed briefly and key elements of the psychometric work required for specific testing programs are highlighted.

Classical Item Analyses

The delivery of the assessments required for all testing programs maintained by PDE necessitates the development and ongoing maintenance of item pools. These item pools must reflect the content of the academic standards and the variety of item types required by each testing program, including rich and engaging items that may be presented individually or in testlets (e.g., passages or scenarios). Moreover, each pool must be constructed such that it supports the delivery system (paper/pencil, CBT fixed-length, CAT) required by the testing program. Each item within a given pool will have an extensive set of item statistics to facilitate test assembly. The item statistics will be computed when initially field tested as part of the psychometric work that supports operational test administration for PSSA, Keystone Exams, and CDT testing programs.

Regardless of the testing program, all items will be evaluated using classical test theory using non-proprietary software. Classical item analysis statistics, such as p -values, item-total correlations, and distractor analysis will be estimated and evaluated. DRC's Psychometric staff begins this process with key verification, computing the number and proportion of students selecting each response option, the p -value for the item, the item-total correlation for the key, and the item-total correlations for each of the response alternatives. In addition, a distractor analysis is conducted to identify patterns of item responses that are inconsistent with the total raw score. For example, we expect that the proportion of students selecting the keyed response option should increase as ability (raw score) increases. Conversely, the proportion of students selecting each of the incorrect response options (distractors) should decrease as ability increases. DRC has found that this type of analysis, when used in conjunction with the above-mentioned item statistics, is a powerful tool in detecting possible item miskeys.

DRC calculates Differential Item Functioning (DIF) statistics to detect possible item bias. DIF analysis is designed to detect items for which students of equal ability from different groups do not have the same probability of answering the item correctly. DIF results will be provided by gender, ethnicity, administration mode, and other requested subgroupings where sample sizes are sufficient to perform the analyses. We recommend the use of two different DIF methodologies depending upon item type: Mantel-Haenszel (Mantel and Haenszel, 1959) for multiple-choice items and the standardized mean differences (SMD) (Zwick, Donoghue & Grimes, 1993) for polytomous or multi-point items.

Item Response Theory Analyses

Item response theory calibration and scaling analyses will be used throughout our work on the testing programs maintained in Pennsylvania. DRC proposes to use a common item calibration that places both multiple-choice and open-ended item types onto a common scale. The multiple-choice items (MC), scored right or wrong, will be calibrated using the familiar form of the Rasch model (Rasch, 1960). The open-ended items will be calibrated using the partial-credit Rasch model (Wright & Masters, 1982; Masters, 1982). The latter model parameterizes the threshold such that there is a single item difficulty parameter associated with each possible score after zero. In this context, a multiple-choice item may be thought of as a partial-credit task with a single threshold.

The Rasch model applicable to dichotomously scored items (MC) can be expressed as:

$$1. \Pr(\text{right} \mid \beta_n, \delta_i) = \frac{\exp^{\beta_n - \delta_i}}{1 + \exp^{\beta_n - \delta_i}}.$$

The probability of success for a person with ability β_n on an item with difficulty δ_i is determined by the difference between the ability of the student and the difficulty of the item.

With the partial-credit model used for open-ended items, π_{nik} is the probability that person n will score k on item i . Then, the *first* threshold for item i is a score of 1 rather than a 0, which is the conditional probability of a score of 1, given a score of 0 or 1:

$$2. \Phi_{1ni} = \frac{\pi_{ni1}}{\pi_{ni0} + \pi_{ni1}} = \frac{\exp(\beta_n - \delta_{i1})}{1 + \exp(\beta_n - \delta_{i1})},$$

where β_n is the ability of person n and δ_{i1} is the difficulty of the first threshold. The expression on the right is identical to the Rasch model for a dichotomous item.

For example, with a three-point open-ended item, where a person n must make one of the four possible scores (0, 1, 2, or 3) on item i ,

$$3. \pi_{ni0} + \pi_{ni1} + \pi_{ni2} + \pi_{ni3} = 1$$

These relationships can be rearranged to obtain one general expression for the probability of person n scoring x on item i :

$$4. \pi_{nix} = \frac{\exp \sum_{j=1}^x (\beta_n - \delta_{ij})}{1 + \sum_{k=1}^{m_i} \exp \sum_{j=1}^k (\beta_n - \delta_{ij})}, \quad x = 1, \dots, m_i$$

If the number of thresholds (m_i) is one, the summations in expression (4) drop out and it reduces to expression (1).

Joint-maximum-likelihood estimation of item parameters will be accomplished using WINSTEPS (2014), a commercially available software package used to implement Rasch measurement models. WINSTEPS is a comprehensive program that can be used to assess dimensionality, local item dependence, and other assumptions that ensure proper estimation of model parameters. Once these assumptions are met, the number of correct responses to a given set of items is a sufficient statistic for estimating person ability. As a result, item parameters and person ability estimates are expressed on the same scale, leading to technically sound equating and appropriate use and interpretation of scores.

During all IRT analyses conducted in support of the PSSA, Keystone Exams and CDT, DRC Psychometric staff will employ a standardized set of quality control procedures. This includes a thorough evaluation of the item parameter estimates. In particular, we focus on whether the test meets the assumption of unidimensionality to make sure that the chosen measurement model fits the data for each administration. In particular, we expect that the first dimension associated with the Rasch model will account for the majority of score variation. This is accomplished in WINSTEPS via a principle component analysis of the residuals. If the assumption is met, an analysis of the residuals will indicate that variation associated with secondary factors is negligible.

Model-data fit will be monitored using Mean Square (MS) infit and MS outfit statistics, which indicate the degree of accuracy and predictability with which the data fit the IRT model (Linacre, 2002). Infit is sensitive to misfit on items targeted at the ability level of the person, whereas outfit is sensitive to misfit on items with difficulty far from the ability of the person (Linacre, 2002).

To evaluate the strength of the equating for each operational administration, we focus on Robust-Z (Huynh & Meyer, 2010) and/or WINSTEPS displacement values as indicators how well a particular item is functioning as an anchor. In this context, the anchor items have been previously used in another administration which allows us to check whether the parameter estimate in this year's administration varies significantly from last year's. Items with large Robust-Z or displacement are carefully investigated for cause and may be considered for removal from the equating process.

DRC maintains a comprehensive set of systems that can be tailored to PDE's needs for form selection, calibration, equating and scaling. Our systems currently

incorporate all item/task types whether individual items or passage or scenario based. In addition, DRC's item banking and test assembly systems facilitate the construction of test forms regardless of delivery method (i.e., paper/pencil, CBT fixed-form, and CAT).

Scoring, Reporting and Documentation

DRC conducts an extensive set of analyses on the state data after each testing cycle has been completed. For all testing programs, we establish and document evidence of the reliability of test scores at the total and subscore levels, as well as for designated student subgroups. Particular attention will be paid to reliability around the cut scores. Decision consistency and generalizability estimates of standard errors will also be provided. Decision consistency information will include estimates of the probabilities of misclassification based on the existing four performance levels.

The comprehensive set of psychometric work (e.g., calibration, equating and scaling) associated with each major phase (i.e., field testing, item banking and test assembly, operational administration and score reporting) will be thoroughly documented in the technical reports and memoranda developed for each testing program. To maintain reliability and validity of the testing programs, Psychometric staff will work with Test Development staff to provide practical and useful information to PDE after each major phase. This will allow PDE to proactively address any issues that may arise.

4.h.1.b. Equating and Scaling

DRC recognizes that PDE has the highest standards for technical analyses for the Pennsylvania System of Assessments and that accurate equating and scaling activities are fundamental to the success of the testing programs. DRC, in collaboration with PDE and its technical advisory committee (TAC), will be responsible for developing and maintaining the current scales of measurement. DRC understands that PDE plans to retain the existing scales for the CDT, Keystone Exams, and PSSA science assessments. DRC also acknowledges that new scales for PSSA mathematics and ELA assessments will be established in June 2015.

DRC understand that test forms will be constructed annually beginning with the summer 2016 Keystone Exams. Test forms will contain both core items and embedded field test items beginning with the spring 2017 administrations of the PSSA and the Keystone Exams. More information about test construction can be found in *Subheading 4.C.8*.

We look forward to continuing our successful working relationship with PDE, providing comprehensive psychometric analysis and support of the Pennsylvania System of Assessments.

Scaling

DRC understands that a core task required by this RPF is the maintenance of the scales of measurement that support each testing program. The scales of measurement developed in support of the PSSA ELA and Mathematics assessments must be carefully monitored given they were newly established in 2015. Existing scales of measurement that support the PSSA Science, Keystone Examinations, and the CDT testing program must be continually evaluated to ensure they continue to function appropriately. The data collection, item calibration, and equating required to manage scales of measurement to meet the goals of each testing program can be complex. Our extensive history in the development, implementation, and management of the scales of measurement that support the assessments delivered throughout the Commonwealth of Pennsylvania make DRC ideally suited to continue this work moving forward.

Evaluation of Dimensionality

Rasch models assume that one dominant dimension determines the difference among students' performances. Principal Components Analysis (PCA) will routinely be used to assess the unidimensionality assumption for each operational administration. The purpose of the analysis is to verify whether any other dominant component(s) exist among the items. Our experience in working with the PSSA, Keystone and CDT is that the unidimensionality assumption is reasonable and that the Rasch model can be appropriately implemented to manage the scales of measurement.

DRC will also conduct validation research to further evaluate the dimensionality of the assessment administered within the Commonwealth. Specifically, we will use a combination of exploratory and confirmatory factor analysis models (see Thompson, 1994). First, an exploratory factor analysis will be fit to the items in order to assess the number of dimensions. Both orthogonal and oblique rotations of the resulting factors will be implemented to enhance ease of interpretation. The revealed patterns of item to factor loadings will then be evaluated to further articulate the definition of the factor structure.

Following the exploratory factor analyses, a complimentary set of confirmatory factor analyses will be performed to test which of a set of factor analysis models "best fit" the data. Specifically, a model assuming item unidimensionality will be directly compared to models wherein multiple factors are specified. These alternative models can be based on the exploratory analyses or specified on the basis of substantive expectations like the reporting categories. Overall model selection and fit will be evaluated using a chi-squared significance test as well as a numerous other model fit statistics (Bollen & Long, 1993; Kaplan 2000).

The use of categorical item response data necessitates the factor analyses be based on polychoric correlation matrices. Moreover, the clustered nature of the data (i.e., students nested within classrooms) can make polychoric correlations difficult to estimate using such data (Carlson, 1993). Furthermore, when factor analytic

models are fit to such data, the associated model/data fit statistics and parameters can be biased. Fortunately, corrections for bias introduced by complex samples (Satorra & Bentler, 1994) have been built into factor analytic software programs. We recommend that the commercially available Mplus (Muthen & Muthen, 2006) software be used for both the exploratory and the confirmatory factor analysis.

Subtest Scores

While our proposed calibration, scaling, and equating analyses are focused on the development and maintenance of scales of measurement defined at the total test level, we recognize that there is also a need to provide viable subtest score information to increase the assessment's diagnostic value for assessment stakeholders. DRC has developed a number of useful and informative options for reporting subtest scores in large-scale testing programs.

For example, student subtest scores may be obtained by estimating each student's expected percent correct on a reference form developed to reflect the broad PSSA test blueprint. This reference form provides a common frame of reference to evaluate student test performance over multiple PSSA administrations. This allows for the direct comparison of the expected percent correct scores for all students (i.e., all students in a class could be compared to the reference form).

Similarly, mastery versus non-mastery cut-scores can readily be determined by estimating the expected percent correct for a hypothetical student at particular proficiency level cut-scores on the total test. In addition, strength and weakness profiles can readily be developed using subscore profiles and student growth relative to mastery can be observed over time.

Should PDE want to more fully explore the development of scales to support the development of multiple levels of measurement and score reporting at more granular levels such as the reporting category, DRC would first perform a comprehensive evaluation of the content specifications to ensure whether there are sufficient items for each subscale to be reported. In addition, we would need to determine whether testing time would need to be increased to allow students the opportunity to reliably demonstrate their knowledge and skills for all subtests. In addition, a series of dimensionality analyses would be conducted to provide information as to whether implementing multiple subscales is feasible from a psychometric perspective.

While multi-dimensional IRT calibration and equating procedures have been extensively addressed in the psychometric literature (Reckase, 1985; Whitely, 1980), their inherent complexity makes them more difficult to use, interpret, and explain.

DRC would be happy to discuss the advantages and disadvantages of the various available methods of enhancing the interpretability and value of subscore reporting.

Equating

DRC recognizes the need to establish a connection between the measurement scales across administrations for each of the testing programs (PSSA, Keystone Exams, and CDT). Moreover, we understand and accept that PDE requires that the technical quality of the equating meets the *Standards for Educational and Psychological Testing* as well as best practices for high-stakes educational testing.

To connect the scales of measurement across administrations, we will implement a common-item, non-equivalent groups design, wherein different cohorts of students take a common set of linking (anchor) items. This common-item design is reflected in PDE's current test designs which are detailed in *Subheading 4.B*. The Mean/Mean linking procedure (Loyd and Hoover, 1980) will be used to estimate the transformation constants that define the link between two assessments.

The Mean/Mean method uses the mean of the items difficulty (b) parameter estimates for the linking items to find the transformation constants alpha (α) and beta (β):

$$\beta = \bar{b}_Y - \alpha \bar{b}_X$$

where \bar{b}_Y and \bar{b}_X are the item difficulty values of the linking items in tests Y and X, and α is the slope and β is the intercept of the linear transformation line. Note that $\alpha = 1$ when the Rasch model is used and the equating transformation is defined by the difference between the difficulty estimates for the linking items.

The transformation constants are used to transform the item parameter estimates on the provisional scale x to the existing scale y . This places all unique items onto the existing scale y .

While the Mean/Mean approach is a common linking method used within large-scale educational assessments scaled using the Rasch model, it is also possible to evaluate the consistency of the equating results alongside other commonly used methods such as: Mean/Sigma (Marco, 1977), Robust Mean/Sigma (Linn, Levine, Hastings, & Wardrop, 1981), Stocking and Lord TCC method (1983), and another TCC method developed by Haebara (1980). DRC will work with PDE and its TAC to determine if equating methods in addition to Mean/Mean should be explored.

We will conduct a rigorous evaluation of each equating analysis. Given that the parameters for the linking items have been previously estimated, we can check whether the parameter estimates from the current year's administration varies significantly from the previously obtained parameter estimates. Outlying items can be identified by plotting the input and estimated item parameters along with the line of best fit. We will employ multiple methods to evaluate linking items including scatter plots of the item parameters, t -tests of the discrepancy of the item parameters, and Robust-Z and displacement statistics.

Population invariance analysis will also be performed as part of our evaluation of equating. The methodology of population invariance analysis follows Dorans and Holland (2000). The analysis examines the degree of cumulative deviance across subgroups compared to the population (all students) calibration and equating results. For each subgroup of interest, the usual item calibration and equating process will be conducted separately including students in specific subgroup. The subgroups considered are gender (male, female), ethnicity (White, Black, and Hispanic), and scrambling pattern (A, B, C, D, E, F, G, M).

Pre-Equating vs. Post Equating

DRC has extensive experience in managing high-stakes testing programs that are based on both pre-equating and post-equating designs. Pre-equating designs have value in that they expedite score reporting and assure score stability across administrations. In contrast, post-equating designs provide additional information because the item parameters are re-estimated after each administration, but it can be more time consuming. Regardless of whether a pre-administration or post-administration equating design is used, all equating analyses will be implemented in parallel with PDE to best support the stability of the reporting scale. Where common item, post-administration equating methods are employed, the careful selection of the anchor set with respect to content coverage and psychometric characteristics will be a key element in the test construction process. When pre-administration equating methods are employed, careful selection of the content coverage and test construction of a test matching psychometric targets defined in previous operational administrations will be our focus.

The specific implementation of the equating analyses depends on the requirements of the testing program. Next, we briefly discuss each program.

PSSA

For the **PSSA**, we are proposing to continue with post-administration equating analyses, wherein items from the previous operational administration of PSSA will be included as linking items. The equating transformation that defines the link between each new form of the PSSA and the existing scale of measurement will be calculated using the Mean/Mean method (Loyd and Hoover, 1980), described earlier. PSSA utilizes both an internal link where all students take a common set of linking items (core-to-core) that count towards a student score and an external link (equating block) where additional linking items are administered in small chunks to equivalent groups of students. Using both internal and external linking items provides an extremely strong mechanism to link test forms. Once the item parameters have been linked to the operational scale, raw score to equated scale score conversion tables are produced. All supporting documentation and conversion tables will be compiled in extensive detail within an equating report that will be provided to PDE and TAC for review and approval prior to issuing score reports.

Keystone Exams

For the **Keystone Exams**, we are proposing to maintain a pre-administration equating approach with a post-administration verification check. With pre-equating, all items are linked to the common scale of measurement prior to the operational test administration to support expedited score reporting. The equating procedures supporting the Keystone Exams are also based on the common item, non-equivalent groups design. However, in this application, students take a common set of operational items and small subsets of field test items. The entire pool of field test items that will be used to build subsequent Keystone Exams are linked to the common scale of measurement using the same equating procedures. Once linked to the common scale of measurement, the item pool is used to assemble new forms of the Keystone Exams using the field test statistics, and raw-score-to-equated-scale-score tables are built prior to the operational administration. After the operational administration has occurred, DRC conducts a post-administration equating evaluation to identify discrepancies between pre-administration and post-administration equating solutions.

Keystone Exams Best Score Calculation

DRC's sophisticated process for banking and managing Keystone Exams scores across multiple administrations and years will ensure that all students have their best scores reported for accountability. For the Keystone Exams, a student's best scaled score and overall performance level is calculated using all past test events. For example, if a student's module 1 score in one administration is their highest score for that module, but their highest score for module 2 was in a subsequent retake opportunity, the calculated highest or best total score is based on module 1 from the first administration and module 2 from the retake. This approach avoids the inherent problems with treating each highest module score as a composite, which ignores the advantages of utilizing IRT as a solution. Leveraging IRT methodologies, DRC obtains the most accurate estimate of this best score by treating it as if the student took both highest module sessions at the same time. With this approach, we obtain maximum precision and minimum error compared to a composite approach.

CDT

For the **CDT**, all items within the pool supporting the computer-adaptive test (CAT) administration have been linked to a common scale of measurement. Unlike PSSA and Keystone Exams, the CDT is vertically scaled across grades and courses within a content area. Our psychometric team conducts extensive simulations prior to the operational administration to prepare for operational testing. The simulations are designed to confirm that each test event adheres to the test blueprint and test specifications. In addition, our simulations allow us to examine systematic patterns in the order of administration of items, or sets of items, associated with passages or scenarios. The simulations allow us to pay special attention to the precision of the ability estimates across the full range of proficiency. For each simulated examinee, we compute the test information functions to assess how well we tailored each test to each student. Lastly, our

simulations include an evaluation of how well students across the range of proficiency are being served by the CAT system. Test administrations for students at specific points will be simulated and we will compare the final proficiency estimate of each student to the true values to assess the accuracy and stability of the estimations. During the operational analyses, we will conduct ongoing analysis to monitor the functioning of the CAT algorithm. Daily student files are generated which allow us to check whether all the constraints, such as content coverage, are met for the administered forms. We also monitor the accuracy and stability of the final ability estimates for the students using measures, such as bias and measurement errors, to ensure that the algorithm behaves as we expect both at the overall test level and at subtest levels. At the end of each testing cycle (school year), CDT banked item parameters are evaluated for stability. Items that show large changes in values may be re-estimated with the most recent operational data, or removed from the item pools.

Third-Party Equating Verification of the PSSA Assessments and Keystone Exams

In the high-stakes era of large-scale assessment, it has become more and more common for states to require that the equating and scaling calculations associated with these systems be replicated and verified by independent, third-party experts. Pennsylvania has used this model for many years with DRC providing primary psychometric processing. Independent replication is a strong form of quality control that ensures the accuracy of test processing. It is for this reason that DRC is proposing verification for the PSSA and Keystone Exams by **eMetric**.

eMetric will serve as the objective third-party to provide technical evaluation of the equating procedures and methodology for the PSSA and Keystone Exams testing programs. In addition, eMetric will provide the personnel, expertise, and technical resources necessary to perform an independent verification of the equating results to comply with the standards for psychometric practice as outlined in the *Standards for Educational and Psychological Testing*.

Led by **Dr. Huixing Tang**, eMetric has a long history of providing psychometric consultation services to support large-scale, high-stakes state assessments. Dr. Tang has extensive experience in psychometric analysis and will provide direction and oversight for the replication work. Dr. Nathan Wall will be responsible for performing the replication work and will establish a well-coordinated set of procedures to ensure timely delivery of all results. Dr. Wall also has extensive experience in applying item response theory (IRT) to summative assessment data. In addition, Yongkang Hong, a statistician with eMetric, will provide support for all aspects of the replication work. Over the past 10 years, eMetric has worked on the replication analysis for a number of states including Connecticut, Hawaii, Nevada, and Texas. This experience has led eMetric to play a key role in ensuring the accuracy, reliability, and timely delivery of the equating and scaling results for its clients' major statewide assessment programs.

Given this history, eMetric is sensitive to the fact that equating results are to be delivered accurately and quickly to allow PDE to meet its reporting requirements. eMetric will ensure that the above mentioned team is dedicated to this effort during each equating season. Early each year, eMetric will review and, if necessary, consult on any updated or revised equating procedures to prepare for the upcoming equating work. eMetric will also participate in trainings and dry runs to ensure that all steps of the equating procedure have been verified and that analysis programs are ready to be run once the data are available.

PSSA Third-Party Equating Verification

Tasks for Third-Party Equating Verification for the PSSA

The following steps will be performed with regard to third-party verification of scaling and equating for the PSSA.

Anchor File Construction. Anchor files contain item parameters from past years for any items repeated during the current administration. These parameters can be compared to place the current administration of the PSSA onto a previous measurement scale. Since 2008, DRC has been providing an independent replicator with a full set of item parameters from previous years. eMetric will independently pull the parameters for items identified as anchors. These items can be identified using unique identification numbers, allowing their parameters to be matched to the same items repeated on the current test forms. This is a key step in ensuring the accuracy of equating and can be complex, especially if anchor parameters come from multiple years.

Sample Identification and File Construction. The next step in performing the required analyses is to identify a calibration sample for each grade-subject and construct files formatted for use with the IRT software. The prime contractor will provide eMetric with complete student data records and the inclusion/exclusion rules for the calibration sample. Calibration samples can be compared across companies to ensure a common starting data set. eMetric will then independently create control files that read the student data files and reformat them for input into the IRT software. Multiple control files will be required for this process. The purpose of each is described below.

Scaling and Equating Procedures. The PSSA is administered using multiple forms for ELA and math. Each contains a core set of common items as well as field test and equating block items that vary by form. Equating block items do not count toward students' final scores, but are used to place the current assessment on the previously established scale. Both multiple-choice and open-ended items have been used for equating in the past.

Operational (common items that all students receive), linking (repeated operational items used for equating) and equating block (repeated items unique to a form that are used for equating) student data must be read into the IRT software in order for parameters to be estimated. In the past, Pennsylvania has estimated

parameters for operational multiple-choice items separately from open-ended items and equating block items. Equating block multiple-choice items are then placed on the same unequated scale with the operational multiple-choice items by fixing the operational multiple-choice item parameters and placing the equating block multiple-choice items on the same scale using a separate control file. In the final calibration step, open-ended items are calibrated by fixing the operational multiple-choice and equating block multiple-choice item parameters from the previous steps and placing the open-ended items on the same scale using a third control file. eMetric can replicate the steps described above or can accommodate changes to the procedures. eMetric has experience with a wide array of IRT software and can also replicate simultaneous parameter estimation for multiple-choice and open-ended items or alternative procedures (e.g., Rasch, 2 or 3 parameter, partial credit).

Current PSSA parameter estimation procedures include an additional step to estimate and correct for any rater effect that might impact the equating of open-ended items which are handscored by trained raters. eMetric will replicate this step as well, knowing that there are several potential methods that might be used to make this correction.

Once parameters have been estimated for the current year of the PSSA, eMetric will use the matched anchor parameters to equate to the prior year's scale. This step is currently conducted by computing the mean difference in item parameters for the current versus prior years. Equating constants represent a major step during psychometric processing and will be used as an interim checkpoint to ensure that eMetric's results match DRC's results at this stage.

Equated parameters can then be used to create scoring tables. eMetric will replicate this step and assign student performance levels using the resulting tables (e.g., Below Basic, Basic, Proficient, or Advanced).

Since 2009, domain scores have also been calculated for PSSA. Domain scores are subscores related to specific content domains within a content area (e.g., Algebraic Concepts or Geometry). Domain scores are calculated much the same as the overall scores. Using previously estimated item parameters, IRT software can be used to calculate scale scores based on subsets of items by content domain. The domain-level scoring tables can then be placed on Pennsylvania's reporting scale in exactly the same manner as the overall test scores. Cut scores are the same as the overall assessment's cut scores except that the below basic and basic categories have been combined and reported as "L" (low). Proficient is reported as "M" (medium) and advanced is reported as "H" (high). eMetric will replicate the domain scoring tables in addition to the overall scoring tables and compare them with tables provided by DRC.

Keystone Exams Third-Party Equating Verification

Tasks for Third-Party Equating Verification for the Keystone Exams

Under the pre-equating design currently used on the Keystone Exams, the following steps will be performed with regard to third-party verification of the Keystone raw-to-scale conversion tables.

- 1. Select operational item parameters from item bank.** eMetric will independently extract the item parameters from the item bank. Because items can shift on forms previously used, it is imperative that the banked item parameters are correctly located.
- 2. Create and run WINSTEPS command files.** eMetric will independently create WINSTEPS command files to conduct a fully anchored item calibration run. The output of this run will be the raw score to un-scaled ability score conversion table.
- 3. Create raw-to-scale score conversion tables.** eMetric will then apply the linear transformations necessary to move from the logit scale to the Keystone score scale. The slope and intercept for the linear transformations have already been established and will be supplied to eMetric by DRC.
- 4. Compare results with DRC.** The raw-to-scale score conversion tables will be compared to those derived from DRC. All differences between eMetric's and DRC's results will be investigated and resolved prior to applying the tables to produce final score reports.
- 5. Reporting to DRC and PDE.** eMetric will provide to PDE, with copy to DRC, a report detailing all of the above processes and findings.

Independent but Collaborative Nature of Psychometric Quality Assurance

eMetric will rely on DRC to provide detailed descriptions of processes and procedures in order to replicate those procedures with fidelity. For that reason, we will establish regular meeting times prior to and during psychometric processing to ensure there are no misunderstandings that lead to lengthy investigations of unmatched results. Each year, we meet well before the processing window to walk through procedures, ask questions, and clarify any vagueness in the processing plan. If there have been any changes to the system from the previous year, we will conduct a dry run with mock data to ensure that all involved parties hold a common understanding of all procedures.

All procedures between DRC and eMetric will be well documented and thoroughly tested prior to the testing window. Our procedures include a hand-off of preliminary data. This allows us to have a common first data set that we can check against one another prior to full processing of all data. If discrepancies are discovered, both companies will share interim data sets and results to diagnose the origin of the mismatch. If the mismatch is the result of a processing error, it will be corrected before any further data analyses. If the mismatch is the result of

differing understanding of the procedures, or best psychometric practice, we will investigate and come to consensus on the correct way to proceed. Score reports are generated when both companies have achieved a complete data match through scoring tables.

Communication between companies is restricted to a discussion of procedures, results, and diagnostics. That is, no sharing of programs or control files is allowed. This helps ensure that the replication is conducted independently and that results are free of processing errors. PDE is encouraged to designate one or more staff members to be invited to all electronic and telephone communication between DRC and eMetric.

The entire process is conducted openly and collegially. The purpose of the replication is to ensure that students' score reports are accurate. Results are shared via an electronic data sheet that contains major milestones from processing (e.g., sample size, equating constants, and problematic anchor items) as they are completed. A formal report detailing the full replication work will be completed by eMetric and any decisions made after the operational processing is completed will be documented. That report will be delivered to both DRC and PDE simultaneously.

To summarize the equating and scaling processes, IRT parameters will first be estimated using commercially available software. Assumptions for proper estimation of the Rasch model will be evaluated using model/data fit statistics. IRT based equating methods will be used to link item parameters to the common scale of measurement that is maintained for a given testing program. All equating analyses are thoroughly evaluated by DRC, PDE, the third-party replicators and the TAC. DRC will present all tables and supporting documentation to PDE for review and approval.

Once all item parameters are expressed on a common metric, student performance can then be expressed on a common scale regardless of the test form that is administered. A linear transformation is then applied to produce a scaled score that is more easily interpreted by educational stakeholders. This scale of measurement is maintained for the life of the testing program.

Bias, Reliability, and Validity Studies

Bias

DRC calculates differential item functioning (DIF) statistics to detect possible item bias. DIF analysis is designed to detect items for which students of equal ability from different groups do not have the same probability of answering the item correctly. DIF results will be provided by gender, ethnicity, administration mode, and other requested subgroupings, where sample sizes are sufficient to perform the analyses. Flagged items (i.e., those where the statistical analyses indicate possible DIF) will be reviewed by PDE and item data review committees.

For multiple-choice items, DRC uses the Mantel-Haenszel (MH) statistic (Mantel & Haenszel, 1959). The MH chi-square test is the most accepted test to determine whether the odds that the focal and reference groups will respond correctly are equal (Holland & Thayer, 1988). The MH analysis involves the computation of an MH chi-square statistic and an MH Delta (MHD) value that represents the average amount that members of the reference group found the studied item more difficult than did comparable members of the focal group. (The MHD is the delta scale for item difficulty where the natural logarithm of the common odds ratio is multiplied by $-(4/1.7)$.) The MH statistic does not depend on the application or the fit of any specific measurement model, does not require specific forms of item response functions, and does not require large sample sizes.

DRC reports the MH chi-square, delta, and severity classifications. These statistics will enable Pennsylvania educators to make better decisions about the presence or absence of DIF and will also help to reduce false identification (i.e., labeling items with DIF if no item bias exists).

As an aid to the non-statistical review committees, all items are placed into DIF severity classifications (A+/- to C+/-) based on industry standard guidelines (Allen, Carlson, & Zelenak, 1999). The A category indicates negligible DIF, the B category indicates moderate potential DIF, and the C category indicates large potential DIF. The plus (+) or minus (-) sign that follows the DIF category indicates which group is favored by the item. The minus sign indicates that the reference group outperformed the focal group once the skill level differences between the groups have been removed. The plus sign indicates that the focal group outperformed the reference group once the skill level differences between the groups have been removed.

A classification system is used in addition to a formal significance test of DIF. MH chi-square is less or equal to 3.84 implies it is not significantly different from 0. As a result, the items are classified as A. If the chi-square is greater than 3.84, the following additional criteria are used to classify the dichotomously scored items by using the absolute value of MHD and its standard error (SE):

Rule 1: If $|MHD| < 1.0$, the items are classified as A.

Rule 2: If $|MHD| \geq 1.5$ and $|MHD| - 1.645SE > 1$, the items are classified as C.

Rule 3: Else, the items are classified as B.

The analysis of polytomous items will be based on the standardized mean difference (SMD) procedure developed by Zwirk and Thayer (1996), which takes into account the natural ordering of the response levels of the item. In contrast to the MH procedure, this summary statistic compares the means of the reference and focal groups, adjusting for differences in the distribution of each group's members across a given number of ability (i.e., total score) stratifications. The SMD statistic represents the difference between the unweighted item mean of the focal group and the weighted item mean of the reference group. The weights

applied to the reference group are determined such that the weighted number of reference group students is the same as in the focal group (within the same ability group). The absolute Z value and the effect size of SMD (Z_{SMD} and ES) are used to classify the polytomous items according to the rules below:

Rule 1: $|Z_{SMD}| \leq 1.96$ or $|ES| \leq 0.17$ is classified as A.

Rule 2: $|Z_{SMD}| > 1.96$ and $0.17 < |ES| \leq 0.25$ is classified as B.

Rule 3: $|Z_{SMD}| > 1.96$ and $|ES| > 0.25$ is classified as C.

- + Favors the focal group
- Favors the reference group

DRC proposes to include the results of the Mantel-Haenszel and SMD analyses in the technical report.

DRC also proposes to examine for bias in the equating using population invariance analyses described by Doran and Holland (2000). Using the root mean squared difference (RMSD) and the root expected mean standardized difference (REMSD) statistics, we evaluate the impact of the equating at the subgroup level. The RMSD statistic quantifies the difference in the equating relationship at an observed score in terms of the subgroup relationship and the full group equating relationship. The REMSD summarizes the average difference between the equatings across all observed score points. DRC examines bias in the equating using a “difference that matters” (DTM) approach (Dorans, Holland, Thayer & Tatenkeni, 2003) to provide further context for interpreting the population invariance results.

Reliability Studies

According to the *Standards for Educational and Psychological Testing*, reliability refers to the degree to which test scores for a group of test takers are consistent over repeated applications of a measurement procedure and hence are inferred to be dependable, and repeatable, for an individual test taker, this is also defined as the degree to which scores are free of errors of measurement for any given group of students.

Coefficient Alpha is an industry standard index and will be reported for English language arts, mathematics, and science assessments for all major population subgroups in Pennsylvania. The standard error of measurement (SEM) is also reported for all raw scores and scaled scores. Because Coefficient Alpha is influenced by content homogeneity, a test with items targeting different domains based on the test’s content specifications might reduce the value of the index. In such cases, it can be more informative to compute the Stratified Alpha coefficient, a weighted reliability coefficient that accounts for the contribution of each subpart to the overall test variance. Stratified Alpha produces a higher reliability coefficient than Coefficient Alpha when the covariance within domains is greater than the covariance between domains.

There are other benefits to using stratification. For example, when a test is composed of subparts that require different cognitive tasks, like open-ended versus multiple-choice items, the traditional formula for Coefficient Alpha may underestimate test score reliability. Stratified Alpha may be employed in these circumstances to get a more appropriate indication of reliability. DRC proposes to continue to report both Coefficient Alpha and Stratified Alpha.

DRC also provides standard errors of measurement estimates that directly indicate the uncertainty associated with an estimated scale score. Standard errors are reported in the same units as the associated scores, which gives the standard error an important advantage in interpretability when compared to reliability coefficients. We use standard errors to obtain confidence intervals for estimates, and these intervals are more useful than reliability coefficients in quantifying how much uncertainty is associated with reported test results. For these reasons Cronbach et al. (1995) strongly encourage the use of standard errors for quantifying the reliability of test scores.

Classification consistency can be considered as another measure of reliability in situations where test results are used to classify students into categories of proficiency (e.g., Below Basic, Basic, Proficient, and Advanced). Since it is not feasible to repeat testing in order to estimate the proportion of students who would be reclassified into the same performance levels, a statistical model needs to be imposed on the data from the available administration. Although a number of procedures are available, DRC proposes to report two of the more well-known and researched methods, developed by Hanson and Brennan (1990) and Livingston and Lewis (1995).

Validation Studies

Validity is the most fundamental consideration in developing and evaluating tests. The purpose of test score validation is not to validate the test itself, but to validate interpretations of the test scores for particular purposes or uses. Test score validation is not a quantifiable property but an ongoing process, beginning at initial conceptualization and continuing throughout the entire assessment process.

For this reason, DRC views each part that contributes to an assessment as part of collecting validation evidence in support of each assessment administered in Pennsylvania. Development of the standards by PDE for each assessment; construction of test blueprints, item specifications, and item banks; the selected test forms; administration; scoring; standard setting; and analyses are all important steps in developing a comprehensive portfolio of validity evidence in support of each testing program.

DRC will collect and document validity evidence across a series of technical reports supporting the PSSA, Keystone Exams, and CDT testing programs. This process will begin with a description of the targeted student population. We will collect student participation rates (N-counts and percentages) across subgroups: gender, ethnicity, LEP, migrant, low SES, disability type, IEP status,

accommodations, and mode of administration. An accurate articulation of the target population ensures that the test content is chosen such that intended inferences from test scores are equally valid for members of different groups of test takers.

A complete description of the standards and test development process follows. Once the summative assessments are scored, we can begin to look at specific data to provide further evidence of reliability and validity. For example, to investigate alignment and the reliability thereof, frequency distributions, means, and standard deviations of scores across each domain can be analyzed.

We will examine all of the statistics within the item calibration, equating, and scaling that contribute to evidence of item, standard score, and test level reliabilities, stability, and validity. We will conduct factor analyses, as described above, and in relevant/desired detail to provide PDE with a full range of transparent and defensible data as evidence toward the overall validity of the assessments. We will also conduct a thorough evaluation of equating population invariance and scale drift to ensure the scales are functioning effectively and are stable across administrations.

Additional evidence that bears on validity is that of the conditional standard errors of measurement (CSEMs) across the entire continuum as well as at the cut scores that determine proficiency levels. Low CSEMs at the cut scores and the degree to which students are classified into performance levels consistently provides strong validity evidence. As part of our ongoing validation research in support of the Pennsylvania System of Assessments, we further recommend that we conduct mode comparability studies using propensity score matching to evaluate the comparability of scores administered either with paper/pencil or CBT.

In an effort to collect consequential validity evidence, the use of an online or paper teacher survey can provide PDE with opportunities for collecting information related to the use and impact of assessments on instruction. We have successfully conducted similar surveys for the Pennsylvania assessments and for other states and will provide this service for PDE within the new contract.

For example, teachers could complete a survey on the instructional implications of the summative assessments regarding how student scores impact instructional practice.

4.h.1.c. Validity/Research Studies

Over the years, DRC is proud to have partnered with PDE in the design and implementation of an extensive validation program in support of its assessments. We, like PDE, feel that ensuring the validity of the assessment program is the core task of maintaining a successful assessment program. As part of our ongoing commitment to the Commonwealth, we have included funding to support two validation studies to be implemented annually.

Validity refers to the degree to which evidence and theory support the interpretations of test scores entailed by proposed uses of the test (AERA, APA, and NCME, 2014). The unified concept of validity refers to multiple paths of establishing validity with construct validity being supported by content validity, criterion related validity, and consequential validity as appropriate. As part of our standard operating procedures, DRC conducts and collects validity evidence to support the intended interpretations and uses of test scores using a unified concept of validity framework in the following areas in support of the Pennsylvania System of Assessments:

- Content-related validity
- Concurrent validity with other assessments
- Construct validity
- Student response processes
- Internal structure and dimensionality
- Predictive, consequential, and other types of validity evidence
- Score comparability

Content-related validity in achievement tests is evidenced by a correspondence between test content and specification of the content domain. Content-related validity can be demonstrated through consistent adherence to test blueprints, through a high-quality test development process that includes review of items for accessibility to students who are English language learners and students with disabilities, and through alignment studies performed by independent reviewers.

Concurrent validity can be assessed by correlating scores on the assessments with other contemporaneous variables that are believed to measure similar abilities. These variables may be scores on other tests, end-of-course grades, or other relevant measures of the construct that the test purports to measure.

Construct validity may be addressed through the use of convergent and discriminant correlational analyses. For example, subscales on the mathematics test should correlate more highly with other mathematics subscales than with subscales from the reading or science tests. Construct validity may also be examined through the use of factor analysis to explore the structure of the assessments within and across subject areas.

Student response processes can be analyzed through an investigation of omit rates, not reached rates, and erasure analyses. Low item omit and not reached rates serve as supporting evidence that a student's low score is due to lack of content knowledge rather than an issue with items or the test. Similarly, erasure analyses, including changes from wrong-to-right frequencies online, can provide evidence that a student's high score is due to strong content knowledge rather

external factors that are not related to knowledge (e.g., a violation of test security).

Internal structure and dimensionality of the assessments can be explored through the use of factor analysis within and across content domains. In addition to collecting construct validity evidence, dimensionality investigations are important to validate the appropriate use of IRT (see Kane, 2006). Score reliability and fairness will be assessed using a number of different analyses, such as test form reliability (Coefficient Alpha) for each content area and for subscores within content areas, computed for the total student population and separately for subgroups such as gender, ethnicity, and disability. Reliability can also be assessed in terms of classification consistency and accuracy statistics. Fairness is typically evaluated using differential item functioning (DIF) to determine the extent to which particular items might be differentially difficult for particular subgroups of interest (gender, ethnicity, disability, test mode, etc.).

Our test construction, calibration, scaling, equating activities, and associated analyses, described in *Subheading 4.G.1., Psychometric Analyses*, are specifically designed to maintain score comparability over test administrations while concurrently meeting the reporting requirement of each testing program. Our routine evaluation of rater-drift, as described in *Subheading 4.G.2., Scoring*, is designed to ensure that differences in pools of raters are accounted for in producing reliable and valid scores for students that are comparable over years.

Score comparability across administration formats (CBT, paper/pencil) and conditions (accommodated, special forms), content (blueprints, scramble pattern), examinees (geographically, demographically), and time will be routinely explored to provide validation evidence in support of the testing programs. We routinely implement equating invariance research analyses to ensure that the equating relationship does not vary over subgroups of interest (i.e., gender or ethnicity) or testing conditions (scramble patterns). In addition, we have conducted several mode-comparability research studies using propensity score matching to evaluate the comparability of scores administered either with paper/pencil or CBT for PSSA and the Keystone Exams.

In addition to the validation work that DRC conducts as part of our standard operating procedures on behalf of the Commonwealth, DRC has included funding to support two validation studies to be implemented annually. These validation studies are designed to address areas of interest that naturally arise in the evolution of a testing program. DRC has executed such studies, or has partnered with national experts to pursue topics of interest on behalf of PDE, and we look forward to continuing our work supporting the validation program. Some potential work that we could do is outlined below.

PDE may want to consider collecting additional data resources that are representative of validity evidence, such as through a teacher survey. For example, to address consequential validity, PDE may consider an examination of

the intended and unintended consequences of the assessments by way of teacher surveys to collect information about use of test scores and their impact on teachers' behaviors within and outside of the classroom. The rubrics and resulting scores should be reviewed in terms of consequences of the scores to be reported by different stakeholders. The quality of the information provided to stakeholders should be evaluated to ensure that appropriate and effective communication has been implemented.

PDE might consider an error analysis to further investigate the accessibility of items, especially as new item types are introduced into the assessments. The error analysis provides an investigation into the types of distractors for multiple-choice items that students tended to choose when getting the item wrong. Similarly, this investigation can be extended to the features of constructed-response items that proved to be difficult for students. This type of analysis can directly provide information to teachers about students' misunderstandings and help guide and target instruction. The error analyses could be further investigated by subgroup to provide insight into the source of item bias. Cognitive analysis of student thinking as they solve assessment questions can be incorporated into an evaluation of subgroup differences as a means of providing validation evidence that supports future item and test development activities (Lane, 2010).

Should PDE incorporate performance tasks into the PSSA (see Option 3), we would suggest that PDE implement a series of validation studies to address the utility of the data obtained from these new items. The instructional sensitivity, generalizability, and consequences of incorporating the performance tasks should be thoroughly evaluated. Content reviews with educators prior to field testing could provide the evidence for the instructional sensitivity of the performance tasks. The degree to which the performance tasks model best practice and the degree to which the results are useful to teachers in improving their instruction should be evaluated. Validation research that addresses how a student responds to the performance tasks and any relevant subtasks will also be critical to gather. The patterns and errors of how students respond to the performance tasks can help provide new evidence to distinguish students across performance levels. There is an extensive research literature on the challenges associated with incorporating performance tasks into assessment. DRC looks forward to partnering with PDE in evaluating how best to move forward in this exciting area.

4.h.1.d. Peer Review Requirements

DRC recognizes that one of the key components of our clients' success in peer review comes directly from rigorous documentation of all aspects of the testing program. DRC has meticulously documented item and test development, item and test alignment, and psychometric processes to provide the foundation for the comprehensive and coherent technical documentation that PDE uses as the central source of validity evidence in support of the assessment system. In collaboration with PDE, DRC has carefully crafted the PSSA, Keystone Exams, and CDT technical reports such that specific links to evidence within the *Standards for Educational and Psychological Testing* (AERA, APA, and NCME, 2014) and the

Standards and Assessment Peer Review Guidance for NCLB are readily available. Supporting ancillary documentation for each testing program, including alignment of items to standards, item content blueprints, test designs, guide to test administration, score reports, and interpretive guides, has been developed to provide further support for PDE throughout the peer review process. In addition, DRC has routinely compiled documentation required for peer review such as participant lists, agendas, and presentation and training materials for item review, bias review, data review, and standard setting meetings, in support of the peer review process. Lastly, we have pursued a number of research studies to provide further validation evidence in support of PDE and peer review activities. Please see *Volume IV; Appendix S, Source of Documentation for Related Standards for Educational and Psychological Testing*, which lists program documentation that supports each facet of the peer review process.

Moving forward, DRC proposes to continue to provide comprehensive and thorough documentation of all steps in the item and test development process, test administration, and scoring, psychometric, and reporting activities in support of PDE and the peer review process. For example, for each of our technical reports for PSSA, Keystone Exams, and CDT, we will build cross-reference tables wherein each component of the reports can be used to provide evidence for critical elements for peer review. *Volume V: Appendix V, Technical Reports*, provides source documentation that will be provided as evidence for each of the Standards in technical analyses and reports, as specific to any future PSSA, Keystone Exams, or CDT administration. Ancillary documentation such as the directions for test administration will be annotated for ease of reference and evidence collection for peer review. DRC's program management staff will maintain a comprehensive set of materials for all activities throughout the item and test development process, administration, scoring, and reporting cycle that is indexed with respect to the evidence required by the Standards for Peer Review.

4.h.1.e. Technical Report

DRC will continue to produce annual technical reports for all Pennsylvania assessments. The PSSA technical report will be produced following each spring administration. The Keystone Exams technical report will be produced following each summer administration and will include the preceding winter and spring test administrations. The CDT technical report will be produced annually after each school year.

DRC believes our technical documents represent the best the industry has to offer. As stated in previous sections, the technical reports will serve as the primary vehicle for documenting reliability and validity evidence as well as documentation necessary to support PDE's compliance with the U.S. Department of Education's *Standards and Assessment Peer Review Guidance* as discussed in the subheading titled *Peer Review Requirements*. Given their fundamental importance, the reports will contain complete documentation of the technical features of the items, tests, and performance standards, including reliability measures, evidence of validity, and evidence that the scores from all tests are

valid measures for their intended use. *Volume V: Appendix V, Technical Reports*, contains an example of the PSSA, Keystone Exams, and CDT technical reports.

From the earliest stages of projects, DRC psychometricians are mindful of the critical importance of technical reporting. The same staff members who plan and conduct project analyses also prepare the associated technical documentation. As with project deliverables, the project's senior psychometrician oversees technical report preparation. DRC's psychometric staff views the technical report as an essential component for enhancing the validity of the PSSA, Keystone Exams, and CDT assessments. Contributions by functional groups other than Psychometric Services are managed with help of our project management team. All technical reports undergo extensive review by independent senior staff members. "Cold reads" by editors are used to eliminate grammar and stylistic errors.

DRC typically establishes a comprehensive core text for technical reports during the first year of a project. Thought is given to minimizing the amount of new text required yearly and to keeping text that requires modification to established locations. Whenever possible, program output is placed directly into technical documents to limit errors. Staff also use visual checks between statistics reported in technical documents and original program output.

As discussed earlier in this proposal, in observance of the demand for quality assurance in the testing industry, DRC employs a Manager of Psychometric Quality, **Ms. Christie Plackner**. To ensure the accuracy and completeness of all Pennsylvania technical reports, Ms. Plackner and her team worked alongside the psychometricians and statistical analysts, checking for internal and external consistency and reasonableness. This, in conjunction with the tests and checks performed by our Software Quality Assurance team, ensures Technical Reports that will meet or exceed the highest industry standards.

Consistent with our current experience with PDE, DRC anticipates a solid working relationship with PDE and the TAC in the development of technical reports supporting each testing program. Both groups will be consulted regularly throughout the creation of the reports. DRC proposes continuing the use of a multiple edit-and-review cycle with PDE and the TAC resulting in revision and production of the final technical reports.

DRC proposes to provide information regarding the assessment's purpose, test blueprint and test maps, test development procedures, reliability and validity results and graphics, scaling information, inter-rater agreement data, accommodations and testing of students with special needs, security information, administration details, scoring and equating procedures and results, standard setting results, reporting, and appropriate/inappropriate uses and interpretation of data. Appendices will include related materials, administrative regulations, state standards, sample items, committee rating forms, frequency/percentile

distributions, state and system performance summaries by ethnic group, and other pertinent information in compliance with PDE.

4.H.2. DATA FORENSICS (DF) ANALYSES FOR TEST SECURITY

Due to the high-stakes nature of assessment programs and the recent and ongoing emphasis on assessment security at the national level, it is prudent to ensure that the results from statewide assessments are based on effective instruction and true student achievement. Through the years, DRC has partnered with PDE to investigate irregularities and aid the Commonwealth of Pennsylvania in multiple aspects of security analyses and reporting. Some examples include:

- Providing PSSA data forensic reports since 2009, including
 - answer change analyses;
 - across-year performance changes;
 - and NCLB subgroup population changes.
- Providing Keystone Exams forensic reports since 2013, including answer change analyses and item response similarities.
- Reporting results at the state and school level.
- Providing erasure maps at the student level.
- Working closely with PDE-appointed staff for additional support when needed.

As assessment stakes have increased, DRC has developed high-quality data forensic tools and monitoring reports to support our clients in maintaining valid, reliable assessment results. Our forensic offerings include the evaluation of erasure data, response-pattern similarity, and performance fluctuation within paper/pencil administered assessments, as well as answer-change and response-time analyses within computer-based administrations. DRC continues to study emerging detection methodologies and develops and offers the latest known methods to our assessment clients. The common thread across DRC's forensic methods is to find aberrant, abnormal, or unusual behavior that may have been carried out by a student, teacher, or an administrator. Please see the next subheading for more information on DRC's proposed data forensics offerings for the Pennsylvania assessments.

We understand PDE's request for its assessment vendor to be vigilant in its monitoring of the web to check for compromised items or copies of the exams. For many years, DRC staff have been actively running key searches across the internet for PSSA and Keystone related topics, and we will continue to do so within the new contract. Additionally, DRC's Government Relations team monitors the web daily for any assessment news stories or entries that reference the PSSA, Keystone Exams, or the CDT. All applicable stories, images, blogs, etc. are immediately brought to the attention of the Project Management Team

and subsequently shared with PDE in the event the monitoring reveals any level of item/exam compromise.

DRC is also aware of PDE's requirement to produce an Exception File to include all PAsecureIDs provided to DRC from PIMS for which matching assessment records do not exist. Although the RFP indicates that this comparison should be made against the PIMS precode file, DRC would propose to run the comparison against the PIMS reporting file (taken at the close of an assessment and meant to be inclusive of all students enrolled in a grade). DRC's current approach for calculating the participation-rate denominator for grade 11 already makes it possible for us to produce such a file for that student population. When PDE begins using PIMS data to calculate the participation-rate denominator for grades 3–8 (PSSA), the same data will automatically become available via that process. Upon award, DRC will collaborate with PDE to determine the best approach for providing the required report, with or without the use of PIMS data to calculate the grades 3–8 participation-rate denominator.

DRC fully understands PDE's requirement for the results of each PSSA and Keystone Exam to be analyzed by content area for each contract year. We have worked with PDE since 2009 to investigate and analyze data forensic results. Ms. Plackner and her data forensic team have worked extensively with PDE to establish procedures for flagging identified scores and reporting analyses based on each administration for the PSSA assessments and most recently the Keystone Exams. DRC will provide data forensic reports to PDE no later than four months following the administration of an assessment.

4.h.2.a. Irregularity and Data Forensic Analysis – 4.H.2.e. Additional Analyses and Data for Online Test Administration of the Keystone Exams

The importance of prevention cannot be over-emphasized when it comes to test result quality or the integrity of test results. Preventative measures such as those outlined by the National Council on Measurement in Education (NCME; 2012)—relevant, clear, and direct security regulations and policies for all participants (i.e., test administrators, teachers, principals, students)—are essential in preventing testing irregularities. *Subheading 4.E.7., Test Security*, contains detailed information about DRC's security features and processes, while *Subheading 4.E.8., Test Monitoring of Fidelity to Test Administration and Security Procedures*, discusses our recommendations for processes, procedures, and systems that will continue to assist PDE with strengthening the overall security of Pennsylvania assessments. Implementing and publicizing preventative security measures goes a long way towards minimizing the number of testing policy violations. However, the possibility of security breaches and other irregularities persists.

As a full service provider of large-scale assessment services, DRC has extensive experience that is ideally suited to provide a comprehensive data forensics and monitoring program that can be seamlessly integrated within Pennsylvania's

assessment and accountability programs. As the stakes for assessment have increased, DRC has invested in the development of high-quality data forensic tools and monitoring reports in support of our clients. DRC continues to research emerging and state-of-the-art detection methodologies, presents regularly at national conferences—including the Annual Statistical Detection of Potential Test Fraud Conference—and updates developments in security guidelines from NCME, the Institute of Education Sciences National Center for Education Statistics, and TILSA.

DRC’s forensic offerings include the evaluation of erasure data, response-pattern similarity, and performance fluctuations within paper/pencil administered assessments, as well as answer-change analyses within CBT administrations. The following section offers examples of the methodologies that may be included in a comprehensive data forensic plan. The table below lists each of these forensic approaches, their purpose, the area of concern they can address, and the Pennsylvania test administration program to which they are applicable.

Forensic Approaches

| Methodology | Area of Concern | Appropriate For | | |
|----------------------------------------------------------------|--------------------------------------------|-----------------|------|----------|
| | | Mode | PSSA | Keystone |
| Scaled Score Mean Change (non-cohort) | Unexpected Changes in Performance | P/P & CBT | X | X |
| Percentage of students Advanced/Proficient Change (non-cohort) | Unexpected Changes in Performance | P/P & CBT | X | X |
| Rasch Residuals | Isolated irregularities | P/P & CBT | X | X |
| Wrong-to-Right Erasures | Unexpected Level of Answer Changes | P/P & CBT | X | X |
| Scaled Score Mean Change (cohort) | Unexpected Changes in Performance | P/P & CBT | X | X |
| Percentage of students Advanced/Proficient Change (cohort) | Unexpected Changes in Performance | P/P & CBT | X | X |
| Copying Index (Omega) | Collusion | P/P & CBT | X | X |
| Frequency of Login/Logout Counts | Unusual and excessive login events | CBT | X | X |
| Date/time for each Login/Logout | Unusual and excessive login events | CBT | X | X |
| Time required per test item, by student | Excessive backtracking and answer changing | CBT | X | X |
| Total student time to complete each section/module | Excessive backtracking and answer changing | CBT | X | X |

Reporting of Forensic Results

DRC proposes reporting in a manner that is similar to how PDE's forensic results are currently reported. The reports are organized so that PDE will be able to access results with an increasing level of detail.

- **State Level:** The state-level results will be summarized in Word documents that will provide documentation regarding methodology. This includes a count of schools identified by each forensic method.
- **School Level:** When more detailed information is needed at a group-of-interest level, a filterable Excel spreadsheet can be useful. The spreadsheet will contain detailed information, including methodologies, statistics, and results requested by PDE.. This allows PDE to see a summary of all information relevant to the group of interest.
- **Student Level:** Currently PDE receives student-level erasure reports. These reports permit PDE to see erasure patterns that can be filtered by school, subject, or form. If additional student-level results are of interest, DRC is happy to consult with PDE to design a report to address whatever is deemed necessary.

A sample of the school-level spreadsheet is below. All of the applied methodologies will be combined into this spreadsheet to provide complete information for each school.

Sample Summary Report at Group of Interest Level

| DistNum | DistName | SchNum | SchName | Flag | | | Scale Score | | | | | | | Erasures | | | | Copying | | |
|-----------|----------|--------|---------|------|-------|------|-------------|------|-------|------|------|------|-------|----------|---------|-----|-------|---------|----------|--------|
| | | | | Gr | Count | Subj | N | | Scale | | SD | | Tstat | OS | WR/Test | SD | Tstat | OS | Omega | |
| | | | | | | | 2013 | 2012 | 2013 | 2012 | 2013 | 2012 | | | | | | | Pct Flag | P-tile |
| 114067002 | | | | 8 | 6 | MATH | 1004 | | 1254 | | 197 | | | | 0.7 | 1.1 | 0.0 | 3.4 | 4.6 | 14.5 |
| 119648703 | | | | 5 | 6 | MATH | 157 | 153 | 1419 | 1590 | 212 | 244 | -5.3 | 17.2 | 0.6 | 1.4 | 0.0 | 0.0 | 4.2 | 18.1 |
| 104375302 | | | | 4 | 4 | MATH | 215 | 221 | 1343 | 1384 | 231 | 210 | -0.7 | 1.2 | 0.6 | 1.0 | 0.0 | 0.0 | 4.9 | 64.4 |
| 113382303 | | | | 7 | 4 | MATH | 190 | 173 | 1480 | 1376 | 219 | 211 | 4.6 | 14.1 | 0.6 | 1.0 | 0.0 | 0.2 | 4.7 | 36.0 |

Outlier Score

Many of the data forensic methodologies result in an outlier score. The outlier score is used to identify extreme aberrances. In the sample, for the instances where unusual results are detected, the school's outlier score (OS) column is highlighted in pink.

Hypothesis testing in statistics requires the researcher to define the probable and improbable. For the proposed analyses herein, the term probable is defined as the state average of the event or occurrence (the baseline).

Schools will be flagged based on improbable events. To make it easier to interpret, probabilities will be transformed into what is referred to as an outlier score. To facilitate understanding and interpretation of very small numbers (i.e., very small probabilities), the OS was created with an effective range of 0 to 50.

Results that are closer to the baseline have an OS closer to zero, while schools and test administrators with the most extreme results will be closer to 50. For practical purposes, any probability that would translate into an OS greater than 50 has been assigned a score of 50.

The outlier score is computed using the following equation:

$$OS = \left| 1.086 \ln \left(\frac{p}{q} \right) \right|, (1)$$

Where p is the probability of the occurrence of the behavior, and q is $1-p$. The natural log of p/q was taken to make the scale symmetric around small and large probabilities. The constant 1.086 was used to make the probability of 0.0001, or 0.0002 for two-sided, equal to an outlier score of 10. Thus, for ease of use and interpretation, any behavior that results in an outlier score of 10 or greater was considered different from the baseline.

Data Forensic Methodologies

Changes in Performance

Scaled Score Mean Change – Cohort and Non-cohort

It is anticipated that performance on the PSSA and Keystone Exams assessments will improve over time from legitimate causes such as changes in the curriculum and improvement in instruction. However, large and unexpected score changes may be a sign of suspicious activity. An approach to identify improper behavior is to compare the state's level of change in performance from one year to the next to a school's change in performance during the same time frame. A statistic will determine if a school's average- score change is statistically different than the statewide average score change. This method will identify large and unexpected score changes that may be a sign of suspicious activity.

Two approaches could be conducted to consider score changes in student populations across years. A non-cohort analysis will compare scores from a specific year's grade to the prior year's grade (e.g., this year's grade four students to last year's grade four students). A limitation to this method, however, is that if irregularities have been conducted for multiple years, an unexpected score change would not be identified. Therefore, an alternative method would be to use unique identifiers, when available to match students across years and to examine a cohort's score change from the previous year to the current year (e.g., comparing this year's grade four results to last year's grade three results). In both analyses, a subgroup's (school or classroom) degree of performance change from one year to the next is compared to the state's degree of performance change during the same time frame.

Schools will be identified that have performance changes that are determined to be either statistically higher or lower than in the previous year when compared to

the state. Currently, schools are identified within Pennsylvania if they have an outlier score of at least 10. An outlier score is determined by statistically comparing a school-group to the state, determining the probability of the difference between the two, and translating the probability into an outlier score. A score of 10 is interpreted as the probability of the difference occurring at .0001.

The following table is an example of the information that will be reported in the filterable Excel file for the scaled score mean-change methodologies. For each school, by subject, the following information is provided: student count used for each year in the analyses; the schools' mean scaled score and standard deviation for each year, the resulting *t* statistic; the outlier score based on the probability of the *t* statistic. Outlier scores of 10 or higher are highlighted pink.

| Subj | Scale Score | | | | | | | | | Scale Score - Cohort | | | | | | | | |
|------|-------------|------|-------|------|------|------|-------|------|-----|----------------------|------|------|------|-------|------|------|--|--|
| | N | | Scale | | SD | | Tstat | OS | N | Scale | | SD | | Tstat | OS | | | |
| 2014 | 2013 | 2014 | 2013 | 2014 | 2013 | 2014 | | | | 2013 | 2014 | 2013 | 2014 | | | 2013 | | |
| MATH | 1019 | 1004 | 1240 | 1254 | 206 | 197 | -5.0 | 16.2 | 864 | 1253 | 1340 | 208 | 217 | -4.5 | 13.5 | | | |
| MATH | 893 | 673 | 1208 | 1231 | 196 | 185 | -5.6 | 19.5 | 598 | 1218 | 1320 | 200 | 223 | -5.0 | 15.9 | | | |
| MATH | 684 | 645 | 1425 | 1421 | 239 | 215 | -1.3 | 2.3 | 648 | 1432 | 1535 | 239 | 229 | -8.0 | 36.9 | | | |
| MATH | 585 | 534 | 1623 | 1604 | 228 | 244 | 1.6 | 3.1 | 556 | 1628 | 1630 | 228 | 247 | -2.1 | 4.4 | | | |

Percentage Proficient and Advanced (P+A) Change – Cohort and Non-cohort

An additional data forensic methodology that examines student change in performance is to note the change in percentage of students in Proficient and Advanced (P+A) from one year to the next. (Focus is given to students at this proficiency range because it is theorized that this is the “bubble” student on the verge of becoming proficient that educators may be tempted to assist.)

To determine whether a school has an improbable change in the percentage of students who are proficient or advanced, the log-odds ratio is used to compare the percentage of students who are proficient or advanced in the current year to the percentage in the previous year. Schools will be identified that have a percentage change that is statistically significant. Similar to the scale score change methodology, a resulting probability is translated into an outlier score. Currently, schools are identified within Pennsylvania if they have an outlier score of at least 10. Identifying changes in the percentage of proficient and advanced students can be done using a cohort, as well as a non-cohort, of students.

Below is an example of the information that will be reported in the filterable Excel file for the percentage of students in proficient and advanced (P+A) groups. For each school, by subject, the following is provided: percentage of students in these achievement categories for both years in the analyses; the resulting Zscore; the outlier score based on the probability of the *t* statistic. Outlier scores of 10 or higher will be highlighted pink.

| Subj | Performance Level | | | | Performance Level - Cohort | | | |
|------|-------------------|------|--------|-----|----------------------------|------|--------|------|
| | Passing% | | Zscore | OS | Passing% | | Zscore | OS |
| | 2014 | 2013 | | | 2014 | 2013 | | |
| MATH | 38 | 42 | 1.7 | 3.4 | 40 | 54 | 5.8 | 21.3 |
| MATH | 31 | 34 | 1.2 | 2.3 | 34 | 51 | 6.2 | 23.6 |
| MATH | 66 | 70 | 1.6 | 3.1 | 67 | 91 | 9.9 | 49.9 |
| MATH | 93 | 90 | 1.8 | 3.5 | 94 | 92 | 1.2 | 2.1 |

Rasch Residuals

Using Rasch residuals DRC can identify schools that may have performed better or worse than expected. For the student, the probability of success on any item depends on the student’s ability and the item’s difficulty. A student’s ability is determined by how well the student performs on the overall assessment. A residual is generated when the student performs in an unexpected manner, such as a high-ability student missing an easy item, or a low-ability student correctly answering a difficult item. Although student-level residuals would not be reported, they will be calculated and summed at the school level. A standardized outfit statistic is produced for each school and the probability of the outfit statistic is translated into an outlier score.

Below is a sample of how schools’ Rasch residual results will be reported. For each school the outfit and resulting Zscore statistics will be reported along with an outlier score translated from the Zscore probability.

| Subj | Rasch Residuals | | |
|------|-----------------|--------|------|
| | Outfit | Zscore | OS |
| MATH | 0.2 | 4.8 | 15.3 |
| MATH | 2.5 | 6.8 | 28.3 |
| MATH | -4.4 | 1.3 | 2.5 |
| MATH | 0.9 | 3.9 | 10.7 |

Wrong-to-Right Erasures

Answer-change analyses are appropriate for both paper/pencil and CBT tests. The same data can be gathered and analyzed regardless of administration mode. Erasure analysis is a more familiar term for this methodology when applied to a paper/pencil administration. However, what is truly being investigated is answer change. Therefore, in consideration of online data, the methodology will be referred to as answer-change analysis.

For paper/pencil administrations, DRC’s image scanners and ISO 9001:2008 certified scanning and editing processes are able to provide detailed data by student. Student-level erasure data can be aggregated at the state level, where trends across grades and subjects can be identified.

For CBT administrations, the DRC INSIGHT system can capture a variety of data at the time of student testing. At a district, school, or other preferred subgroup, totals will be calculated for the number of changed responses that went from:

- Incorrect to correct (wrong to right—WR),
- Correct to incorrect (right to wrong—RW), and
- Incorrect to incorrect (wrong to wrong—WW).

Results can be reported at a group level. For every group of interest at every grade and subject, the average number of WR erasures is evaluated in terms of the meaningful statistical difference from the statewide mean value of erasures. PDE will be made aware of the groups of interest that have a statistically large number of WR erasures. Currently, schools are identified within Pennsylvania if they have an outlier score of at least 10. An outlier score is determined by statistically comparing a school group to the state, determining the probability of the difference between the two, and translating the probability into an outlier score. A score of 10 is interpreted as the probability of the difference occurring at .0001. The following is an example of the information that is reported in the filterable Excel file for the erasure analysis: schools’ wrong-to-right erasure mean and standard deviation; the resulting *t* statistic; the outlier score based on the probability.

| Subj | Erasures | | | |
|------|----------|-----|-------|-----|
| | WR/Test | SD | Tstat | OS |
| MATH | 0.8 | 1.2 | 0.4 | 0.7 |
| MATH | 0.5 | 1.0 | -8.1 | 0.0 |
| MATH | 0.8 | 1.3 | -2.0 | 0.0 |
| MATH | 0.7 | 1.2 | -0.1 | 0.0 |

Additionally, because DRC has been conducting erasure analyses for PDE since 2009, we can produce reports that not only include this year’s and previous years’ results, but previous years’ results for a historical perspective of a school’s erasure behavior.

| Yr | Gr | DistrictID | DistrictNa | SchoolID | SchoolNa | Subject | N | WR/Test | SD | 5+Percent | Outlier Score | | | | | |
|------|----|------------|------------|----------|----------|---------|-----|---------|-----|-----------|---------------|------|------|------|------|-------|
| | | | | | | | | | | | 2014 | 2013 | 2012 | 2011 | 2010 | 2009* |
| 2014 | | | | | | MATH | 163 | 1.3 | 1.3 | 3.1 | 21.5 | 0 | 1.5 | 38.4 | 34 | 19.1 |
| 2014 | | | | | | MATH | 87 | 1.8 | 1.9 | 5.7 | 19.5 | 3.5 | 12.4 | 16.2 | 9.8 | 8.2 |
| 2014 | | | | | | READING | 87 | 2.4 | 2.9 | 21.8 | 18.8 | 0 | 11.1 | 16.1 | 5.2 | 12.9 |
| 2014 | | | | | | READING | 83 | 1.3 | 1.2 | 1.2 | 17.9 | 7.3 | 0 | 1.9 | 1.5 | 1 |

To help understand erasure data, DRC developed the **Erasure Map**. This provides a visual representation of response patterns and answer changes within a group, usually a school. The tool has been a primary tool in reviewing the Pennsylvania answer change analysis results. Key aspects of this map include:

- Identification of key levels of aggregation (district, school, and student),

- Color-coded shading indicating type of answer change (wrong to right, right to wrong, or wrong to wrong), and
- Shading of the field test item columns to easily distinguish them from operational items.

The erasure map is an Excel spreadsheet, which allows the user to filter data. It provides a visual answer to these questions:

- Within the school, do the field test items have a similar erasure pattern as the operational items?
- Within the school, are the same items being erased?
- Are the erasure patterns consistent for a student across subjects?

The example erasure map on the following page illustrates a situation where an unusual amount of erasing occurred. The erasure map includes a row for each student and a column for each item. This quickly illustrates by student item responses and erasing behaviors.

To better understand the map, look at Student 1. The student with Student ID “1” had a total of 21 wrong-to-right (WR) erasures, 16 of them in the mathematics section of the exam, and 5 of them on the reading portion. Student “1” received a Proficient performance rating in mathematics (MLevel column). However, if none of the erasures were made, a Basic level would have been achieved (MLevel*). Student 1 would have received a Proficient reading score regardless of the erasing behavior. A snapshot of the answer selections of Student 1 can be seen under the section labeled “Math Session 3.” A numerical response indicates a wrong answer (1 = A, 2 = B, 3 = C, and 4 = D) and a lettered response equals the correct answer. The shading in the map represents the erasing behavior. Cells that are shaded **red** represent items where wrong answers were erased and changed to correct answers. **Green**-shaded cells are items where wrong answers were erased and changed to another wrong answer. **Blue**-shaded cells are items where a correct answer was erased and changed to a wrong answer.

For item 50, Student 1 selected B, which was incorrect, so the erasure map has a 2. The green shading for item 50 means that this item was originally answered incorrectly, erased, and then answered incorrectly again. Item 52 was originally answered incorrectly, but erased and answered correctly. Thus, it is shaded red.

The gray-shaded area of the map are the field test items. It may be interesting to note in the example erasure map that many WR erasures are made on items that count towards the student score. The same erasing behavior is not seen on field test items. This may mean that the field test positions are known in this school. Because they do not count towards the final score, no effort was made to change the answers.

Sample School Level Erasure Map (Typical)

| Secure ID | Total WR | Math WR | Read WR | MLevel | MLevel* | RLevel | RLevel* | Math Session 3 | | | | | | | | | | | | | | | | | | | | | | | | |
|-----------|----------|---------|---------|--------|---------|--------|---------|----------------|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|----|--|
| | | | | | | | | 50 | 51 | 52 | 53 | 54 | 55 | 56 | 57 | 58 | 59 | 60 | 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 | 70 | 71 | 72 | 73 | |
| 21 | 3 | 2 | 1 | Bel | Bel | Pro | Pro | 4* | 3 | A | 1 | A* | 3 | 2 | D | C | 4 | 1 | B | 3 | A | B | 2 | D | A | 3 | 2 | 4 | 3 | | | |
| 22 | 3 | 2 | 1 | Bel | Bel | Bel | Bel | 2 | 1 | 3 | 4* | 2 | 2 | A | 3 | 2 | 4 | 1 | 3 | D | 2 | B | 1 | D | 3 | A | 6* | C | D | 2 | C | |
| 23 | 3 | 3 | 0 | Adv | Adv | Adv | Adv | C* | 1 | 3 | 1 | A | 2* | 2 | D | C | C | D | B | D | A | B | A | D | B | C | C | 2* | A | | | |
| 24 | 3 | 1 | 2 | Adv | Adv | Adv | Adv | C | B | A | B | A | 2 | A | D | C | C | D | B | 2 | A | B | A | 2 | B | B | B | D | A | | | |
| 25 | 3 | 1 | 2 | Bel | Bel | Bas | Bas | 1 | B | A | 4 | 2* | 1 | 4 | 3 | 4 | 2 | D | 4 | D | 1 | B | 4 | 1 | A | 1 | 1 | 1 | 1 | | | |
| 26 | 3 | 2 | 1 | Pro | Pro | Bas | Bel | C | B | 3 | 1 | A | D | 2 | D | 2 | C | 1 | B | D | 4 | B | D | 1 | A | C | 2 | C | 1 | | | |
| 27 | 3 | 1 | 2 | Bas | Bas | Bel | Bel | C | B | A | B | A | 1 | A | D | 4 | 1 | 1 | 4 | 1 | 1 | 2 | 4 | 2 | A | C | 4 | D | 2 | 4 | | |
| 28 | 3 | 2 | 1 | Bel | Bel | Bel | Bel | C* | B | 2 | 4 | 2 | 1 | 2 | D | 4 | 4 | D* | 3 | 1 | A | 4 | 2 | 4 | 1 | 2 | C | 2 | B | A | | |
| 29 | 3 | 2 | 1 | Bel | Bel | Bel | Bel | 2* | 1 | 3 | B | 2 | 2 | 2 | 1 | C | 2 | 1 | 1 | D | 1 | B* | C | 3 | 0 | B | C | 4 | B | A | | |
| 30 | 2 | 2 | 0 | Bas | Bas | Bel | Bel | C* | B | 4 | B | A | 1 | 2* | D | 1 | 2 | D | B | 2 | A | B | 4 | B | D | 4 | 2 | A | 1 | 2 | | |
| 31 | 2 | 2 | 0 | Adv | Pro | Bel | Bel | 2 | 1 | 2 | 4 | 2 | 2 | 4 | 1 | 2 | 1 | 3 | B | D | 2 | 4 | 3 | D | 4 | C | A | C | D | 2 | B | |
| 32 | 2 | 2 | 0 | Bel | Bel | Bel | Bel | 1 | 1 | 2 | B | 3 | 2 | 3 | D | C | 4 | D | B | 3 | 4* | 2 | 4 | 2 | D | C | 1 | 4 | 3 | 2 | | |
| 33 | 2 | 0 | 2 | Adv | Adv | Adv | Adv | C | B | A | B | A | 2* | A | D | C | C | D | B | D | A | B | A | D | A | A | D | D | B | A | | |
| 34 | 2 | 1 | 1 | Bas | Bel | Pro | Pro | C | B | 2 | B | 4 | 2 | 3 | 1 | 2 | C | D | 1 | 2 | 2 | 4 | C | A | 3 | C | C | D | 1 | B | 4 | |
| 35 | 2 | 2 | 0 | Bel | Bel | Bel | Bel | C* | B | 3 | B | 2 | D | 3 | 2 | 4 | 1 | 3 | B | 3 | 4 | B | 4 | 3 | 1 | B | 3 | 2 | A | 1 | 3 | |
| 36 | 2 | 2 | 0 | Bas | Bel | Pro | Pro | 2 | 4 | 4 | 3 | 4 | 2 | 3 | D | 2 | 1 | 2 | B | D | A | 1 | B | B* | 4 | 3 | A | D | 3 | 3 | | |
| 37 | 2 | 0 | 2 | Bel | Bel | Bas | Bel | 4 | 3 | 2 | 3 | 2 | 1 | 3 | D | C | 2 | 1 | B | D | 3 | B | 3 | A | D | 3 | D | D | 1 | 4 | | |
| 38 | 2 | 1 | 1 | Bel | Bel | Bas | Bas | 2 | 4 | 3 | 1 | 4 | 2 | 2 | D | C | 2 | 1 | 4 | 3 | 2 | B | 4 | 3 | A | 3 | 3 | B | 1 | 3 | | |
| 39 | 2 | 2 | 0 | Bas | Bas | Bel | Bel | 2 | 1 | 2 | 4 | 2 | 2 | 3 | 2 | C | 2 | 1 | B | 2 | C | 1 | B | 3 | 2 | A | 3 | 1 | C | 1 | C | |
| 40 | 1 | 0 | 1 | Bas | Bas | Pro | Pro | C | B | 3 | 3 | A | 2 | 3 | 1 | 2 | 4 | 1 | B | D | 4 | B | B | D | 1 | 2 | 4 | D | A | A | | |

Copying Indexes

Answer copying, or test taker collusion, is a serious problem in assessment. The full attention of the proctor or test administrator can only go so far in preventing cheating. Fortunately, due to PDE taking the proactive test design approach to scramble forms, test takers in the Commonwealth of Pennsylvania are already at a disadvantage for collusion.

Examination of student responses to multiple-choice items can be analyzed for unusual testing patterns using statistical indexes sensitive to random and string copying strategies. These indices identify student pairs in which answer patterns are statistically unlikely. The percentage of pairs is determined for each school and the schools ranked. Wollack (2006) reviewed and compared eight common copying indexes found in the literature for Type-I error rates and power. He concluded that although no one index is unvaryingly best, if a single statistic is used, ω seems to perform best. This statistic has performed well when compared with more recently developed copying indexes (Zopluoglu & Davenport, 2012).

An outlier score is not used for this methodology. Alternatively, the percentage of flagged student-pair per school is determined and then ranked. Schools may then be sorted by the percentile ranking to determine areas of concern.

| Subj | Copying Omega | |
|------|---------------|--------|
| | Pct Flag | P-tile |
| MATH | 4.6 | 14.5 |
| MATH | 5.1 | 29.5 |
| MATH | 5.3 | 53.3 |
| MATH | 3.7 | 7.7 |

Answer similarity is also monitored for during the handscoring of open-ended items and writing prompts. During handscoring, DRC’s scorers, team leaders, and scoring directors are trained to watch for student responses to open-ended items that are unexpectedly similar. DRC’s image handscoring system provides scorers the ability to alert such responses. Alerted responses are routed to the scoring director, who prints the response if he/she determines it to be alertable. Next, the alert is reviewed by the Handscoring Project Advisor, who sends copies of the student’s response to DRC’s Pennsylvania Project Management Team if he also concludes that the response warrants an alert. It is sent to PDE for direction. PDE is given district/school information, but is not provided with any student-identifying information. If PDE finds the alert to be legitimate, Project Management sends correspondence to the district and copies PDE on the correspondence. At no time during scoring do scorers have access to demographic information about any of the students participating in the assessment.

On-line Data Forensic Methodologies

Unusual log on/log off patterns

DRC currently provides Pennsylvania with an Excessive Logins Report that displays information about students who have logged in to the system an excessive number of times. Students appear on the Excessive Login Report if they exceed two log ins for a specific module or section of a CBT assessment. The report provides PDE and LEAs with a tool to monitor and research unusual log in patterns that occur during the administration of the CBT assessment. As a value-added offering, DRC offers additional status reports and CBT testing statistics for PDE and districts to use to monitor CBT testing. These offerings are described in *Subheading 4.E.8.a.iv*.

Post-administration, DRC is able to summarize the administration’s log on/log off behavior. In the state-level summary report, overall averages will be provided, as in the example that follows.

State-level Average Number of Interruptions per Module: State-level

| Subject | Module 1 | | | | | Module 2 | | | | |
|------------|----------|---------------|-----|-----|-----|----------|---------------|-----|-----|-----|
| | N | Interruptions | | | | N | Interruptions | | | |
| | | Mean | SD | Min | Max | | Mean | SD | Min | Max |
| Algebra 1 | 24,314 | 0.1 | 0.4 | 0 | 3 | 24,247 | 0.1 | 0.3 | 0 | 2 |
| Literature | 16,752 | 0.0 | 0.2 | 0 | 4 | 16,709 | 0.0 | 0.3 | 0 | 5 |
| Biology | 20,317 | 0.0 | 0.2 | 0 | 2 | 20,261 | 0.0 | 0.2 | 0 | 3 |

Additionally, results can be reported at a group level. This allows for the comparison between the state and a district or school. A summary report can be provided indicating each school’s, or subgroup’s, average number of interruptions per subject module.

Note that the example provided in the table below also includes the schools' average time in minutes on module. Once a baseline pattern for log ins is established for a given assessment program, DRC will work with PDE to determine the best method to identify situations where results seem improbable.

School-Level Login and Time on Module Summary

| Yr | DistID | Dist Name | SchID | Sch Name | Subj | Mod 1 | | | | | Mod2 | | | | | |
|------|--------|-----------|-------|----------|------|------------|-------|-------|--------|------|------|------------|-------|------|--------|--|
| | | | | | | Time (min) | | | Logins | | N | Time (min) | | | Logins | |
| | | | | | | N | Mean | SD | Mean | SD | N | Mean | SD | Mean | SD | |
| 2015 | | | | | Bio | 82 | 29.93 | 18.12 | 0.00 | 0.00 | 82 | 19.44 | 15.87 | 0.07 | 0.56 | |
| 2015 | | | | | A1 | 83 | 32.94 | 15.75 | 0.00 | 0.00 | 83 | 19.50 | 11.63 | 0.02 | 0.15 | |
| 2015 | | | | | LI | 86 | 44.94 | 22.62 | 0.08 | 0.35 | 85 | 28.22 | 15.24 | 0.08 | 0.28 | |
| 2015 | | | | | A1 | 67 | 38.04 | 13.94 | 0.01 | 0.12 | 67 | 28.37 | 11.81 | 0.00 | 0.00 | |
| 2015 | | | | | LI | 68 | 41.83 | 11.53 | 0.01 | 0.12 | 68 | 40.10 | 17.25 | 0.03 | 0.17 | |

Time Spent on Item

Compared to paper/pencil testing, online testing poses new challenges to test security, but allows for additional information, such as amount of time spent on an item and number of item visits. A typical pattern of response times is expected for a particular item or set of items. Unexpected response times may be indicative of specific aberrant behaviors. Typically, when a short item response time produces an unexpected correct response, it indicates that the examinee might have some prior knowledge of the item. Prior knowledge may be obtained from unauthorized acquisition and disclosure of high-stakes test materials (e.g., teaching to the test), which will undermine the accuracies of inferences from the test scores. An evaluation of response time and test scores may also identify unusual testing occurrences. This is especially true if high scores are associated with short testing times (Smith & Davis-Becker, 2011).

State-level summary information can be produced. An example of what they may look like for the Keystone Exams is provided in the following table.

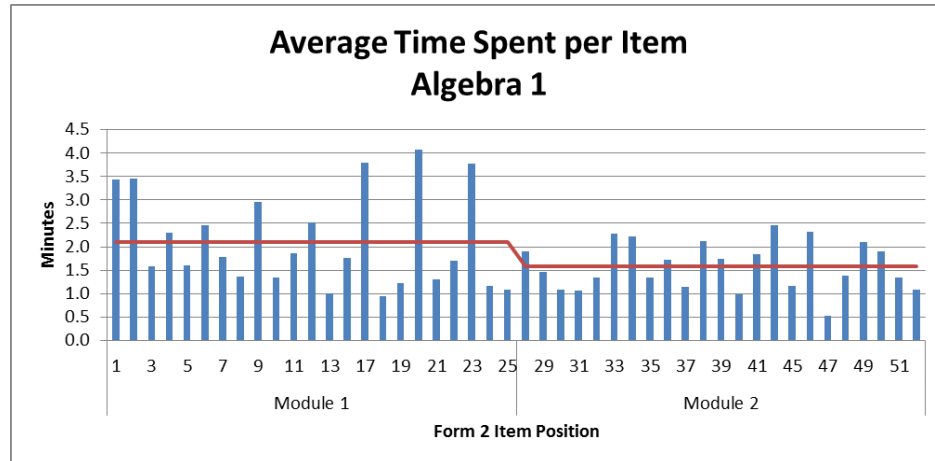
Average Time Spent per Module

| Subject | Module 1 | | | | | | Module 2 | | | | | |
|------------|---------------|------------|---------|------|-----|-----|---------------|------------|---------|------|-----|-----|
| | # of Students | # of Items | Minutes | | | | # of Students | # of Items | Minutes | | | |
| | | | Mean | SD | Min | Max | | | Mean | SD | Min | Max |
| Algebra 1 | 24,314 | 23 | 48.5 | 16.5 | 12 | 86 | 24,247 | 23 | 36.5 | 16.0 | 6 | 68 |
| Literature | 16,752 | 23 | 46.1 | 16.2 | 19 | 112 | 16,709 | 23 | 40.7 | 15.8 | 8 | 108 |
| Biology | 20,317 | 32 | 32.2 | 11.8 | 15 | 52 | 20,261 | 32 | 28.3 | 14.1 | 7 | 50 |

The table and figure that follow provide item response time summary information at the item level.

Average Time Spent per Item: Algebra 1

| Module 1 | | | | | | | Module 2 | | | | | | |
|-----------------|---------|------|--------|---------|-----|------|-----------------|---------|------|-------|---------|-----|------|
| Form 2 Position | Seconds | | | Minutes | | | Form 2 Position | Seconds | | | Minutes | | |
| | Mean | Min | Max | Mean | Min | Max | | Mean | Min | Max | Mean | Min | Max |
| 1 | 205.9 | 71.9 | 572.9 | 3.4 | 1.2 | 9.5 | 28 | 113.8 | 4.8 | 580.0 | 1.9 | 0.1 | 9.7 |
| 2 | 206.7 | 43.6 | 432.5 | 3.4 | 0.7 | 7.2 | 29 | 88.1 | 5.1 | 183.1 | 1.5 | 0.1 | 3.1 |
| 3 | 94.5 | 29.8 | 219.3 | 1.6 | 0.5 | 3.7 | 30 | 65.7 | 14.0 | 232.9 | 1.1 | 0.2 | 3.9 |
| 4 | 137.6 | 29.6 | 872.8 | 2.3 | 0.5 | 14.5 | 31 | 63.6 | 17.4 | 211.0 | 1.1 | 0.3 | 3.5 |
| 5 | 96.7 | 42.5 | 265.1 | 1.6 | 0.7 | 4.4 | 32 | 81.2 | 25.6 | 489.6 | 1.4 | 0.4 | 8.2 |
| 6 | 148.0 | 26.0 | 334.4 | 2.5 | 0.4 | 5.6 | 33 | 136.2 | 26.1 | 351.3 | 2.3 | 0.4 | 5.9 |
| 7 | 106.6 | 29.8 | 320.8 | 1.8 | 0.5 | 5.3 | 34 | 133.3 | 19.9 | 414.2 | 2.2 | 0.3 | 6.9 |
| 8 | 81.9 | 24.6 | 590.3 | 1.4 | 0.4 | 9.8 | 35 | 80.3 | 4.1 | 304.7 | 1.3 | 0.1 | 5.1 |
| 9 | 177.9 | 40.8 | 392.6 | 3.0 | 0.7 | 6.5 | 36 | 103.1 | 7.0 | 657.5 | 1.7 | 0.1 | 11.0 |
| 10 | 81.2 | 11.4 | 222.6 | 1.4 | 0.2 | 3.7 | 37 | 68.2 | 14.9 | 288.9 | 1.1 | 0.2 | 4.8 |
| 11 | 112.3 | 7.4 | 454.5 | 1.9 | 0.1 | 7.6 | 38 | 127.1 | 8.0 | 236.5 | 2.1 | 0.1 | 3.9 |
| 12 | 151.5 | 17.4 | 804.0 | 2.5 | 0.3 | 13.4 | 39 | 104.0 | 5.7 | 299.7 | 1.7 | 0.1 | 5.0 |
| 13 | 60.5 | 19.8 | 220.7 | 1.0 | 0.3 | 3.7 | 40 | 58.6 | 8.8 | 200.8 | 1.0 | 0.1 | 3.3 |
| 14 | 105.7 | 5.1 | 504.5 | 1.8 | 0.1 | 8.4 | 41 | 110.2 | 5.5 | 276.1 | 1.8 | 0.1 | 4.6 |
| 17 | 227.9 | 38.0 | 1053.8 | 3.8 | 0.6 | 17.6 | 44 | 147.4 | 10.7 | 499.2 | 2.5 | 0.2 | 8.3 |
| 18 | 57.3 | 7.6 | 123.8 | 1.0 | 0.1 | 2.1 | 45 | 69.5 | 12.0 | 218.3 | 1.2 | 0.2 | 3.6 |
| 19 | 73.0 | 5.9 | 255.0 | 1.2 | 0.1 | 4.2 | 46 | 138.7 | 7.9 | 335.9 | 2.3 | 0.1 | 5.6 |
| 20 | 244.0 | 21.2 | 1031.1 | 4.1 | 0.4 | 17.2 | 47 | 32.0 | 6.2 | 525.7 | 0.5 | 0.1 | 8.8 |
| 21 | 78.4 | 6.9 | 364.9 | 1.3 | 0.1 | 6.1 | 48 | 82.5 | 5.8 | 577.1 | 1.4 | 0.1 | 9.6 |
| 22 | 102.0 | 8.7 | 454.6 | 1.7 | 0.1 | 7.6 | 49 | 126.1 | 16.0 | 302.4 | 2.1 | 0.3 | 5.0 |
| 23 | 226.5 | 30.1 | 1191.0 | 3.8 | 0.5 | 19.9 | 50 | 114.2 | 6.0 | 332.0 | 1.9 | 0.1 | 5.5 |
| 24 | 70.0 | 7.4 | 186.0 | 1.2 | 0.1 | 3.1 | 51 | 80.9 | 5.9 | 556.6 | 1.3 | 0.1 | 9.3 |
| 25 | 64.9 | 13.5 | 333.2 | 1.1 | 0.2 | 5.6 | 52 | 64.6 | 5.2 | 279.9 | 1.1 | 0.1 | 4.7 |



Additionally, results can be reported at a group level. This allows for the comparison between the state and a district or school. The figure above, presented in the discussion regarding logins, refers to the average time in minutes per module.

A summary report (below) can also be provided, in a filterable Excel spreadsheet format, indicating each school's, or subgroup's, average time on item, as per the example above. In addition to school-identifying information, the number of students taking the test via the computer and the average time spent on each item is reported. Once a baseline pattern for response times is established, DRC will work with PDE to determine the best method to identify situations where results seem improbable.

Sample Summary Report Showing Average Time on Item

| Yr | dNum | dName | sNum | sName | Subj | 1 | | 2 | | 3 | | 4 | |
|------|------|-------|------|-------|------|-----|-------|-----|-------|-----|-------|-----|-------|
| | | | | | | N | Avg T | N | Avg T | N | Avg T | N | Avg T |
| 2015 | | | | | A1 | 83 | 162 | 83 | 130 | 83 | 75 | 83 | 87 |
| 2015 | | | | | A1 | 67 | 179 | 67 | 197 | 67 | 76 | 67 | 105 |
| 2015 | | | | | A1 | 76 | 252 | 76 | 184 | 76 | 111 | 76 | 129 |
| 2015 | | | | | A1 | 132 | 221 | 132 | 177 | 132 | 89 | 132 | 111 |
| 2015 | | | | | A1 | 4 | 174 | 4 | 327 | 4 | 136 | 4 | 222 |
| 2012 | | | | | A1 | 169 | 236 | 169 | 254 | 169 | 123 | 169 | 174 |

In order to fulfill PDE's requirements, DRC will perform and/or provide the following services:

The DRC Customer Service team monitors web activity throughout each administration to ensure information security practices are adhered to, as well as, suspect content. If a situation or question regarding an unusual pattern/circumstance arises, this will also be brought to the attention of DRC project management team and, if necessary to PDE's attention.

4.I. Delivery of Data Files and Reporting of Assessment Results

4.I.1. GENERAL REQUIREMENTS

DRC has a broad and deep understanding of PDE's general and detailed expectations for the secure distribution of test results to the Department, to LEAs across the Commonwealth, and to other entities that have been approved by PDE to receive the data. DRC has collaborated with PDE over a number of years to ensure that all gathering, calculating, and reporting of assessment data falls within state and federal guidelines. DRC's partnership with PDE at the time the NCLB requirements were implemented gives us an unparalleled understanding of the requirements necessary to calculate and report assessment data that meets PDE's state and federal obligations. DRC has continued that partnership as the reporting requirements have transitioned from Adequate Yearly Progress to the School Performance Profile by maintaining a vital role in the calculation and delivery of assessment data that directly supports the new state and federal accountability reporting platforms. To that end, DRC is uniquely positioned to meet each detail of the general requirements for data files and reporting assessment results.

- Through close collaboration with PDE, DRC has successfully defined and delivered all assessment and accountability files for reporting state and federal accountability systems.
- The criteria to match students records by first name, last name, birthdate, and PAsecureID was implemented by DRC in the second year that PDE used PIMS data for assessment records and has been used successfully ever since.
- DRC has defined and refined systems and procedures that allow the LEAs, PDE, and DRC to identify and resolve student records that are missing PAsecureIDs.
- DRC has successfully transferred assessment data to PDE for inclusion in PIMS for a number of years and continues to work closely with the Division of Data Quality to identify ways to resolve any issues with matching assessment records to the PIMS database.
- The business rules for the acceptance of data elements from PIMS for the production of precode records were established by DRC in collaboration with PDE and have been successfully applied to each PIMS file that DRC has received from PDE.

- DRC has worked closely with PDE each year to define and update a file layout that meets PDE’s needs for the reporting of assessment results. DRC understands the requirement to redact certain data elements from PDE’s version of the files and has been doing so successfully for as long as the requirement has been in place. DRC is also keenly aware of the file requirements for third-party vendors and has been successfully delivering such files for a number of years.
- Much like the missing PAsecureIDs, DRC’s systems and procedures already allow LEAs, PDE, and DRC to identify and resolve any student records that do not match to PIMS because of incomplete or incorrect hand-gridded data.
- DRC currently incorporates PIMS data to identify the grade 11 population for accountability reporting and can provide to PDE a list of those student records that do not have a matching Keystone or PASA test event. As the PSSA transitions to a similar model (PIMS-identified testing population), DRC will be able to provide PDE with a list of students in grades 3-8 without a matching PSSA or PASA test event, as well as a list of test events to which there is not a matching student record.
- The concept of the Master Calendar was introduced by DRC as the assessment program grew with the addition of the Keystone Exams. The calendar includes all the necessary elements to serve as a high-level guide for PDE to track all the critical systems, files, and reports that impact both PDE and the LEAs. The calendar has proved to be a valuable tool to both PDE and DRC in the management of the assessment programs, considering that one given month, take July 2015 as an example, could have activities and hand-offs for both the PSSA and Keystone Exams.

4.1.2. DATA DOCUMENTATION

DRC has extensive experience defining and producing data files used by PDE for many different state and federal reports, including the data files first produced in 2013 to support PDE’s new School Performance Profile (SPP) accountability reporting system.

Working cooperatively with PDE, each year we have produced Functional Specification Documents (FSDs) for every deliverable including all data files and reports. The FSDs include all the business rules as well as file layouts that clearly define each data variable and format to include content, naming conventions, definitions of data elements, and file types. The file layouts are developed with PDE input so that the files can serve the needs of other PDE departments and vendors. PDE may choose to report the data in additional reporting layouts.

Delivery and approval of all requirements is outlined in the master schedule in *Volume IV; Appendix O, Project Schedules and Hours by Task*. DRC will use this schedule as well as any additional input from PDE for the production of all

deliverables. Production of data files or reports will not begin until DRC has official PDE approval of all FSDs associated with that work.

4.1.3. DATA OWNERSHIP

DRC recognizes that PDE owns all data generated through the Pennsylvania System of Assessments and will not use this data for any purposes outside of this contract without the prior written consent of PDE.

4.1.4. DATA FILES

After every administration, DRC will provide PDE with all necessary data files to accurately fulfill all required reporting. The requirements for each assessment and administration, including content, naming conventions, definitions of data elements, and file type, will be clearly documented and agreed upon through FSDs and file layouts at least three (3) months prior to test administration. DRC has collaborated with PDE over a number of years to produce timelines and schedules that are fully integrated with the PIMS data calendar and will continue to do so upon award of the new contract. Our experience with and understanding of the PIMS process gives us a distinct advantage as the most qualified partner to continue the success of increasing the use of PIMS data throughout the assessment programs. Assessment and accountability reporting timelines, processes, and data file composition will be discussed at regularly-scheduled planning meetings.

Files will be provided via DRC's secure FTP site as electronic files that can be read by current PDE software used for analysis, including delimited or flat fixed files. All files will be produced according to the approved requirements and layouts as outlined in the FSDs, and historical student data will be retained for all accountability reporting purposes.

In order to ensure the most accurate data is used for all reporting, DRC will attempt to use data from the Pennsylvania Information Management System (PIMS) for all data files produced. In order to accomplish this, DRC uses a four-way matching criteria between data received during a test event (either paper/pencil or CBT) and data received from PIMS. The four criteria are first name, last name, PAsecureID, and date of birth. When DRC matches on all four data points, we use the student biographical data from the PIMS file. In all cases, the student files will include school and district information, response data to all individual items, and all raw and derived data. DRC will work with the PDE teams to ensure that all records can be matched, including records with special characters.

Data Process

All student data files will include all raw responses to individual items, all calculated values, the student's tested district and school, and a field indicating

whether the student-level data came from PIMS or from the hand-gridded booklet. These files will be delivered via DRC's secure ftp site.

Once the FSD for the Student Leveling Processing (SLP) is complete and approved by PDE, the lead support analyst will configure the workflow for scoring and processing the data. This configuration will include student reconciliation of demographic (PIMS) and site information, scoring rules for multiple-choice (MC) and open-ended (OE) items, and the PSSA or Keystone Exams rules for reporting and accountability. The workflow will manage both paper/pencil and CBT processing.

The workflow will be tested in both the development and Software Quality Assurance (SQA) environments prior to migrating to production. This allows the lead support analyst and SQA analyst to determine the process that will be the most efficient and accurate to meet all student level processing requirements and report timelines.

As answer documents are received and scanning begins, the first approved production batches will be processed in the development environment and approved by the lead support analyst. Upon approval, the same production batches will be independently tested by the lead SQA analyst. Only when the team agrees on the expected results are batches processed in production and daily processing begins.

The approved production system will run continuously during the scanning and scoring windows. Daily quality checks will be done by the team to immediately identify anomalies introduced by a single answer document or online test event. The anomaly will be isolated and reprocessed as necessary. All workflows are designed to be repeatable.

As new inputs (PIMS reporting file) or systems (Corrections) are introduced into the workflow, the data is first tested in the development and SQA environment prior to executing in production. This ensures integrity of the data at all times and minimizes the amount of risk introduced to the complex workflow. DRC's Information Service (IS) team's expertise and knowledge of Pennsylvania's assessment programs is extremely valuable at these integration points.

Final quality assurance checks are completed as data is prepared for the reporting milestones. Each reporting milestone is managed very carefully based on a unique set of requirements and complexity of the data. As each deliverable is created, the entire team plays a role in the approval. Each resource will focus on their input and expertise for the output created.

DRC will provide all data files to PDE for approval prior to the release of any files or reports to the districts and schools. Files are transferred via DRC's secure SFTP site. All details of the file transfer are communicated to PDE including file name and record count for their confirmation of receipt. Upon approval, final report production begins.

Required Data Files Received by PDE

The **PSSA** files include individual student data files, summary data files, and disaggregated data files for:

- Grade 3 English language arts and mathematics
- Grade 4 English language arts, mathematics, and science
- Grade 5 English language arts and mathematics
- Grade 6 English language arts and mathematics
- Grade 7 English language arts and mathematics
- Grade 8 English language arts, mathematics, and science

For the **Keystone Exams**, these files include individual student data files, summary data files, and anchor summary data files for:

- Algebra I
- Biology
- Literature

Required Data Files Received by Districts

DRC has successfully delivered District Student Data Files, Summary Reports, and Individual Student Reports after every PSSA and Keystone Exams administration, and will continue to do so. For the PSSA, DRC has delivered Student Performance Files, Preliminary Student Files, and Final Student Files.

Required Accountability Data Files—School Performance Profile (SPP) Files

DRC worked closely with PDE on the School Performance Profile during the initial development and provided required assessment data files for the inaugural roll-out of the SPP. DRC proposed to continue to deliver the following files for the SPP:

- Accountability Student Data File
- Accountability Summary File
- SPP Summary File—Academic Performance
- SPP Participation Rate Summary File

4.1.5. PSSA DATA FILE PROCESS

After every Spring PSSA administration, DRC will provide electronic Preliminary Student Files and Student Performance Files to PDE for approval and, upon

PDE's approval, to the districts on or before June 10 of each year, or a date designated and mutually agreed-upon between PDE and DRC.

DRC uses a unique security barcode on every assessment booklet we ship. These barcodes give DRC the ability to track booklets in real time through our MMS Receiving Application and allow schools to return answer booklets as soon as the majority of students have completed testing. This gives DRC the opportunity to begin early processing to meet the June 10 delivery date.

DRC has successfully met the PDE-designated date for the first release of PSSA data, for the last six years.

Test Decks

Prior to any PSSA test materials returning to DRC, the Software Quality Assurance staff will perform extensive tests to ensure all scanned data (including demographic and multiple-choice responses) are captured and accurately stored in a secure database environment. Each record in the database will be independently verified against the test decks for validation.

The analysts will follow a software testing methodology that thoroughly evaluates and verifies the scanning and scoring system and verifies that each scanner is configured and set up for the PSSA. This process includes validating test decks, which will be comprised of answer documents with and without student and school Pre-ID information for each form/version of the test. The test decks will be specifically gridded to include a variety of possible student response permutations and combinations.

The test decks will be processed completely through DRC's systems to verify the following:

- Readability of security, student, and school barcodes
- Data capture of Pre-ID and barcode information
- Accurate capture of district and school codes
- Consistent data capture on all scanners
- Accurate scan positions on all documents and forms
- Scanner calibration and hardware functionality

The Software Quality Assurance staff will also perform a validation of all production data processed through the system. **Each student record will be verified for accuracy** to ensure high-quality data file development and reporting.

4.1.6. KEYSTONE EXAMS DATA FILES PROCESS

Following each Keystone Exams administration, DRC will provide the required preliminary electronic student data files to PDE for approval and, upon PDE's approval, to the districts no more than six weeks after the close of the testing window for each administration (winter, spring, and summer).

DRC uses a unique security barcode on every assessment booklet we ship. These barcodes give DRC the ability to track booklets in real time through our MMS Receiving Application and allow schools to return answer booklets as soon as the majority of students have completed testing. The timely return of the answer booklets is critical to DRC's ability to provide the student data files within PDE's required timeline.

For the Keystone Exams, a student's best scaled score and overall performance level is calculated using all past test events. For example, if a student's module 1 score in one administration is their highest score for that module, but their highest score for module 2 was in a subsequent retake opportunity, the calculated highest or best total score is based on module 1 from the first administration and module 2 from the retake.

4.1.7. PSSA AND KEYSTONE EXAMS DATA FILES PROCESS

4.1.7.a. Accountability Student Data File

DRC fully understands the critical role of assessment data in PDE's required state and federal accountability reporting. DRC's collaborative work with PDE led to the development of an Accountability Student Data File that successfully incorporated PSSA, Keystone Exams, and PASA data into one cohesive student data file layout. DRC's extensive knowledge of student attributions and data-corrections systems for the Pennsylvania assessments further ensured that the DRC-produced accountability file met all the requirements for PDE's new School Performance Profile system and Required Federal Reporting Measures.

Each year, DRC will use our extensive knowledge of PDE's requirements to produce an Accountability Student Data File by mid-July. The file will include all grade 3–8 PSSA records from the spring administration, all PASA records for grades 3–8 and 11, and all grade 11 Keystone records. DRC's sophisticated process for banking and managing Keystone scores across multiple administrations and years will ensure that all students identified by PIMS as grade 11 will have their best scores reported for accountability.

All student records included in the Accountability Student Data File will be made available to the districts and schools in the appropriate attributions and/or corrections systems prior to the production of the Accountability Student Data File. PSSA and PASA records will be editable in a corrections/attributions system, while grade 11 Keystone records will be available for update in an attributions/match to master system. In addition, all districts will have completed

any required work in the 1% Redistribution System prior to the production of the Accountability Student Data File.

DRC will post electronic versions of the Accountability Student Data File for both PDE and approved third-party vendors to access. Upon PDE approval, DRC will also post “Accountability” District Student Data Files to eDIRECT so that the districts and schools have access to the final data that will be used for state and federal accountability reporting. In accordance with PDE policy, the Accountability Student Data File produced for PDE will not include student names. Also in accordance with PDE policy, access to the Accountability District Student Data Files in eDIRECT will be restricted to the individual each district and school has identified as its Reporting Contact (typically the Superintendent or CAO).

If PDE determines that the districts and schools should be given an opportunity to make corrections to their final accountability data, DRC will be prepared to collaborate with PDE to develop a process that meets such requirements. Although the proposed scope for the Accountability Student Data File is a single deliverable, DRC has a breadth of experience working with PDE to manage situations that have required the collection of new data and the production of updated data files.

4.1.7.b. Accountability Summary File

DRC fully understands PDE’s directive to use the Accountability Student Data File to ensure that all final reports (School Performance Profile, Required Federal Reporting Measures, district/school summary reports, and the data warehouse) are in sync. DRC’s summary reports were historically developed to match final AYP, and most recently were developed to match the final accountability file used for the inaugural release of the School Performance Profile and Required Federal Reporting Measures.

Based on a mid-July delivery of the Accountability Student Data File, DRC will provide electronic summary files to PDE no later than mid-August. Additional information on DRC’s proposal for district and school summary reports can be found under *Subheading 4.H.7.e, Summary Reports*.

DRC is also well-versed in the requirements for the Accountability Summary Files needed to support PDE’s reporting in the School Performance Profile. Both the SPP Summary File (Academic Performance) and the SPP Participation Rate Summary File were defined and developed through collaboration between PDE and DRC. Similar to all files produced for final reporting, these special SPP summary files will be reflective of the data in the final Accountability Student Data File. The files will be provided electronically to PDE one week after their approval of the Accountability Student Data File.

4.1.7.c. Grade 12 Keystone Exams Graduation File

DRC proposes to follow an approach similar to the method successfully implemented in 2013 for the identification of grade 11 students for accountability reporting. DRC will work closely with PDE to determine the method and time by which PIMS can most accurately identify the grade 12 population for the graduating class of 2017 (and beyond). Upon receipt of the PIMS data, DRC will match all grade 12 students to the student data in the Keystone Master database.

The use of the Keystone match-to-master process ensures that all student records used for this reporting will include the students' best scores to date for the purposes of determining graduation status. In addition, DRC proposes to use any other student performance that PDE deems to be sufficient for graduation purposes. For example, DRC could include a student's performance on the grade 11 PASA or a student's successful completion of a Performance Based Assessment as equivalent criteria for graduation.

DRC will produce individual data files for each district and school identified by PIMS as having grade 12 students. The requirements for the file, as well as any additional data sources, will be determined in collaboration with PDE. The files will be posted to DRC's eDIRECT system for districts and schools to access and review. Similar to other reports that include student results, access to the Keystone Exams Graduation File will be restricted to the Reporting Contacts identified by each district and school. DRC understands that the twelfth grade Keystone Exams graduation file must be provided to each LEA no later than 10 days prior to graduation. DRC will work with PDE to determine a process to ensure this requirement is met.

4.1.8. REPORTING OF ASSESSMENT RESULTS

DRC has over 30 years of experience in reporting large-scale assessment results. Our reporting experience with Pennsylvania assessments, as well as those for other client states including Alabama, Alaska, Idaho, Louisiana, Nebraska, South Carolina, and Washington can assure PDE that DRC has the ability to report accurate results in critically prescribed time limits.

DRC state assessment clients appreciate our ability to tailor reporting solutions to meet their needs, while still maintaining superior quality and timely delivery.

For every project, DRC works with our clients to **customize our reporting process to the unique needs of their assessment**. We offer PDE a combination of proven excellence in designing and implementing customized solutions to meet expectations, in-depth understanding of the complexities of assessment reporting in Pennsylvania and across the country, and a cadre of highly qualified professionals who will work collaboratively to address all reporting requirements, as well as the needs of Pennsylvania students, parents, and educators.

No other testing vendor has as much experience generating data files and reporting results for Pennsylvania assessments as DRC, including the PSSA,

Keystone Exams, and the CDT, as well as for state and Federal reporting mandates. We understand that Pennsylvania reports must be designed to be easily understood by students, parents, teachers, and administrators to sustain and contribute to the integrity of the testing program. Results of statewide tests are extremely sensitive areas of public disclosure, and a tangible and public representation of the character of the program and all staff associated with that program. To this end, reporting results accurately, effectively, and in a timely manner, with close attention paid to the various target audiences, is paramount to the longstanding efficacy of a testing program. DRC recognizes this critical element of customer service and client commitment, and is proud of our record of reporting accurate and meaningful Pennsylvania assessment results.

4.1.8.a. General Requirements for Reports

At the core of DRC's proposal is our commitment to continue to provide PDE with accurate and on-time delivery of data and reports. We are proud to provide effective reporting solutions in user-friendly formats and that are designed to support educators instruction and promote student learning and achievement. DRC fully understands the requirements to produce and deliver graduation and attendance data, accountability data, achievement data, Title I data, Highly-Qualified Teacher data, and NAEP data in the appropriate systems. We have a long history of successfully delivering these reports and many others that PDE has requested to fulfill all state and federal reporting requirements.

We are pleased to be able to once again include eMetric as our Pennsylvania reporting partner. eMetric, a Small Diverse Business (SDB), has a history of providing innovative technology-based solutions for displaying and managing assessment data, including several years of direct PSSA experience. DRC and eMetric have an established, proven partnership, working together to successfully provide reporting services for Pennsylvania since 2008. Prior to 2008, DRC provided data files that were used by eMetric for accountability reporting via their online reporting tool, Data Interaction™. DRC and eMetric will leverage our many years of Pennsylvania reporting experience to provide consistency with the current reporting processes familiar to districts and schools and PDE. We will also continue collaborating with PDE to develop reporting enhancements that address current program changes and challenges, as well as those that may arise in the future.

DRC and eMetric propose a superior reporting offering for the Pennsylvania System of Assessments that includes the following:

- CDT results provided via DRC's own dynamic, diagnostic reporting system via eDIRECT. Please see *Subheading 4.1.8.j., CDT Reporting Tool*, for more information.
- Hard-copy, full color PSSA and Keystone Exams Individual Student Reports (ISRs) that present assessment results in an easily understood and

psychometrically sound manner. Please see *Subheading 4.I.8.c., Individual Student Reports (ISRs)*, for more information.

- School, district, and state PSSA and Keystone Exams Summary Reports that are focused on the importance of both assessment and accountability results. Please see *Subheading 4.I.8.e., Summary Reports*, for more information.
- Enhanced PSSA ISRs and Summary Reports that include the new ELA assessment and new mathematics reporting categories for grades 3-8. DRC has utilized the valuable feedback gained through the parent and educator focus groups we co-facilitated with PDE in winter 2015 to redesign the reports in a way that will enhance usability and effectiveness for Pennsylvania educators, administrators, and students and families. There will also be potential development of new Keystone Exams reports for English Composition and Civics & Government tests if these are added in the future. (please see *Subheading 4.I.8.b., Formatting of Reports; Report Modifications and Enhancements*).
- eMetric’s highly functional Data Interaction™ dynamic data query and reporting tool. To streamline access, all PSSA and Keystone Exams Summary Reports and parent letters will be posted on the Data Interaction™ system. *Subheading 4.I.8.g., PSSA and Keystone Exams Data Query Reporting Tool*, provides a complete discussion of Data Interaction™.
- Parent letters for the PSSA and Keystone Exams that provide parents/guardians with straightforward information about student performance. The parent letters can be printed from Data Interaction™ and distributed by schools and districts to students and their families. Please see *Subheading 4.I.8.d., Parent Letters*, for more information.
- Score attribution and data correction processes that were developed through collaboration between DRC and PDE, and implemented annually since 2004. *Subheading 4.I.8.i., Attribution Windows*, provides more information.
- PSSA and Keystone Exams Report Interpretation Guides provided in English and seven other languages; these guides will be provided for posting on PDE’s website. Additional information about these guides is included in *Subheading 4.I.8.b., Formatting of Reports*.
- Collaborative design and delivery of PDE’s Required Federal Reporting Measures (RFRM) online reports. Formerly known as the State Report Card, DRC and eMetric have been providing these services since 2009. *Subheading 4.I.8.f., Required Federal Reporting Measures (RFRM)*, provides more information.
- Data posting for PDE for the World-Class Instructional Design and Assessment (WIDA) assessment. eMetric currently provides PDE access

to the Access for ELLs assessment results in Data Interaction (<https://solutions.emetric.net/paaccess>). eMetric will continue to provide development, maintenance and support for the Data Interaction for Access for ELLs website. This includes processing the data file received from PDE (in our current agreed upon format), quality assurance procedures to ensure that the results posted are error free, and end-user support. Users will continue to access the Data Interaction for Access for ELLs website with their existing usernames and passwords.

- Timelines for data and report distribution that meet or exceed PDE's requirements. Please see *Subheading 4.J.1.c. Project Schedule*, for proposed milestone schedules and *Volume IV; Appendix O, Project Schedules and Hours by Task* for complete project schedules, including reporting activities, for each component of the Pennsylvania System of Assessments.
- Processes and systems that have been successfully used by DRC and eMetric for reporting PSSA results for years, and are familiar to PDE and schools/districts throughout Pennsylvania.

DRC's Reporting Process

DRC understands the activities and coordination required to accurately and comprehensively report large-scale assessment results. DRC has proven success with understanding and implementing reporting requirements and currently produces a wide variety of reports for PDE and other assessment clients, including individual student reports, labels, rosters at varying levels, summaries at varying levels, and item analysis reports. DRC has a proven record of meeting reporting deadlines for large-scale, statewide assessment programs around the country.

Reporting Team

As a way to address the wide variety of requirements inherent in large-scale assessment reporting, DRC has created a Reporting Team, dedicated to the design and implementation of our report process. Our cross-functional Reporting Team includes psychometric experts, project managers, business analysts, software developers, software quality assurance analysts, and test development professionals. Each of these key resource groups contributes its own unique expertise to ensure that all reports produced by DRC are of the highest quality possible and meet all client needs and specifications.

Reporting Requirements

DRC's Reporting Team has a wealth of experience in defining and documenting requirements for data analysis and report development, having worked with Pennsylvania and numerous other state assessment programs. In the subheadings that follow this section, we have provided examples of some of the reports that we currently produce for Pennsylvania. Full-length sample reports produced for the current Pennsylvania contract are provided in *Volume IV; Appendix I, Sample*

Reports, as well as additional report samples developed by DRC for other assessment programs.

We will use our experience with Pennsylvania reporting to ensure that reporting processes for the new contract are consistent with those currently used for the PSSA, Keystone Exams, and the CDT, while also incorporating modifications and enhancements to continue to improve reporting usability and accommodate changing reporting requirements. *Subheading 4.1.8.b., Formatting of Reports; Report Modifications and Enhancements*, provides more detail.

For the PSSA, one scale score and performance level will be reported for each subject, while raw scores and strength profiles will be reported for the reporting categories. For the Keystone Exams, student results will be reported at the total score and module level, while summary results are reported at the anchor, module and total score level. CDT student results will be reported at the overall score level and for each diagnostic category within a selected assessment via the online reporting component of the CDT (please see *Subheading 4.1.8.j., CDT Reporting Tool*, for more information).

DRC will work closely with PDE on developing and documenting all reporting requirements and modifications and enhancements, including layout and design. We will produce a reporting requirements document for each assessment component (PSSA, Keystone Exams, and the CDT) that explicitly describes all of the processing rules used for the design and development of the scoring and reporting software. These documents will be used as the standard for all software development, the definition of acceptance testing criteria, and the development of scripts for test plans during the internal quality assurance process.

DRC's Psychometric Services staff will ensure that data flow from materials receipt through reporting complies with standards for educational and psychological testing. Definition of content and format of data files and hard copy reports will also be developed and documented during this time.

Report Generation and Quality Procedures

We employ a two-step report generation process. The first step is to perform all calculations and analysis to produce the data elements contained on the reports. The second step takes the data and formats it for presentation on the reports. This process allows the data to be thoroughly verified prior to and independent of formatting of the reports. This two-step process is first conducted using mock student data. Then, only after the mock data phase meets all requirements, reporting continues using live student data captured and processed during scanning and scoring of returned tests.

DRC incorporates rigorous quality assurance activities throughout the reporting process to ensure the highest level of quality and data integrity. The **focus on “building in quality” and “issue prevention”** ensures our clients quality products and services.

DRC’s primary goal is to ensure the quality of student data and to make certain that each student record is tested and verified for completeness and accuracy. Our familiarity with Pennsylvania reporting requirements and data elements, as well as those for similar large-scale assessment program, will provide DRC's Reporting Team with a solid platform and the experience that will be invaluable to PDE.

Upon the completion of the thorough data verification process, quality checks will be performed on the data placement and report file formatting for each data element displayed on the reports. All reporting data elements will be verified back to the production data file and the reporting processing rules. Additional quality cross-checks will be performed to ensure accuracy and consistency across all reporting mediums for the assessment. This includes hard copy reports, posting data to our secure web-based reporting tool, or any other type of reporting medium.

Similar quality checks will also be used to validate data at the school, district, and state level. The Reporting Team will conduct a second review of each report to ensure methodology, processes, and procedures are followed and verify that the reports are approved for production. An additional post-print review is conducted before any hard copy reports are packaged and shipped.

Final Data and Report Review

The final data and reporting review with PDE is a critical component of our reporting process. PDE will have the opportunity to review and approve all data and reports prior to final production. DRC’s Reporting Team will also perform a thorough quality assurance review prior to release of reports. All files and reports are thoroughly tested to guarantee accuracy.

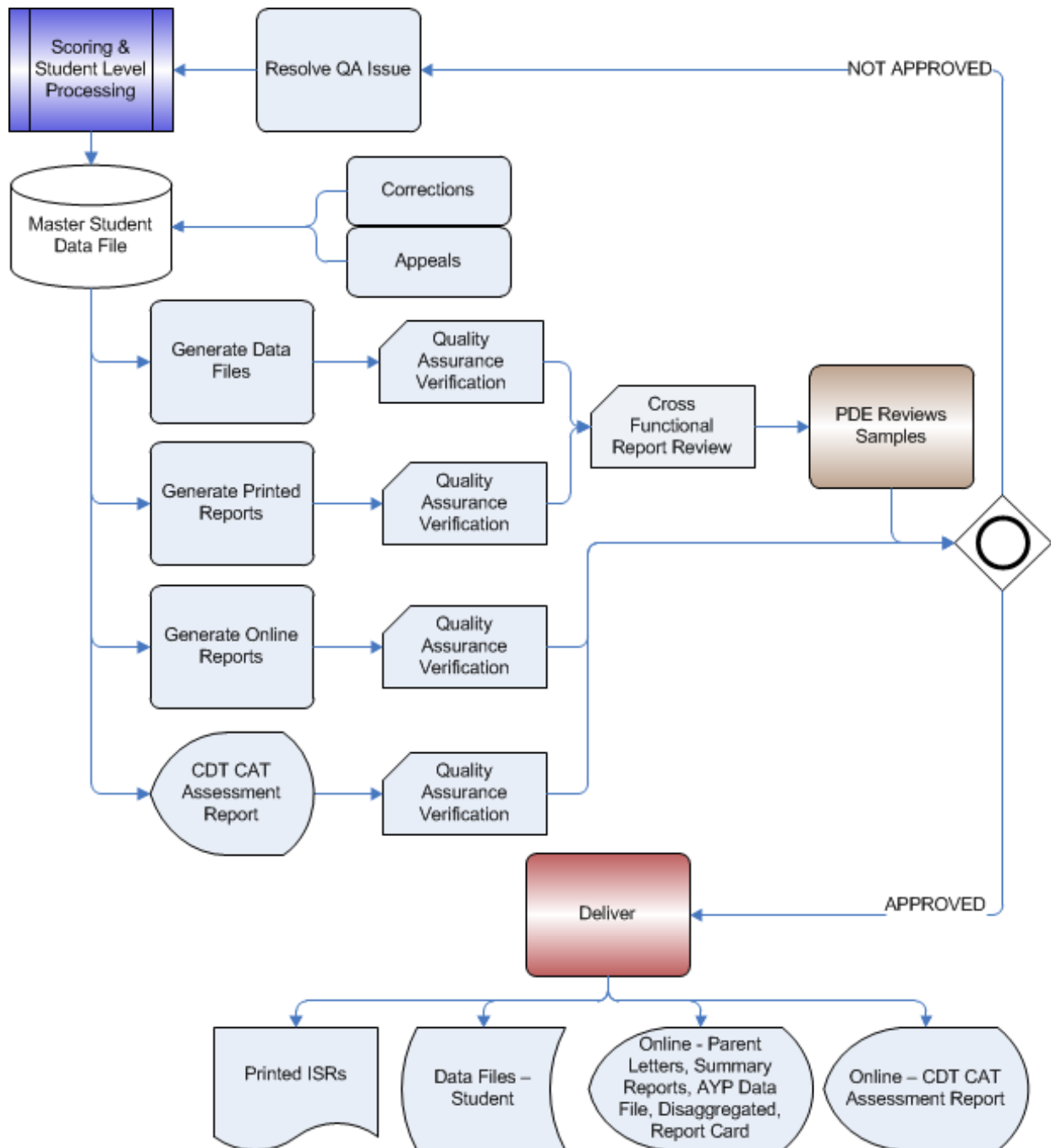
Upon approval from PDE, DRC will produce the final student and summary reports. DRC’s large-scale assessment and Pennsylvania-specific reporting experience can assure PDE that accurate and high-quality reports will be delivered within the prescribed time limits of the contract. Over the years, DRC has **repeatedly demonstrated the ability to provide ongoing communication and to deliver on time accurate data and reports** in Pennsylvania and educational assessment programs across the country.

As directed by PDE, DRC will retain student response files documents for possible re-scoring for a designated period to be agreed upon by DRC and PDE. DRC will also retain the appropriate report file in case a district needs to have ISRs reprinted. Districts may contact DRC’s customer service team to request the reprinting of reports. DRC will establish a set-up fee and a per-report fee for the

reprinting of specific reports requested by districts. These fees will be paid by the districts, not by PDE. In the event that the reports are damaged by natural disaster or issues during shipping, DRC will reprint the requested reports at no charge to the district.

The following figure shows our report generation, review, and approval process.

DRC's Reporting Process



4.1.8.b. Formatting of Reports

The varied audiences receiving assessment data have differing needs and requirements when viewing or analyzing the data. DRC currently produces a wide array of reports of varying types including rosters, summaries, and disaggregations at various levels, including state, district, school, classroom, and individual student. In the subheadings that follow, we provide more information on proposed Pennsylvania ISR and Summary reports, including examples. Sample full length reports produced for the current Pennsylvania contract are provided in *Volume IV; Appendix I, Sample Reports*, as well as additional report samples developed by DRC for other assessment programs.

In 2008, DRC teamed with PDE on a major initiative to re-design Pennsylvania PSSA ISR and Summary reports. The outcome of this initiative was the development of first-class reports that were aesthetically engaging, user friendly, psychometrically sound, and instructionally supportive. A unique component of this effort was the use of focus groups to gain stakeholder feedback and support. In 2015, as the PSSA transitioned to an ELA assessment and a mathematics assessment aligned to the Pennsylvania Core Standards (PCS), DRC again teamed with PDE to re-design the reports to facilitate the new reporting requirements. Again, focus groups were held to solicit direct input from parents, educators, administrators, and PDE on report elements and design. Similarly, in 2011, Keystone Exams reports were developed using the same focus-group approach and modeled after the highly-regarded PSSA report designs.

DRC will work closely with PDE on developing and documenting all reporting requirements, including content, layout, design, and timeframes. We will leverage our many years of Pennsylvania reporting experience to provide consistency with the current reporting processes and report designs familiar to districts and schools and PDE.

PSSA ISRs will continue to report strength profiles and student performance by reporting categories for each subject area, ELA, mathematics, and science, with ELA replacing the former subjects of reading and writing. PSSA Summary reports will report school and district performance by subject area and reporting categories. The PSSA Summary reports have also been redesigned to support the transition to the ELA subject area and its associated reporting categories.

For the Keystone Exams, student results will be reported at the total score and module level, while summary results are reported at the anchor, module and total score level. Keystone reports will continue to calculate a student's best score from any combination of current and banked test modules, and a student's performance on his/her last three test events will be reported on the Keystone ISR. CDT student results will be reported at the overall score level and for each diagnostic category within a selected assessment via the online reporting component of the CDT (please see *Subheading 4.1.7.i., CDT Reporting Tool*, for more information).

DRC also understands PDE's expectation for its assessment vendor to fulfill all federal accountability reporting requirements of the ESEA and any additional requirements announced by the USDOE. DRC is well prepared to produce any such reports for posting on a PDE-approved website.

Report Modifications and Enhancements

DRC proposes the following report modifications and enhancements:

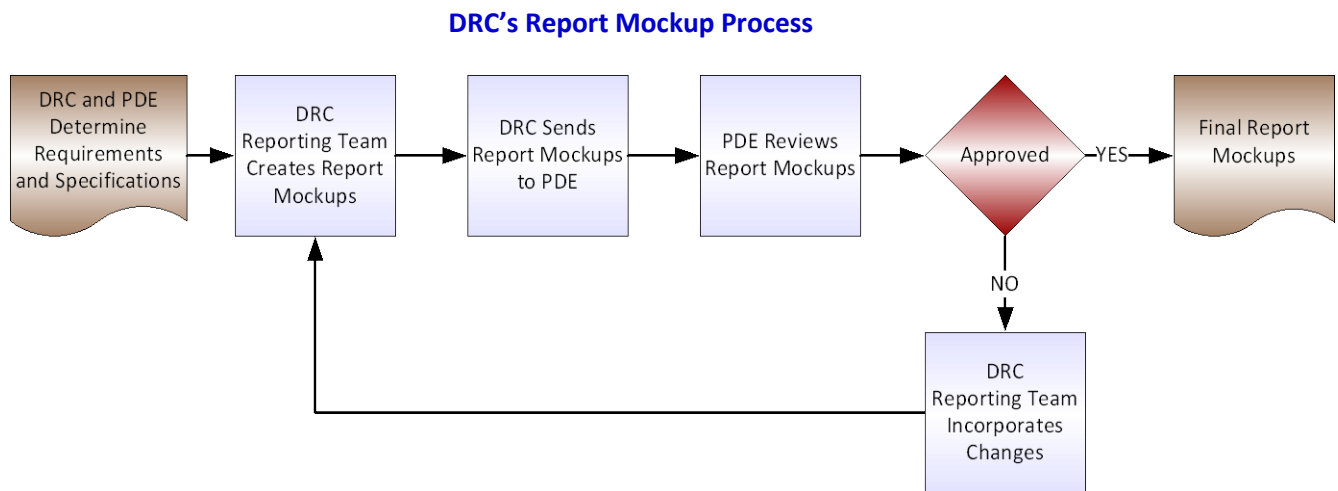
- **New Keystone Exams ISR and Summary Reports:** DRC also understands that new Keystone Exam reports will need to be developed for English Composition and Civics & Government if those tests are added in the future.
- **Keystone Exams Summary Report Format:** DRC recommends modifications to enhance the layout of information, including the use of more white space and the inclusion of percentage sums on both sides of the performance level bar graphs.
- **Parent Letters:** Parent letters will be developed and provided for each subject and administration of the Keystone Exams. PSSA Parent letters will be modified to incorporate the new ELA assessment and new reporting categories, as well as new reporting categories for mathematics. The parent letters for both the PSSA and the Keystone Exams will be posted to Data Interaction™; schools and districts can then print and distribute them to students and their families.
- **Report Interpretation Guide Linked Resources:** DRC recommends enhancing the PSSA and Keystone ISRs to include the web address for parents or educators to access the subject-specific Performance Level Descriptors (PLDs). Within the electronic version of the ISRs used for the Report Interpretation Guides, this same web address will become a hyperlink that will navigate directly to core-specific PLDs to provide educators, administrators, and parents with information regarding the skills and knowledge that students must demonstrate in order to reach each performance level.

Report Mockups

Report mockups are essential in the report development process. DRC will create report mockups representative of the exact production reports that will be delivered for each administration of each assessment component. The mockups will be comprised of simulated, but realistic, data elements. The mockups will be in the required report layout, display the appropriate fonts and font sizes, and demonstrate paper size and printing elements. DRC takes pride in producing high-quality, easy-to-use reports, and will work with PDE to continue the tradition of providing effective, user-friendly reports for Pennsylvania students, parents/guardians, districts and schools, and PDE.

Following development and PDE-approval of all reporting requirements, DRC proposes to follow a process that provides PDE with the opportunity to review, edit, and approve hardcopy mockups prior to report development. The mockups will also be reviewed by DRC’s Reporting Team for accuracy and consistency and to ensure initial requirements are met. During the review process, PDE will be able to evaluate the static content and layout of each report to make certain it reflects the format, verbiage, and design required. DRC will work with PDE throughout the review process to incorporate any changes or modifications.

DRC’s report mockup process is outlined in the flowchart below.



Due dates for the report mockups will be clearly outlined in the schedule provided to PDE and negotiated among all appropriate parties. The report mockups will be completed, reviewed, and agreed upon by PDE to ensure the final reports meet the requirements. Adequate time for all phases of the reporting process, including mockup design and review will be built into the program schedule. Please see *Subheading 4.J.1.c. Project Schedule*, for proposed milestone schedules and *Volume IV; Appendix O, Project Schedules and Hours by Task*, for complete project schedules, including reporting activities, for each component of the Pennsylvania System of Assessments.

4.1.8.c. Individual Student Reports (ISRs)

DRC is committed to continuing to develop reports that can be adjusted to reflect the evolving needs of the PSSA and Keystone Exams, and delivering those reports on time. As part of DRC’s current contract with the Commonwealth of Pennsylvania, the ISR reports were recently redesigned, following an extensive series of Focus Groups with key stakeholders of the assessment program. DRC’s focus group team worked with groups of parents and educators throughout Pennsylvania to gather feedback on the PSSA student reports. The DRC team asked for feedback about how well parents and educators understood the content of the new student reports and also discussed overall readability and report

design. The feedback from the groups were incorporated into the new design, which will be delivered this spring.

The primary modifications served to incorporate the new PSSA ELA test (replacing Reading and Writing). DRC's reporting of the ELA assessment incorporates dual reporting of the Reading reporting category by genre and core competency in order to communicate actionable, detailed student performance information. Information on student performance strengths and weaknesses will allow educators and parents to make appropriate student learning interventions. Selected excerpts from the redesigned ISR are presented in the following pages.

DRC also understands the changing nature of assessment programs and recognizes that report designs may need to be further modified to accommodate new reporting requirements and/or future program changes.

The design of the reports will be user-friendly and feature clear graphics and color to represent various data elements. Additionally, the ISRs and Summary Reports will use similar graphic design elements to produce a cohesive look and feel. The PSSA and Keystone reports were designed independently of one another to support the unique features of each assessment program. DRC recommends retaining the overall appearance of each assessment's reports to accentuate the different purposes of the assessments; however, DRC will also be happy to collaborate with PDE on any effort to incorporate some similarities to promote consistency across the programs.

The first page of our newly-developed PSSA ISR will contain the program name, student's name, school, district, grade, and test date. It will present summary information in the form of scaled score and performance level achieved for all subjects tested. This will immediately give students and their families a snapshot of the student's overall performance.

PSSA ISR Program Information and Summary of Results

PENNSYLVANIA

Student Report

| | |
|-----------------------|------------------|
| Student Name: | Sample Student 3 |
| PA Student ID: | ****45154 |
| School: | Sample School |
| District: | Sample District |
| Test Date: | Spring 2015 |
| Grade: | 4 |

| Student's Results | | | | |
|-----------------------|-------------|-------|------------|----------|
| Performance Level | | | | |
| | Goal Range* | | | |
| | Below Basic | Basic | Proficient | Advanced |
| English Language Arts | | | | ✓ |
| Mathematics | | | ✓ | |
| Science | | | ✓ | |

What Is the Pennsylvania System of School Assessment (PSSA)?

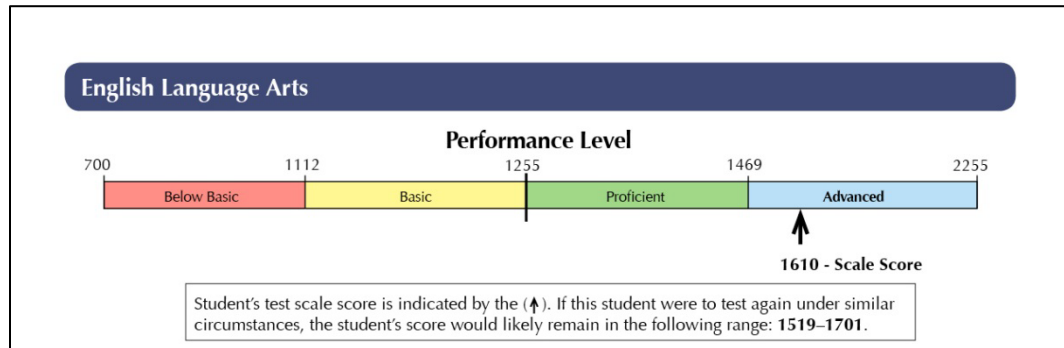
- The PSSA is an assessment system used to measure a student's progression toward mastery of the
 - Pennsylvania Core Standards in Mathematics

* **Goal Range:** The goal range is for all students in the Commonwealth of Pennsylvania to score proficient or above.
 ^ See inside for details
Science is not assessed in Grade --.

Inside each four-color PSSA ISR report, DRC proposes to present detailed information regarding the student's performance on each of the subjects tested. PSSA ISRs will be 4-page (11"×17" folded) reports, while Keystone Exams ISRs will be 2 pages. Student performance information will be presented graphically with accompanying explanatory text. DRC's proposed ISRs feature the following data elements for each subject tested:

- Scaled score and performance level.
- Module scores and total scores for the Keystone Exams.
- Scores from past administrations for the Keystone Exams.
- Dual reporting of PSSA ELA scores by genre and core competency.
- Total points possible and total number of points correct by reporting category for the PSSA.
- Strength profile by reporting category for the PSSA, which identifies strengths and areas for improvement.

PSSA ISR Performance Level Results



PSSA ISR Results by Reporting Category

| Score Reporting Category | Student's Points | Total Points Possible | Strength Profile* |
|--------------------------------------------------------|------------------|-----------------------|-------------------|
| Reading** | | | |
| Key Ideas and Details | 16 | 17 | High |
| Craft and Structure/Integration of Knowledge and Ideas | 9 | 12 | Medium |
| Vocabulary Acquisition and Use | 7 | 9 | Medium |
| Writing | | | |
| Types of Writing | 8 | 12 | Medium |
| Language | 14 | 18 | Medium |
| Text-Dependent Analysis | | | |
| Text-Dependent Analysis | 16 | 16 | High |

**Each reading question connects to a Reading reporting category in the table above as well as to a Text Type reporting category in the table below. However, each reading question counts only one time in the student's score.

| Score Reporting Category | Student's Points | Total Points Possible | Strength Profile* |
|--------------------------|------------------|-----------------------|-------------------|
| Text Types | | | |
| Literature Text | 14 | 19 | Medium |
| Informational Text | 18 | 19 | High |

Finally, the last page of the PSSA ISR will be reserved for easy-to-understand definitions of all Score Reporting Categories displayed within the ISR. The introduction of this new level of detail is a product of feedback from PDE and the focus groups indicating that the new PCS Reporting Categories require a more thorough definition for parents and educators to fully comprehend the breakdown of a student's scores. Full-size samples of ISRs produced by DRC for the current PSSA and Keystone Exams programs can be found in *Volume IV; Appendix I, Sample Reports*.

A summary of the grade levels and/or subjects for the PSSA and Keystone Exams requiring ISR reporting is presented in the following table.

PSSA Exams ISR Reporting Plan

| Assessment Component | Subject | | | |
|----------------------|---------|-----|-------------|---------|
| | Grade | ELA | Mathematics | Science |
| PSSA | 3 | • | • | |
| | 4 | • | • | • |
| | 5 | • | • | |
| | 6 | • | • | |
| | 7 | • | • | |
| | 8 | • | • | • |

Keystone Exams ISR Reporting Plan

| Assessment Component | Subject | | | | |
|----------------------|------------|-----------|---------|----------------------|----------------------|
| | Literature | Algebra I | Biology | English Composition* | Civics & Government* |
| Keystone Exams | • | • | • | • | • |

*English Composition and Civics & Government subject areas may be added to the Keystone Exams in the future.

ISR Hard-copy Distribution

Hard-copy student reports will be produced using the same high-quality secure materials production procedures that DRC has used for years for Pennsylvania. DRC will perform a thorough quality assurance review prior to the production of data files and reports. All data and reports are thoroughly tested to guarantee accuracy. Per the RFP, two hardcopies per student will be provided, one copy for distribution to parents/guardians and one copy to remain in the student’s permanent folder.

Following the printing of the reports, DRC will assemble them by school and district, and package them into boxes clearly labeled “Test Results Enclosed—OPEN IMMEDIATELY.” Packaged reports will be shipped directly to districts for distribution to schools, except for districts with 10 or more schools, in which case the reports will be shipped directly to schools. PSSA ISRs will be distributed so that they are delivered by the first week of September. ISRs for the Keystone Exams administrations will be delivered at a date mutually agreed-upon by PDE and DRC.

Based on our prior experience with student results distribution for Pennsylvania, DRC proposes to send PSSA ISRs to the sites at which students are reported for accountability (i.e., the students’ home districts and schools of residence). Keystone Exams ISRs are delivered to the students’ tested sites. For students who are identified as attributed to the state, DRC proposes to send reports to the tested site. At PDE’s request, DRC has been printing and delivering copies of the PSSA ISRs to a student’s tested site when the tested site is different than the public


school to which the student is attributed for accountability (the attributed site receives the original ISRs). The purpose of the ISR copies is to ensure that alternative education facilities receive student-performance information. Costs for these additional ISR reports will be provided as a value-added service to PDE. DRC will provide report reprints for LEAs as requested.

4.1.8.d. Parent Letter

DRC will develop Parent Letters for the PSSA and Keystone Exams based on the specifications and requirements approved by PDE. These reports will be made accessible to PDE, districts, and schools within the Commonwealth via Data Interaction after each test administration. A sample Keystone Exams Parent Letter is presented below.

Keystone Exams Parent Letter

Dear Family:




This report provides information about your child's recent performance on a Pennsylvania test known as the Algebra I Keystone Exam. On this report, you can see your child's overall performance below basic, basic, proficient or advanced.

Additionally, you will find specific information about your child's performance on the Algebra I Keystone Exam. It displays your child's Highest Total Test Scale Score to Date for Module 1 and Module 2. Module 1 assesses Operations and Linear Equations and Inequalities, and Module 2 assesses Linear Functions and Data Organization. Your child's previous score(s) for this Keystone Exam are also displayed (if applicable).


Student Name: SAMPLE STUDENT
 PA Student ID: *****78901
 School: SAMPLE SCH
 District: SAMPLE SD
 Test Date: SPRING 2014
 Subject: ALGEBRA I

For detailed information about the Keystone exams, please visit the Pennsylvania Department of Education's Standards Aligned System website at www.pdesas.org, or contact your child's school.

Sincerely,



Pedro Rivera
Acting Secretary of Education



Your student's score is indicated by the ↑. If your student were to test again, his or her score would likely remain in the following range: 1500-1530

| ALGEBRA I | Module 1 Operations and Linear Equations & Inequalities | | | Module 2 Linear Functions and Data Organization | | | Total Test ¹ | |
|-----------------------------------------------------|------------------------------------------------------------|-------------|------------------|----------------------------------------------------|-------------|------------------|-------------------------|-------------------|
| | Result | Scale Score | Test Date | Result | Scale Score | Test Date | Scale Score | Performance Level |
| Highest Total Test Scale Score to Date ² | Passed | 1525 | Spring 2014 | Passed | 1507 | Spring 2014 | 1515 | Proficient |
| Scores to Date | Passed | 1525 | Spring 2014 | Passed | 1507 | Spring 2014 | | |
| | Not Passed | 1406 | Winter 2013/2014 | Passed | 1504 | Winter 2013/2014 | | |

¹ Students who do not score Proficient on the Total Test may choose to take the test more than once.

² The highest total test scale score to date is the highest score computed from all possible combinations of module 1 and module 2. Given that modules contain varying item content and difficulty across multiple test forms and administrations, the total scale score may not equal the average of the module scale scores.

4.1.8.e. Summary Reports

DRC will develop Summary Reports for the PSSA and Keystones Exams based on the specifications and requirements outlined in Process Design Documents and Functional Specification Documents and approved by PDE. These reports will be made accessible to PDE, districts, and schools within the Commonwealth via Data Interaction within four weeks after providing the student data files. Summary reports will contain disaggregated data by student subgroup as well as longitudinal trend data. Excerpts of our proposed Summary Reports are shown below.

Proposed District Summary Report Presentation of PSSA ELA Results, with Dual Reporting by Genre and Core Competency

| Grade 8 | | | District Average | State Average | Total Points Possible |
|-----------------------|-------------------|--------------------------------------------------------|------------------|---------------|-----------------------|
| ENGLISH LANGUAGE ARTS | Genre | Literature | 16.5 | 15.8 | 18 |
| | | Informational | 15.9 | 15.3 | 18 |
| | Core Competencies | Key Ideas and Details | 10.1 | 9.9 | 12 |
| | | Craft and Structure/Integration of Knowledge and Ideas | 9.8 | 10.2 | 12 |
| | | Vocabulary Acquisition and Use | 11 | 10.6 | 12 |
| | | Text Dependent Analysis | 8.5 | 7.7 | 12 |
| | WRITING | | Writing | 10.7 | 10.2 |
| | | Language | 19.8 | 20.3 | 24 |

*All Reading points are displayed in both Genre and Core Competencies

Proposed Keystone Exams Summary Report Enhancements

District Summary Report

District: ABINGTON HEIGHTS SD
AUN: 119350303
Test Date: Spring 2013
Number of Students Tested: 319

Content Area: Algebra I

Performance Level Summary: All Testers

| Algebra I | Total Tested | Below Basic | | Basic | | Proficient | | Advanced | |
|-----------------------|--------------|-------------|---------|---------|---------|------------|---------|----------|---------|
| | | Number | Percent | Number | Percent | Number | Percent | Number | Percent |
| District: All Testers | 319 | 14 | 4.4 | 88 | 27.6 | 111 | 34.8 | 106 | 33.2 |
| State: All Testers | 248,871 | 40,893 | 16.4 | 109,258 | 43.9 | 66,240 | 26.6 | 32,480 | 13.1 |

Percentages by Performance Level¹

¹If a percentage is not displayed within the bar graph, consult the table for the actual percentage.
 Summaries are based on students' highest scores to date.
 Please note that the percentages in the table may not add up to 100% due to rounding.

www.pdesas.org

Algebra I

pennsylvania
DEPARTMENT OF EDUCATION

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4.1.8.f. Required Federal Reporting Measures (RFRM)

The Required Federal Reporting Measures website will provide public access to pre-defined accountability reports for the state and each district and school within the Commonwealth; these reports will meet the federal accountability reporting requirements. DRC has successfully managed the production of accurate and aesthetic reporting of these federal requirements with our partner, eMetric, since 2009. The former federally-required report, the State Report Card, was transitioned from a previous vendor to DRC in 2009, at which time eMetric’s accountability reporting solution for AYP reports was used to host the report. In 2013, DRC again collaborated with PDE and eMetric to transition the entire reporting suite to a new website, www.eseafedreport.com, to meet the new Required Federal Reporting Measures. As evidenced by these highly successful transitions, DRC is best positioned to maintain its partnership with PDE to ensure that all federal reporting requirements continue to be met and released with accuracy and within PDE’s timelines.

Overview

The purpose of the RFRM is to report federal reporting measures as identified in Pennsylvania’s ESEA waiver. The RFRM reports the federal designations for Title I schools. These designations are based on a combination of factors that

include Participation Rate, Graduation Rate, Attendance Rate, Closing the Achievement Gap for All Students, and Closing the Achievement Gap for Historically Underperforming Students.

Additionally, Title I schools may be designated as Reward: High Achievement, Reward: High Progress, Focus, and Priority based on meeting the federal requirements associated with each designation. Title I schools that do not fit into one of these categories will be reported as Undesignated. For the purposes of federal reporting, non-Title I schools will be reported as Not Applicable.

System Features

To meet the requirements specified in RFP for Accountability Reporting, DRC proposes the continued use of eMetric’s Required Federal Reporting Measures website with downloadable PDF reports. DRC also understands PDE’s interest in maintaining two years of data on the RFRM website. In response to a specific request from PDE in fall 2014, DRC collaborated with eMetric to configure the website to support the previous year’s data. The website will continue to do so within the new contract. The RFRM website will provide the following features:

- **Public Access**—The RFRM website will provide public access to State Required Federal Reporting Measures. Data is provided at State, District/LEA, and School levels.
- **Easy-to-Use Navigation Menus**—Easy-to-use navigation menus are available to access RFRM reports for a school or district/LEA. Simple drop-down menus for districts and hierarchical school menus filtered by the selected district menus will be provided to select a specific district or school. Additional search options will be available to perform a quick look-up of a school or district by name. State data will be available via a separate tab, or page, that includes tables and charts as well as the downloadable PDF.
- **State-level Pie Charts And Tables**—Users will be able to access State data by selecting a tab for “State Required Federal Reporting” in order to view tables and pie charts describing school designations for the entire state. Additionally, the state level RFRM PDF report can be downloaded from this page.
- **Downloadable RFRM Reports**—Reports available from the RFRM website can be exported to PDF. The PDF export will format the reports similar to the online presentation, and are most suitable for printing and distribution.
- **About RFRM Text and Frequently Asked Questions**—The RFRM website will also include a tab or page with text, tables and/or graphics describing the Required Federal Reporting Measures as defined by PDE. An “About RFRM” section as well as a Frequently Asked Questions (FAQ) section will be included.

RFRM Reports

RFRM reports available via the eseafedreport.com website include the following sections at State, District/LEA and/or School levels as described below:

- **Cover Page:** The Cover page displays the District/LEA or School name, the current year, a description of the RFRM report, and a table of contents for the subsequent sections of the RFRM PDF.
- **Attendance and/or Graduation Data:** This section displays data provided by PDE on student performance on the other academic indicators, attendance and graduation rate. Both measures are based on data from the previous academic year.
- **Accountability Report:** The school, district and state Accountability Report page displays data showing how students performed compared with the State's annual measureable objectives (AMOs) in English language arts and in mathematics. Results are listed by group and performance level. The Accountability Report participation rate (Students Assessed # and %) and Percentage of students in each Performance Level are calculated the same as they are calculated for the current year only. Calculations for the State Report Card do not include 2 and 3 year averaging.
- **Assessment Report:** The Assessment Report page displays data showing how all students performed on the PSSA, Keystone, and PASA over the past two years in Math/Algebra I, Reading/Literature, and Science/Biology. Performance level and participation results are displayed by assessment, grade, subject, and group. The Assessment Report participation rate and percentage of students in each performance level includes all students who were in the state/district/school for any part of the academic year.
- **Federal Accountability Designations:** This section displays the total number of schools that have been identified in the categories specified under the Federal Accountability Designations and the name of each school identified where applicable.
- **National Assessment of Educational Progress (NAEP):** The National Educational Assessment Program (NAEP) is also known as the Nation's Report Card. NAEP is a national mathematics and reading test administered every two years to grades 4 and 8. Samples of students take the test. On the State and District/LEA reports, this page displays the achievement of the All Students group and all subgroups, and the participation rate of the Students with Disabilities and Limited English Proficient a sample of students.

4.1.8.g. PSSA and Keystone Exams Data Query and Reporting Tool

Pennsylvania users have over 10 years of experience utilizing Data Interaction to view and analyze data for the PSSA and Keystone Exams. Continuing the use of Data Interaction for statewide assessment reporting will ensure the uninterrupted management of Pennsylvania student assessment data, with no transition required. eMetric proposes to continue providing access for users via the current URL (pa.emetric.net). Reports and data from the 2002-2015 PSSA administrations will continue to be accessible. Users will be able to query student results regardless of where the student took the state assessments and combine results for all content areas. The next generation of PSSA assessments will utilize our enhanced Data Interaction platform, which is currently being used to report the Keystone Exams. eMetric is committed and proud to offer PDE the same high-quality solutions and support as we have since 2004.

To meet the requirements specified in the RFP for a dynamic data query and reporting tool for both the PSSA and Keystone Exams, eMetric proposes to implement an enhanced and expanded version of Data Interaction. Building on the robust features and functionalities of the previous version, the enhanced Data Interaction platform will continue to meet the needs of Pennsylvania users and fully address requirements listed in the RFP:

- Include a secure-access, permission based application that provides data for educators at the state, LEA, and school levels;
- Query, sort, and retrieve assessment results based on demographic and achievement parameters, and display demographic characteristics at the individual student level or at the aggregate group level;
- Generate various reports in both electronic and hard copy formats and have the ability to import/export data files (e.g., csv);
- Comply with the security and operational requirements specified in FERPA; and
- Allow districts to locate in a single search individual students across all Keystone Exams test events for each content area.

Data Interaction™ Overview

Today's educators and parents are becoming increasingly more sophisticated data consumers. The clamor for meaningful, timely information regarding school and student performance demands more advanced, robust data analytics tools. While thoughtfully-conceived static reports can help quickly convey general performance data, they fall short of answering many questions essential to effective decision-making. Questions such as "How does performance differ across subgroups?," "Are investments in interventions and programs improving performance over time?," and "Which students are at risk of not meeting the assessment performance requirements to graduate from high school?" require

educators to dive deeper into assessment data to discover patterns, trends, and strengths and weaknesses.

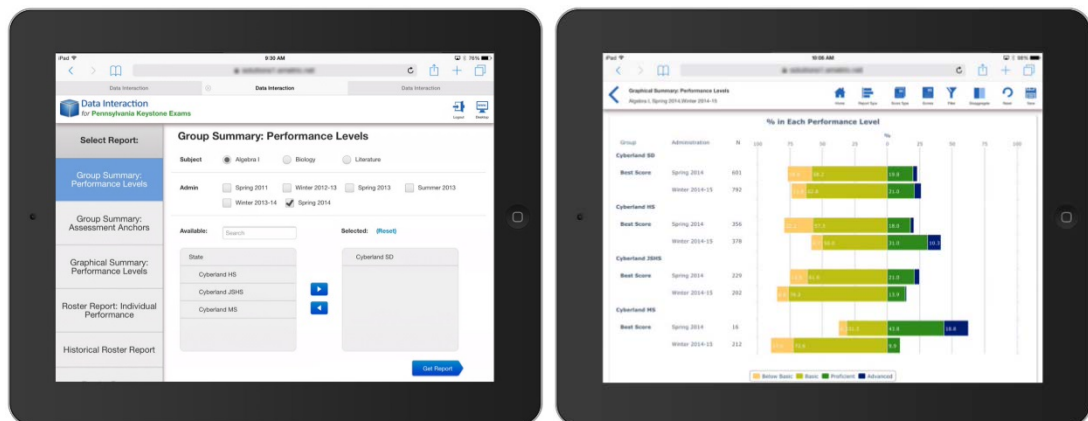
Data Interaction™ is a proven platform for empowering users with convenient, easy-to-use tools to transform assessment data into meaningful, actionable insight to evaluate student performance at the classroom, school, district and state level. Designed exclusively for K–12 assessment, Data Interaction combines an intuitive user interface with sophisticated analytical capabilities, providing educators with richer insight and greater flexibility than a traditional repository of static reports. For over a decade, Data Interaction has served the reporting needs of states and school districts across the country, including Pennsylvania, enabling educators to actively participate in the data discovery and analysis process. Today, Data Interaction remains at the forefront of technological capability, providing seamless support for mobile devices, an intuitive, modern interface, and a rich suite of data analysis tools, all powered by a robust infrastructure built to protect the security and validity of student data.

Mobile First Design

Data Interaction offers seamless, native support for multiple devices, including tablets and smartphones. Recognizing users' shift towards mobile as their primary device, eMetric's design philosophy embodies a mobile-first approach that reflects design directed at mobile devices, rather than a watered down experience of the desktop platform. This provides users information where and when they need it, which is often NOT sitting at their desks behind a PC.

The tablet version of Data Interaction, depicted in the figure below, provides the same reports and mirrors the functionality of the desktop version, excluding account management and file upload features. Users can save and view reports seamlessly on both desktop and tablet versions. The user interface for the tablet version is optimized for touch capabilities and the screen resolution of tablet devices.

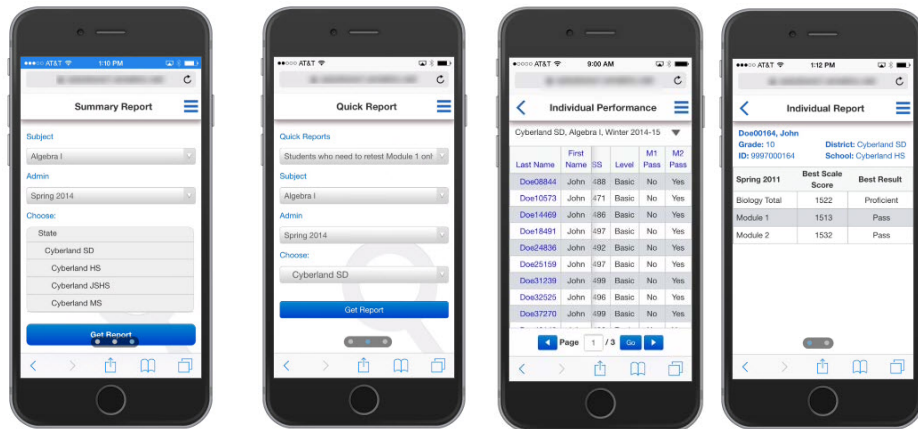
Tablet Version of Data Interaction



Data Interaction’s tablet version provides the same rich functionality of the desktop version, adding another layer of convenience for users.

The smartphone version of Data Interaction, depicted below, complements the desktop site by offering on-the-go access to student data. From a smartphone, a user can access group summary reports and graphs, predefined ‘Quick Reports,’ and individual student reports through a convenient ‘Student Search’ page.

Smartphone Version of Data Interaction

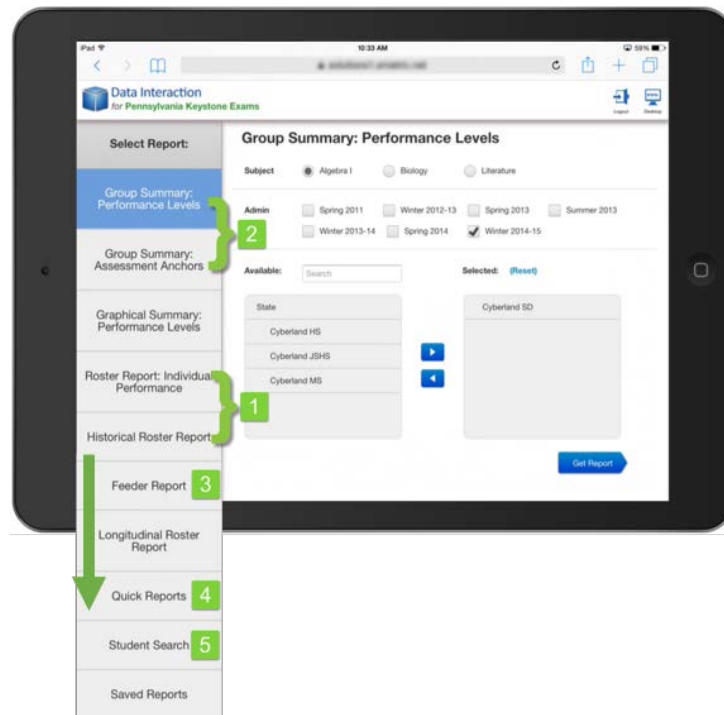


The Data Interaction smartphone version provides quick, easy access to the information educators use most.

Powerful, Easy-to-Use Interface

From a desktop computer or tablet, as illustrated in the figure below, users can begin their data analysis by selecting either a group summary view, to see a district’s or school’s aggregate performance, or a roster view, to see the individual performance of a specified group of students. For quick access to predefined reports, users can select Quick Reports to access one or more reports pre-built based on PDE’s requirements. Each of these three options allows users to drill down for more extensive exploration or to view an Individual Student Report. For convenient access to a specific student’s Individual Student Report, Data Interaction offers a Student Search function.

Easy-to-Use Interface

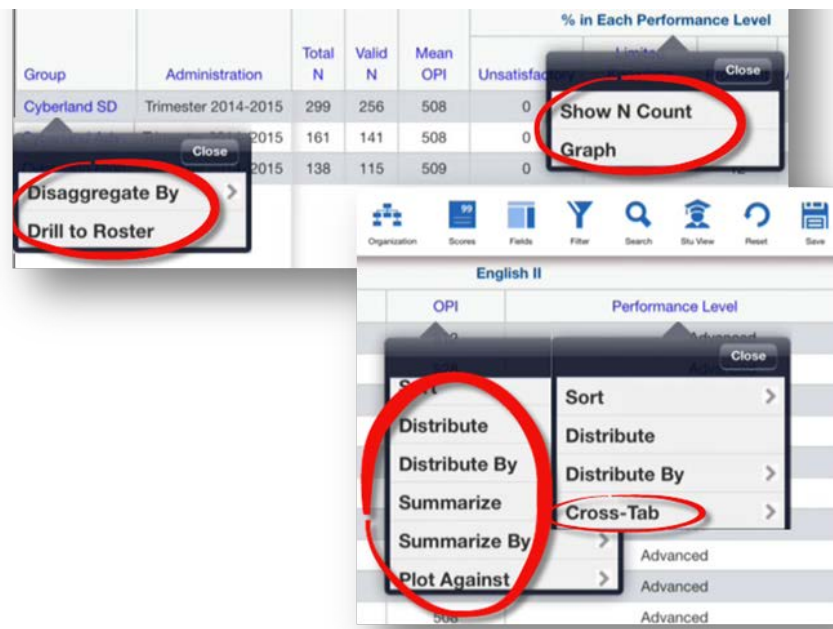


1. **Roster** views provide dynamic access to individual student results. Interactive data analysis features allow users to dig deeper into the data. For example, a district administrator can quickly identify the lowest performing students in her district by applying a single filter. From there, the administrator can identify the number of struggling students, what schools they are enrolled in, and performance outcomes on previous assessments. The roster can also be downloaded as a CSV file for importing into other systems, such as a performance monitoring system, or printed and distributed to campus teams. Data can be displayed for single or multiple test administrations, enabling longitudinal analysis of student performance to identify trends and patterns.
2. **Group Summary** views display school, district, and state group performance over various summary statistics (e.g., number of students tested, mean scale score, number and percent of students in each performance level, mean raw scores by standards, maximum score possible, and percentage of total points earned for each standard). Users can customize the display by selecting different content areas, statistics, administrations, demographic variables, and report views. Drill-down features allow users to further disaggregate by subgroup or directly access individual student results for a selected subgroup. These tools allow educators and administrators to dig deeper to better understand the data, the individual students behind the group summary data, where their strengths are, and where improvement, even intervention, may be needed.

3. Data Interaction also supports **Feeder Reports** through the desktop interface. A Feeder Report provides a longitudinal roster of students' scores and demographics by subject areas across all administrations specific to a roster/list of students uploaded by a district administrator. This report allows users to track student performance across all administrations at the individual student level and is not confined to the assessment results collected in the same school or district. This functionality can be used to identify students who need to take or retake a particular exam as well provide access to results for those students who have not previously tested at the current school. Feeder Reports require a simple data import into Data Interaction. This roster list can be imported as often as necessary to keep the feeder report up-to-date.
4. **Quick Reports** are pre-defined queries configured in collaboration with the PDE. This feature provides educators with quick, easy access to key information. Two examples of Quick Reports eMetric has pre-defined for state clients include roster reports indicating students needing to retake a particular exam and performance level summary reports that include only students who were enrolled in a district before a specific time. Using this feature, eMetric can develop a Quick Report based on PDE's business rules for participation. Highly configurable and easy to access, Quick Reports provide administrators and educators on-demand access to important information within seconds of logging in to Data Interaction.
5. By using the **Student Search** function, users can quickly access a student's Individual Student Report. Individual Student Reports can also be accessed by drilling down from a group summary or roster view. The Student Search function ensures busy educators and administrators can quickly and easily access student performance information whether they are meeting with other educators or parents in their office or dropping by classrooms for impromptu conversations with teachers. These reports are also easily printed for sharing with parents. Individual Student Reports will be designed in collaboration with PDE and the testing vendor to address PDE's specific reporting needs.

Data Analysis Features: Turning Data into Actionable Information

Data Interaction provides a rich suite of data analysis capabilities to help educators easily discover trends, patterns, and areas of strengths and weaknesses. From interactive disaggregation capabilities and calculations to advanced functions for univariate and bivariate analyses, these flexible functions allow users to view and manipulate data at multiple levels to produce customized, actionable reports. Data analysis functions can be accessed from various views and are highly intuitive and easy to use. These data analysis tools allow users to switch from summary reports to roster reports with drill-down capabilities, display raw scores into percentages, and perform commonly used data investigation techniques such as distributions and scatterplots. The figure below illustrates several of these data analysis functions.

Data Analysis Functions

Data analysis features, such as “Drill To Roster” and “Plot Against,” empower users to better understand and take action on student performance data.

Additional features and functionalities are available throughout the secure Data Interaction system enabling users to interact with data to meet their specific needs and preferences. Universal system features in Data Interaction include the ability to save and bookmark queries, customize tabular report displays by determining what data elements to show or hide, and download reports and graphs in multiple formats.

Data Interaction Architecture: Robust, Secure, Reliable

Data will be processed using a robust, industry standard, customized ETL (Extract, Transform, and Load) engine. The ETL engine cleans, verifies, and applies relevant data processing rules and business logic, then loads the data into data marts. The data warehouse will contain record (granular level student records and test data) and dimensional aggregate level data marts.

eMetric understands the importance of accuracy and integrity of data reported through the data portal. The eMetric team is comprised of psychometricians, statisticians, former educators and technologists with years of experience in implementing data systems for high-stakes assessments. Our internal operations and procedures are engineered with particular focus on accuracy of processed and reported data. Stringent data quality checks are implemented throughout the quality assurance lifecycle. eMetric uses industry standard best-practices and tools to process and verify data. All data that is processed and loaded into eMetric’s data warehouse undergoes an internal, independent analysis and audit. In addition,

eMetric utilizes automated testing tools to perform a full functional verification and a regression run for both major and minor releases of the application.

eMetric will provide Clustered Database Services, which will enable mirroring of data on two simultaneous servers using SQL Server Clustering Services. The load-balanced web farm of application servers hosting the Data Interaction application will connect to the database cluster, thereby providing redundancy at the application and data layers. Downtime of any single server will not cause any interruption to the service, making the downtime invisible to users. This setup requires no human intervention and provides an effective solution to mitigate major disasters. As a safeguard, a hot backup of the data warehouse will also be archived on a daily basis at an alternate location.

eMetric understands the essential responsibilities associated with being accountable for confidential, sensitive data. We are committed to proactively addressing security on a number of fronts to protect student information and ensure data integrity. Data Interaction is specifically designed for the dissemination of student-level assessment data. The security architecture of the system is designed to be FERPA compliant and has been successfully deployed in many states to serve as a web-based analytical and dissemination tool for high-stakes student assessment data.

Data Interaction provides a user management interface that allows authorized users to create, view, edit, and activate/deactivate user accounts as well as reset passwords. Role-based authentication is employed to ensure users can access only data they are authorized to view. User roles can be defined by PDE and will specify which data, reports, and platform features users can access. Users are assigned a username and password which is tied uniquely to their role and organization. For added security, Data Interaction automatically logs a user out after a period of inactivity.

Administrative users can monitor the usage of Data Interaction by viewing reports within user management. These reports allow administrative users to view information about which districts and schools are accessing the system by date and time of access, and which reports are most frequently viewed. This allows tracking and oversight of the system's usage to verify it is being used as prescribed.

eMetric will provide a Secure FTP (SFTP) site for the assessment vendor(s) to transfer sensitive student-level data files. eMetric will utilize industry standard authentication protocols such as enforcement of strong passwords for the SFTP sites and signed digital certificates. After successful completion of data transfers for each administration, eMetric will utilize the same security protocols to move data from the SFTP site to eMetric data processing equipment.

PSSA Reporting Components

The Data Interaction reporting solution will provide the following components for PSSA:

- Group Summary Reports
- Graphical Summary Reports
- Individual Performance Report
- Longitudinal Individual Performance Report
- Cohort Comparison Report (following the 2016-17 school year)
- Matched Comparison Report (following the 2016-17 school year)
- Quick Reports

Data Interaction provides two summary reports for PSSA. Users can select content areas, statistics, administrations, demographic variables for summary, test format (e.g., paper or online), and different report views. Drill-down features allow users to disaggregate by subgroup or to access individual student results. eMetric will customize the scores available on this report to meet PDE's requirements.

- The **Group Summary Report: Scale Scores and Performance Levels** provides summary statistics including, but not limited to, number tested, mean scale score, and number and percent of students in each performance level.
- The **Group Summary Report: Reporting Categories and Anchors** provides summary statistics including, but not limited to, number tested, average raw scores by anchor, maximum score possible, and percent of score points earned for each anchor.

Data Interaction provides two graphical summary reports for PSSA. The graphical summary reports provide access to summary graphs including bar charts, pie charts, histograms, and line graphs. Users can select content areas, statistics, administrations, demographic variables for summary, test format (e.g. paper or online), and different report views. Drill-down features allow users to disaggregate by subgroup or to access individual student results. eMetric will customize the scores available on this report to meet PDE's requirements.

- The **Graphical Summary Report: Performance Levels** provides a graphical display of percent of students in each performance level.
- The **Graphical Summary Report:** provides a graphical display of percent of score points earned for each anchor.

The **Individual Performance Report** provides individual student results including, but not limited to, scale scores, performance levels, total raw scores by item type, and raw scores by reporting category and anchors. It also provides student level data including local and PAscoreID, demographic information, and score attribution information. Users can select subgroups of students by filtering options, sort data in ascending or descending order, and perform ad hoc queries on any score variable to obtain summary reports or graphs. eMetric will customize the scores available on this report to meet PDE's requirements.

The **Longitudinal Individual Performance Report** allows users to track student performance from administration to administration at the individual student level. eMetric will customize the scores available on this report to meet PDE's requirements. It should be noted that this report is limited to student results collected in the same school for school level users or the same district for district level users and is based on the roster of students at the time of test administration.

The **Cohort Comparison Report** provides a matched longitudinal comparison of the performance of cohort groups across a multi-year/grade period. For example, users can review and compare the performance summaries for students or subgroups of students matched with PAscoreIDs across years (e.g., grade 3 of 2016, grade 4 of 2017, and grade 5 of 2018). These graphs, similar to those in the Performance Level Summary Report, provide the capability for users to drill to a roster report from any portion of the graph. The same data can also be displayed in a report table.

The **Matched Comparison Report** provides a matched longitudinal comparison of performance levels across a two year period. The two-way table is generated by matching students using the PAscoreID and calculating n-counts and percentages; these percentages can be configured by row, column, or by the grand total. Users may click on any cell to generate a Longitudinal Roster Report of the students contained in the selected cell. It should be noted that this report is limited to student results collected in the same school for school level users or the same district for district level users and is based on the roster of students at the time of test administration.

The **Pre-defined Reports** provide users with access to static reports that users can view or download from the Data Interaction website. For example, the Parent Letters and Summary Reports for PSSA are accessible via Data Interaction under the Macros section.

Keystone Reporting Components

The Data Interaction system will provide the following reporting components for Keystone:

- Group Summary Report
- Graphical Summary Report

- Roster Report: Individual Performance
- Historical Roster Report
- Longitudinal Roster Report
- Feeder Report
- Quick Reports

Data Interaction provides two summary reports for Keystones. Users can select content areas, statistics, administrations, demographic variables for summary, test format (e.g., paper or online), and different report views. Drill-down features allow users to disaggregate by subgroup or to access individual student results. eMetric will customize the scores available on this report to meet PDE's requirements.

- The **Group Summary Report: Performance Levels** provides summary statistics for best overall and current administration results including, but not limited to, number tested, mean scale score, and percent in each performance level.
- The **Group Summary Report: Assessment Anchors** provides summary statistics including, but not limited to, number tested, percent of students that passed or did not pass, and average raw score by module.

The **Graphical Summary Report** provides summary graphs including bar charts, pie charts, and histograms. The statistics to be graphed include, but are not limited to, percent of students that passed or did not pass by best overall or current administration and percent in each performance level. Users can also drill down to individual student results.

The **Roster Report: Individual Performance** provides individual student scores including scale scores, pass/did not pass, and total raw scores by module and anchor. Users access reports by selecting a content area, or subject, and an administration. The Roster Report also provides student level data including local and PAsecureID, demographic information, test or re-test status, results of the most recent three test events, and exclusion information where applicable. Users can select subgroups of students by filtering options, sort data in ascending or descending order, and perform ad hoc queries on any score variable to obtain summary reports or graphs. eMetric will customize the scores available on this report to meet PDE's requirements.

The **Historical Roster Report** allows users to track student performance from administration to administration at the individual student level. Users may choose to view historical results by administration and content area. Results include data for both Keystone Exams and PSSA. eMetric will customize the scores available on this report to meet PDE's requirements. It should be noted that this report is limited to student results collected in the same school for school level users or the

same district for district level users and is based on the roster of students at the time of test administration.

The **Longitudinal Roster Report** allows users to track student performance across all administrations at the individual student level. Users may choose to view longitudinal results by content area. eMetric will customize the scores available on this report to meet PDE's requirements.

The **Feeder Report** provides a longitudinal roster of students' scores and demographics by subject areas across all administrations specifically for a roster/list of students uploaded by a District Administrator. This report allows users to track student performance across all administrations at the individual student level and is not confined to the assessment results collected in the same school or district. This report requires a simple data import into the Data Interaction, containing a list of PAsecureIDs and current school numbers. This roster list can be imported as often as necessary to keep the feeder report up-to-date.

Quick Reports allow users to select from a drop down list of pre-defined reports for quick access to frequently needed information. For the initial reporting administration, these reports will include four pre-defined Roster Reports customized to display records for students who need to re-test one or more modules. Other pre-defined reports may be added as determined by PDE.

Training

eMetric will provide one onsite training session per year for the Intermediate Units (IU) and PDE staff covering its Data Interaction query tool and associated reports for PSSA, Keystones and the Accountability Reports. The training site is assumed to be in Harrisburg, Pennsylvania, with a duration of two days. The format of the training session will be a train-the-trainers model so that IU and PDE staff have the tools and knowledge to train their respective colleagues. This live, onsite training will consist of an overview of the Data Interaction query tool, how users will access the site, overviews of each report, and training to provide users knowledge and familiarity of eMetric's ad hoc analytical tools. Training materials, such as PowerPoint presentations, will be provided to participants as well.

eMetric currently hosts 3 brief video tutorials for the Data Interaction query tool that provides the Keystones data. These videos will be updated to reflect any changes associated with changes to the report and Pennsylvania assessments, as needed. These videos are accessible by all users with access to the secure reporting site.

In addition to one onsite training session, eMetric proposes to provide 3 webinars that will allow users to log into a training session remotely, receive a similar training on the DI query tool, and ask questions of the presenter. Among the advantages of the webinar format are no associated travel costs, and the webinar

may be recorded for future use. Content of the webinars will reflect the same topics that are addressed in the onsite training session but can easily include additional information that PDE staff deems necessary. This would allow the content to evolve, so to speak, based upon the needs of the users of the Data Interaction query tool and reports.

4.1.8.h. Performance and Participation Reporting

DRC's understanding of PDE's rules and requirements for calculating performance and participation for state and federal reporting is the product of a successful and ongoing collaboration with the Department since the inception of these reporting elements. DRC was PDE's partner as the concept of attributions was initially identified and implemented, and we have continued to use that partnership to improve and refine the attribution process over a number of years. Today, DRC offers the systems and processes that allow LEAs to complete all required attributions, corrections, and redistributions to ensure that accurate and verified student data is used for the calculation and reporting of assessment performance and participation. DRC continues to collaborate with PDE as they strive to move toward calculations based on PIMS data rather than test events. Our history and unique understanding of these requirements make us the best positioned to support the next era of performance and participation reporting, as well as all advancements in the application of attributions and data corrections.

- 1.** DRC is keenly aware of the PDE Attribution Map and has successfully implemented its rules and requirements into all systems and calculations for accountability reporting. DRC is aware that the attribution map is subject to change on a yearly basis and has successfully implemented such yearly changes to ensure that participation and performance reporting was calculated accordingly.
- 2.** DRC's online attribution systems have been designed to both allow and restrict attributions outside of a district. The system is built to support the rules in DRC's Attribution Map and ensures that all student records are attributed to an eligible LEA before the student data is used for the production of files and reporting. The system has the capability to block inter-district attributions at a specific time so that each district has a chance to review its final student lists before the system closes.
- 3.** DRC's online attribution systems have been designed to highlight new and processed attributions within the student lists, and the system produces reports for the LEAs to view all incoming and outgoing attributions. The attribution reports (both sending and receiving reports) provide the LEAs with total visibility to all attributions that have taken place within the LEA during an attribution system.

The grade 11 attribution system is designed to display all eligible students, regardless of matching test events. As such, LEAs can account for every grade 11 student record that will be used for accountability reporting at the

district and school(s). Similar functionality will be designed for the PSSA attribution system when PDE begins using PIMS data (rather than test events) to identify the grades 3–8 student populations.

- 4.** In recent years, PDE has moved to a single corrections window after each administration on an assessment; however, DRC understands PDE’s request to have a second opportunity for LEAs and the Department to make corrections after the initial PSSA and grade 11 attribution systems have closed, but before the final data files are produced. We have successfully delivered multiple corrections windows for the PSSA administrations in the past and will have no difficulty reintroducing such functionality to allow corrections to attribution errors that persist after the initial windows close.

 - a.** Upon award, DRC will review all current requirements for the attribution systems with PDE to ensure that the functionality and frequency of the systems meets all of PDE’s requirements.
- 5.** DRC has successfully calculated and delivered subject-specific participation and performance rates by state, LEA, and school (including subgroups) for all state and federal reporting. DRC has also successfully revised such calculations as new PDE and federal rules and allowances have been introduced.

 - a.** DRC currently calculates grade 11 participation based upon a PDE-provided student data file (PIMS). DRC is prepared to extend that same calculation to grades 3–8 when PDE begins using PIMS data (rather than test events) to identify the grades 3–8 student population.
 - b.** DRC is fully aware of PDE’s requirement for multiple performance calculations to fulfill different requirements and has the processing steps in place to produce calculations with and without FAY students, as well as a number of other combinations of student inclusions/exclusions.
- 6.** DRC’s performance and participation rate files are produced after all attributions have been applied to the student data. As such, any files that will be used for reporting will be provided to PDE with the attributions applied for PDE to validate prior to final approval.
- 7.** DRC maintains and archives all source files (PIMS data and assessment records) that are used to calculate participation and performance. DRC will provide PDE with all base files needed for auditing purposes.

4.1.8.i. Graduation Attribution

4.1.8.i.i. Graduation Attribution System

DRC recognizes the importance of providing an opportunity for review and verification of the accuracy of data. DRC's role in the initial development of the Graduation Attribution System provides us with a unique insight into its requirements. DRC understands how the graduation information is presented to the districts and is aware of the process necessary to deliver the system in the timeframe PDE requires.

- DRC has successfully received student data files from PDE via DRC's secure FTP site since the Graduation Attribution System was first released, and we have the processes in place to ensure that future transfers are successful and error-free.
- DRC's Graduation Attribution System is designed so that LEAs can view all students attributed to them, as well as students grouped by the cohorts defined by PDE.
- LEAs have the ability to re-attribute students to other public schools and/or districts and the system is designed so that such attributions prompt an email to be sent to a representative at the receiving LEA.
- Both sending and receiving reports are generated within the system for LEAs to track the students who have been attributed from and to their districts and schools.
- DRC has a process in place by which final reassignments are made by DRC staff upon PDE request. All such manual reassignments are done within the system so that the LEA's visibility to the final attribution remains.
- DRC's Graduation Attribution System tracks the login activity of each LEA. A report can be generated at any time for DRC and PDE to determine the participation by each LEA.
- DRC will produce files from the student data that clearly display the initial attribution site (from the PDE file) and the final attribution site at the system's close. These files will be formatted in such a way to show the one-to-one match for every student record that was uploaded to the system.

DRC proposes using our **secure, online corrections/attribution functionality** in eDIRECT to continue the successful administration of the Graduation Attribution System. DRC is fully aware of the requirement to use PIMS data to populate the appropriate fields for the students' graduation statuses as well as the graduation cohort to which they belong. DRC has a long-standing relationship with PDE's Division of Data Quality that has generated successful file transfers of

PIMS data and a collaborative approach to customer service during the Graduation Attribution window.

The use of eDIRECT's functionality allows districts to easily review their graduation data and apply attributions as necessary. DRC customer service staff is trained to support all aspects of the system, and additional processes have been put in place to handle special requests from the field that require input or approval from PDE. Additionally, DRC project management staff will continue to support PDE in all training webinars for the Graduation Attribution System.

The eDIRECT system allows customer service staff to monitor the districts' activity, which can be reported to PDE at any time to provide additional detail for follow-up communication. All corrections made through the Graduation Attribution System will be reflected in the final data files provided back to the Division of Data Quality upon completion.

4.1.8.i.ii. Winter Keystone Exams Corrections and Match to Master Window

DRC proposes the continued use of our **secure, online corrections/match to master functionality** in eDIRECT to provide this essential system for accurate reporting of the Winter Keystone administrations. Both the corrections and match to master functionality were developed during the 2012/13 school year to handle the unique requirements of the Keystone Exams. This functionality supports both the accuracy of the data associated with each student and the capability for districts and schools to ensure that best score calculations are applied if student data changes over time. Additional functionality was added in the 2013/14 school year to allow for edits and mass updates to the Keystone "Enrolled in Course" data that is collected for PVAAS reporting.

The use of eDIRECT's functionality allows districts and schools to easily review all student records from the Winter Keystone administrations. eDIRECT functionality includes the flexibility to sort and filter student records to view student lists in a way that matches a user's criteria. This functionality supports the main objectives of the system to correct information bubbled on a booklet and to match a student's current record to his/her performance on a past test (in the event a match was not made automatically).

Winter Keystone Exams Filter and Table Screenshot

Correct Students

Administration and District filters are required. Selecting additional filter values will decrease the time it takes to return records.

[Instructions](#)

* Indicates required fields

Administration: 2013/2014 Winter Keyst *
District: (Select) *
School: (All)

Last Name:
First Name:
PAsecureID:

Grade:
PIMS Match: (All)
Master Match: (All)

Subject: (All)
Enrolled in Course (EIC):

| School | Grade | Subjects | PAsecureID | Last Name | First Name | Birth Date | PIMS Match | Master Match | Action |
|--------------------|-------|----------|------------|-----------|------------|------------|------------|--------------|--------|
| No data to display | | | | | | | | | |

A correction to bubbled data will cause a dynamic match to a PIMS record if the data correction (first name, last name, date of birth, and PAsecureID) aligns the student to an existing PIMS record. If the correction does not result in a match to an existing PIMS record, a user can add/update all student demographic information in lieu of the information coming from PIMS.

Match to PIMS Screenshots

Edit Student

Match to PIMS Student Demographics

[Instructions](#)

Last Name First Name Date of Birth PAsecureID

Will not match to PIMS

Clear Changes Save

Back to Student List

Edit Student

Match to PIMS Student Demographics Match to Keystone Master

✓ User has indicated a match to PIMS will never be made. First name, last name, DOB and PAsecureID will be read only, all other demographic data will be editable.

[Instructions](#)

Last Name First Name Date of Birth PAsecureID

Will not match to PIMS

Clear Changes Save

Back to Student List

StuS

Student Demographics Screenshot

The screenshot shows the 'Edit Student' interface with the 'Student Demographics' tab selected. The form includes several sections: 'Match to PIMS', 'Match to Keystone Master', 'Instructions', a main data entry section with fields for Last Name, First Name, Middle Initial, Date of Birth, PAsecureID, Grade, Subjects, Master Match, DRC Student ID, Gender, Ethnicity, IEP, Title I, Migrant Education Program, and Title III; 'Initial Enrollment' with five radio button options; 'Economically Disadvantaged' and 'Foreign Exchange' checkboxes; 'English Language Selection' dropdown; 'Enrolled in Keystone Course(s)' with checkboxes for Algebra 1, Biology, and Literature; and buttons for 'Clear Changes', 'Save', and 'Back to Student List'.

| Match to PIMS | Student Demographics | Match to Keystone Master | | |
|-----------------------------------------------------------|----------------------|--------------------------|---------------------------|------------|
| Instructions | | | | |
| Last Name | First Name | Middle Initial | Date of Birth | PAsecureID |
| Grade | Subjects | Master Match | DRC Student ID | Gender |
| Ethnicity | IEP | Title I | Migrant Education Program | Title III |
| Initial Enrollment | | | | |
| Economically Disadvantaged Foreign Exchange | | | | |
| English Language Selection | | | | |
| Enrolled in Keystone Course(s) | | | | |

The system also denotes if a student is a first-time Keystone Exams tester or a re-tester whose best score will be calculated by a combination of all Keystone Exams attempted. In the event a re-tester does not match to his/her previous tests, the system will allow a user to search the Keystone Master database for the student's past records and match his/her current test to the previous test events (match to master). This unique functionality enables the critical element of the best-score-to-date calculation to proceed even when the student-identifying information changes over multiple administrations (e.g., a student's last name changes as the result of an adoption).

Match to Keystone Exams Screenshot

The screenshot shows the 'Edit Student' interface with the 'Match to Keystone Master' tab selected. At the top, there are three tabs: 'Match to PIMS', 'Student Demographics', and 'Match to Keystone Master'. A green message bar states: 'This student has been linked to a Master record. To unlink this student, [Click Here.](#)' Below this is an 'Instructions' section. The 'Current Student' section contains four input fields: 'PAsecureID', 'Last Name', 'First Name', and 'Date of Birth'. The 'Student Search' section contains four input fields: 'PAsecureID', 'Last Name', 'First Name', and 'Date of Birth', along with 'Search' and 'Reset' buttons. Below the search fields is a table with the following columns: 'Last Name', 'First Name', 'Birth Date', 'PAsecureID', 'Admin Name', 'Tested District', 'Tested School', and 'Action'. The table currently displays 'No data to display'. At the bottom right of the main form area is a 'Create Master & Link' button. At the bottom left is a 'Back to Student List' button.

DRC customer service staff is trained to support all aspects of the system and are accustomed to handling significant volumes of calls and emails during the corrections window. DRC project management staff will prepare and deliver webinar training sessions prior to opening the system to Pennsylvania users and will post a recorded session of the training webinar to eDIRECT for any users who cannot attend a live session. Project management staff will also work closely with PDE to handle any special requests from the field that require input or approval from PDE.

Upon award, DRC will review all current requirements for the Winter Keystone corrections and match to master system with PDE to ensure that the system’s functionality meets all of PDE’s requirements.

4.1.8.i.iii. PSSA Attributions/Demographics Updates Window

DRC proposes the continued use of our **secure, online attributions/demographics updates functionality** in eDIRECT to ensure all PSSA records are reported with accurate student data and at the students’ home schools and/or districts of residence. Similar to the corrections functionality developed for the Keystone Exams, the PSSA attributions system has been developed exclusively for the unique needs of the PSSA testing program. DRC is keenly aware of PDE’s attribution rules and has developed a system that allows users to process attributions accurately and with ease.

Like the Keystone Exams corrections functionality, the demographic update element for the PSSA represents an opportunity to match a student to PIMS or provide the most accurate demographic information if a match cannot be made. Users are able to easily identify the students whose data do not match to PIMS so that work can be concentrated on the student records that need updating. When matches are made, the student information dynamically links to PIMS and the demographic data automatically updates to match that provided by PIMS.

PSSA Filter and Table Screen

The screenshot shows a web interface titled "Correct Students". At the top, a blue banner contains a message: "Administration and District filters are required. Selecting additional filter values will decrease the time it takes to return records." Below this is an "Instructions" section with a red asterisk indicating required fields. The filter section includes dropdown menus for "Administration" (set to "2013 Spring PSSA"), "District" (set to "(Select)"), and "School" (set to "(All)"). There are also text input fields for "Last Name", "First Name", and "PAsecureID", and dropdown menus for "Grade" and "PASA" (set to "(All)"). A "PIMS Match" dropdown is also present, set to "(All)". A "Find Students" button is located below the filters. At the bottom, a table titled "Students" has columns for "School", "Grade", "Subjects", "PAsecureID", "Last Name", "First Name", "Birth Date", "PIMS Match", "PASA", and "Action". The table currently displays "No data to display".

The students loaded to the PSSA attributions/demographics updates system for a public school represent all the students who participated in the PSSA at that school. The school can easily review the student records to determine if any students need to be attributed to a different school or district. These attributions are systematically restricted so that a user can only attribute students to another public school or district and only at a school that hosts the student's tested grade. This functionality ensures that student records remain within approved parameters when the system closes.

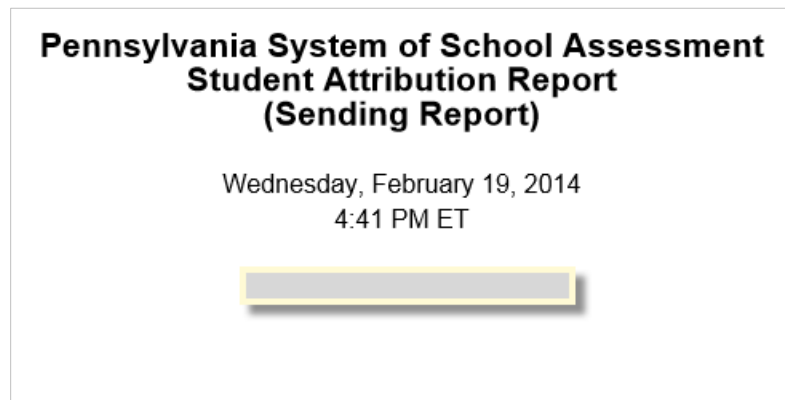
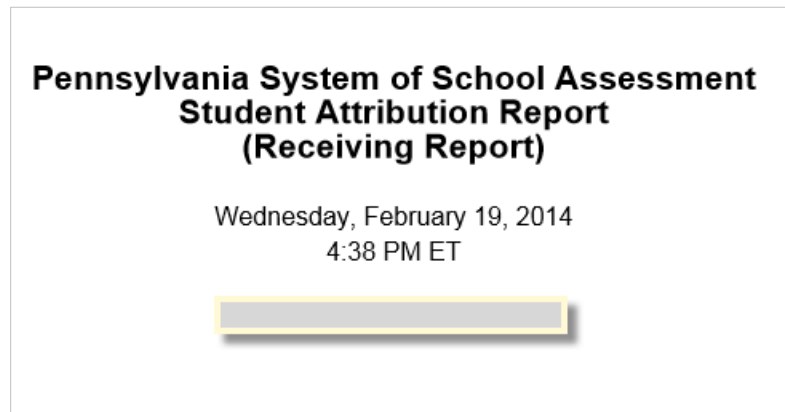
Attribution Screenshots

The screenshot shows the 'Edit Student' interface with the 'Attribution' tab selected. The 'Administration' dropdown is set to '2013 Spring PSSA'. Below this, there are input fields for 'First Name', 'MI', 'Last Name', 'BirthDate', 'Grade', and 'PAsecureID'. The 'Grade' field contains the value '05'. An 'Attribute' button is located in the top right corner of the form.

The screenshot shows the 'Attribute Student To Site' interface. It features a section titled 'Attribute To Site:' containing two dropdown menus labeled 'District:' and 'School:'. Both dropdown menus have a red asterisk next to them, indicating they are required fields. An 'Attribute' button is positioned to the right of the 'School' dropdown. Below the main form area is a 'Back to Student List' button.

For testing sites that cannot retain student records for reporting, DRC will apply the district/school of residence from PIMS to move the students to the public schools identified for them by PIMS. To ensure that all sites are aware of the students who have been attributed away from or to their schools, the system provides reports to track all student movement via attributions. This allows users to follow up with any questions about an attribution. Additionally, DRC's attribution functionality will send a notification email to any district that receives an attribution during the window.

Sending and Receiving Report Screenshots



| | | | | | | | | | |
|----------------|----------------------|-------------------------|--------|-----------|------------|----|------------|-----------|-------------------------------|
| District: | <input type="text"/> | Wednesday, February 19, | | | | | | | |
| School: | <input type="text"/> | 2014 | | | | | | | |
| AUN: | <input type="text"/> | Page: | | | | | | | |
| Date of Action | Grade | DRC Student ID | Source | Last Name | First Name | MI | PAsecureID | Birthdate | Received from District/School |

The system also prepares a report to identify all student records remaining at a site that cannot retain students. DRC will continue to work closely with PDE staff to monitor and communicate with these sites to ensure all attributions are complete by the close of the corrections window.

Additional Reports Used Within the Attribution System

Reports

* Indicates required fields

Administration * District * School

| | |
|-------------------------------|----------------------------|
| Attributions Receiving Report | View/Print |
| Attributions Sending Report | View/Print |
| Login Report | View/Print |
| No ID/Birthdate Report | View/Print |
| Attribution File | View/Print |

Although not referenced in the RFP’s descriptions of the corrections system, DRC is aware that districts and schools must also have the opportunity to perform demographic updates and attributions for PASA students. DRC has successfully worked with the University of Pittsburgh over many years to include in the corrections systems students the university has identified as having participated in the PASA. DRC proposes to continue to incorporate the receipt of PASA files into the workflow for both the PSSA and the grade 11 corrections systems.

As is the case with the Keystone Exams corrections system, DRC customer service staff is trained to support all aspects of the PSSA attributions system and are accustomed to handling significant volumes of calls and emails during the corrections window. DRC project management staff will prepare and deliver webinar training sessions prior to opening the system to Pennsylvania users and will post a recorded session of the training webinar to eDIRECT for any users who cannot attend a live session. Project management staff will also work closely with PDE to handle any special requests from the field that require input or approval from PDE

Similar to all eDIRECT corrections functionality, the attributions/demographics update functionality will include the flexibility to sort and filter student records to

view student lists in a way that matches a user’s criteria. The system will also include functionality to make mass attributions. This will increase efficiency in the event that an entire group of students needs to be attributed to the same school. DRC has continually updated the PSSA attributions functionality to match changes to the requirements. Upon award, DRC will review all current requirements for the PSSA attributions/demographics update system with PDE to ensure that the system’s functionality meets all of PDE’s requirements.

Attribution of Multiple Students Screenshot

Attribute Students To Site

| Students | | | | | | | |
|-----------|------------|----|------------|------------|-------|---------|---------------|
| Last Name | First Name | MI | Birth Date | PAsecureID | Grade | Subject | DRC StudentID |
| | | | 6/6/2000 | | 06 | M R | |
| | | | 5/9/2001 | | 06 | M R | |
| | | | 6/29/2000 | | 06 | M R | |
| | | | 12/24/2001 | | 06 | M R | |
| | | | 8/28/2001 | | 06 | M R | |

Attribute To Site:

District: * School: *

4.1.8.i.iv. Spring Keystone Exams Corrections/Match to Master Window

DRC proposes the continued use of our **secure, online corrections/match to master functionality** in eDIRECT for the Spring Keystone administrations. All of the functionality described for the Winter Keystone Exams corrections/match to master system applies to the Spring Keystone Exams system as well. Hosting both Keystone Exams corrections systems within the same portal provides an additional benefit to the districts and schools as they work through multiple administrations in a given school year. The administrations are easily identifiable under the same links by simple dropdown menus that allow districts and schools to select the current Keystone Exams administration.

As with the Winter Keystone Exams corrections system, DRC customer service staff is trained to support all aspects of this system and are accustomed to handling significant volumes of calls and emails during the corrections window. DRC project management staff will again prepare and deliver webinar training sessions prior to opening the system to Pennsylvania users and will post a recorded session of the training webinar to eDIRECT for any users who cannot attend a live session.

Upon award, DRC will review all current requirements for the Spring Keystone corrections and match to master system with PDE to ensure that the system's functionality meets all of PDE's requirements.

Spring Keystone Exams Filter and Table Screen

Correct Students

Administration and District filters are required. Selecting additional filter values will decrease the time it takes to return records.

[Instructions](#)

* Indicates required fields

Administration: 2013 Spring Keystone Exams *
District: *
School: *

Last Name:
First Name:
PAsecureID:

Grade: (All)
PIMS Match: (All)
Master Match: (All)

Subject: (All)
Enrolled in Course (EIC):

| Students | | | | | | | | | |
|--------------------|-------|----------|------------|-----------|------------|------------|------------|--------------|--------|
| School | Grade | Subjects | PAsecureID | Last Name | First Name | Birth Date | PIMS Match | Master Match | Action |
| No data to display | | | | | | | | | |

Match to PIMS Screenshot

Edit Student

Match to PIMS | Student Demographics | Match to Keystone Master

✔ User has indicated a match to PIMS will never be made. First name, last name, DOB and PAsecureID will be read only, all other demographic data will be editable.

[Instructions](#)

Last Name | First Name | Date of Birth | PAsecureID

Will not match to PIMS

Clear Changes | Save

Back to Student List

4.1.8.i.v. Keystone Exams Grade 11 Attributions and Match to Master Window

DRC proposes the continued use of our **secure, online grade 11 attributions and match to master functionality** in eDIRECT for this integral piece of accountability reporting. The grade 11 system incorporates elements from both the PSSA attributions system and the Keystone Exams match to master system in an online solution developed exclusively to meet the unique needs for reporting this student population.

Unlike the PSSA and Keystone Exams corrections systems, the student records in this system are derived directly from a PIMS file that identifies all grade 11 students for a given school year (instead of a recent test administration). This PIMS snapshot is taken on the last day of the Spring Keystone administration to accurately account for all students enrolled in grade 11 in all public schools across the Commonwealth on that specific date. Since PIMS is the data source, all students in the system are already matched to PIMS; therefore, the data corrections element is not needed. However, all students are not necessarily matched to the tests they took (match to master), nor does PIMS always report all students at their home schools and districts of residence (attributions).

Accordingly, this system affords all districts and schools the opportunity to apply matches and attributions before this student group is brought forward as the grade 11 denominator for accountability reporting.

As is true of the Keystone Exams and PSSA eDIRECT corrections functionality, the attributions and match to master functionality will include the flexibility to sort and filter student records to view student lists in a way that matches a user's criteria. Users will be able to easily identify students for whom a Keystone Exam is not reported, just as they will be able to easily identify students in their schools' lists that may need to be attributed to another school or district of residence. The grade 11 system will deliver the same attribution reports as the PSSA system so that all attributions are visible in a real-time report.

Grade 11 Filter and Table Screenshot

Grade 11 Attributions

Administration and District filters are required. Selecting additional filter values will decrease the time it takes to return records.

[Instructions](#)

* Indicates required fields

Administration: 2013 Grade 11 Attributic *

District: *

School: *

Last Name:

First Name:

PAsecureID:

Grade: 11

PIMS Match: (All)

Master Match: (All)

| School | Grade | Subjects | PAsecureID | Last Name | First Name | Birth Date | PIMS Match | Master Match | Action |
|--------------------|-------|----------|------------|-----------|------------|------------|------------|--------------|--------|
| No data to display | | | | | | | | | |

Grade 11 Match to Master Screen

DRC customer service staff is trained to support all aspects of the grade 11 attribution and match to master system. DRC project management staff will prepare and deliver webinar training sessions prior to opening the system to Pennsylvania users and will post a recorded session of the training webinar to eDIRECT for any users who cannot attend a live session. Project management staff will also work closely with PDE to handle any special requests from the field that require input or approval from PDE.

Upon award, DRC will review all current requirements for the grade 11 attributions and match to master system with PDE to ensure that the system's functionality meets all of PDE's requirements.

4.1.8.i.vi. 1% Alternate Assessment Cap Redistribution

As with the Graduation Attribution System, DRC's role in the initial development of the 1% Redistribution System provides us with a unique insight into the requirements of this specialized system. DRC has a broad understanding of PDE's expectations for the system and has successfully transformed the system from its inception for AYP reporting through changes to support the modified assessments and the current federal reporting requirements.

DRC proposes using our **secure, online 1% alternate assessment cap redistribution functionality** in eDIRECT to continue the successful completion of the 1% redistribution for accountability reporting. DRC will continue to leverage our many years of experience with this requirement to produce an easy-to-use system that provides districts and schools with the information necessary to complete the redistribution work. The system will clearly delineate the number of students in excess of the 1% cap for both ELA and mathematics in all applicable grade ranges. The system will allow districts and schools to select which students will be reported as non-proficient for accountability reporting. Those selections will be carried forward by DRC through all calculations for applicable accountability reporting. The system will provide for automatic redistributions as directed by PDE. The system will provide for a manual override function for PDE use.

1% Redistribution Filter and Table Screenshots

| Math | | | |
|-------------------------------------------------------------------------|-----------------------------------------|------------------------|---------------------------------------------|
| Total Number of Students Tested | Advanced/Proficient PASA Student Scores | | |
| | 1% Cap | Actual Number You Have | Number that Must be Moved to Not Proficient |
| | | | |
| Students scoring Advanced/Proficient on the alternate assessment (PASA) | | | |
| Grade | Last Name | ▲ First Name | PASecureID |

DRC fully understands that the redistribution of PASA students is for the purposes of accountability reporting only. DRC has long-standing processes in place to ensure that all reports that summarize the actual performance of students always display the performance level a student earns on the PASA, not the revised performance level from the 1% redistribution.

DRC customer service staff is trained to support all aspects of the redistribution system, and special reports have been designed within the system to allow project management staff to monitor the activity of the districts that need to redistribute PASA records. As has been DRC's practice since the 1% Redistribution System was first offered, any outstanding redistribution work at the close of the window will be processed with direct input from PDE. Additionally, DRC project management staff will continue to support PDE in all training webinars for the 1% Redistribution System.

Upon award, DRC will review all current requirements for the 1% Redistribution System with PDE to ensure that the system's functionality meets all of PDE's requirements.

4.1.8.i.vii. Summer Keystone Exams Corrections/Match-to-Master Window

Historically, the Summer Keystone Exams Corrections/Match-to-Master system has been made available after processing has been completed for a summer administration (currently scheduled to occur in August 2015 for the upcoming summer administration). DRC understands PDE's request to move the Summer Keystone corrections to occur within the Winter Keystone corrections window for the following school year and will plan accordingly. As such, the same **secure, online corrections/match-to-master functionality** in eDIRECT described for the Winter Keystone Exams corrections systems will be utilized for LEAs to verify or update their Summer Keystone data. DRC will configure the Winter Keystone Exams corrections system so that data from the summer and winter administrations is presented separately to allow LEAs to easily identify the student records associated with the each administration.

4.1.8.j. CDT Reporting Tool

DRC is pleased to continue our collaborative work with PDE on the development and enhancement of the Classroom Diagnostic Tools (CDT) interactive reporting tool. DRC is well qualified to provide diagnostic reports that support a cohesive system of psychometrically sound, instructionally sensitive assessments that are meaningful for students, parents, and educators in Pennsylvania.

First introduced in 2010, DRC's dynamic and innovative suite of user-friendly CDT reports is **uniquely tailored to provide instructional impact in conjunction with Pennsylvania's computer-adaptive CDT assessments.**

DRC's reporting tool for the CDT will:

- Provide Pennsylvania educators with immediate, on-demand data that will directly impact instruction in the classroom
- Allow educators to easily explore and analyze CDT performance and quickly pinpoint students' strengths and areas of need

- Identify and link to targeted curriculum and instructional resources, aligned to Pennsylvania’s standards and Assessment Anchors/Eligible Content, based on students’ needs

As with the PSSA and Keystone Exams reports, authorized users can access the CDT reporting tool electronically through eDIRECT. **Pennsylvania teachers have the ability to access report information at any time and from anywhere to support instructional planning.**

DRC applauds PDE in the development of this showcase reporting system for diagnostic student information. DRC is excited for the opportunity to support and grow the system in the future. As such, DRC has several suggestions for enhancements to the CDT, which can be found in *Volume IV; Appendix U: Classroom Diagnostic Tools: Possible Report Enhancements*.

Diagnostic Reports—Maps

DRC will continue to provide user-friendly, insightful reports that educators can use to support instruction and make data-driven decisions. Teachers can easily sift and sort data using a variety of search tools, including drill-down capability to access more-detailed information. Understanding assessment performance will give educators the power to plan instructional strategies that are aimed at helping their students continue to make progress. Reporting data will enable PDE and educators to:

- Receive immediate and usable data to be used for targeting instruction to meet the needs of individual students
- Show the progress of students across test administrations
- Interpret student scores with greater accuracy and confidence
- Identify gaps in learning in order to develop action plans prior to summative testing
- Identify professional development opportunities for educators and district leaders

Using the CDT reporting tool, Pennsylvania teachers can generate reports that provide a deep understanding of overall classroom performance as well as performance for each student. This feedback allows teachers to monitor classroom performance trends, providing actionable data that can be used to target customized instruction. The CDT reports provide direct links to resources in PDE’s Standards Aligned System (SAS), including specific lesson plans, interventions, and other resources. Reports can be generated immediately after an assessment, providing rapid feedback.

The CDT reporting suite consists of four interactive “maps.” Users can access information in the maps based on a set of easy to use filters, which include:

- Administration date
- District and school
- Student first name, last name, and PAsecureID
- Grade
- Teacher
- Student Group

A secondary list of filters, which is displayed on the Sample Group Diagnostic Map graphic in the following section, allows users to drill into content-specific information, including:

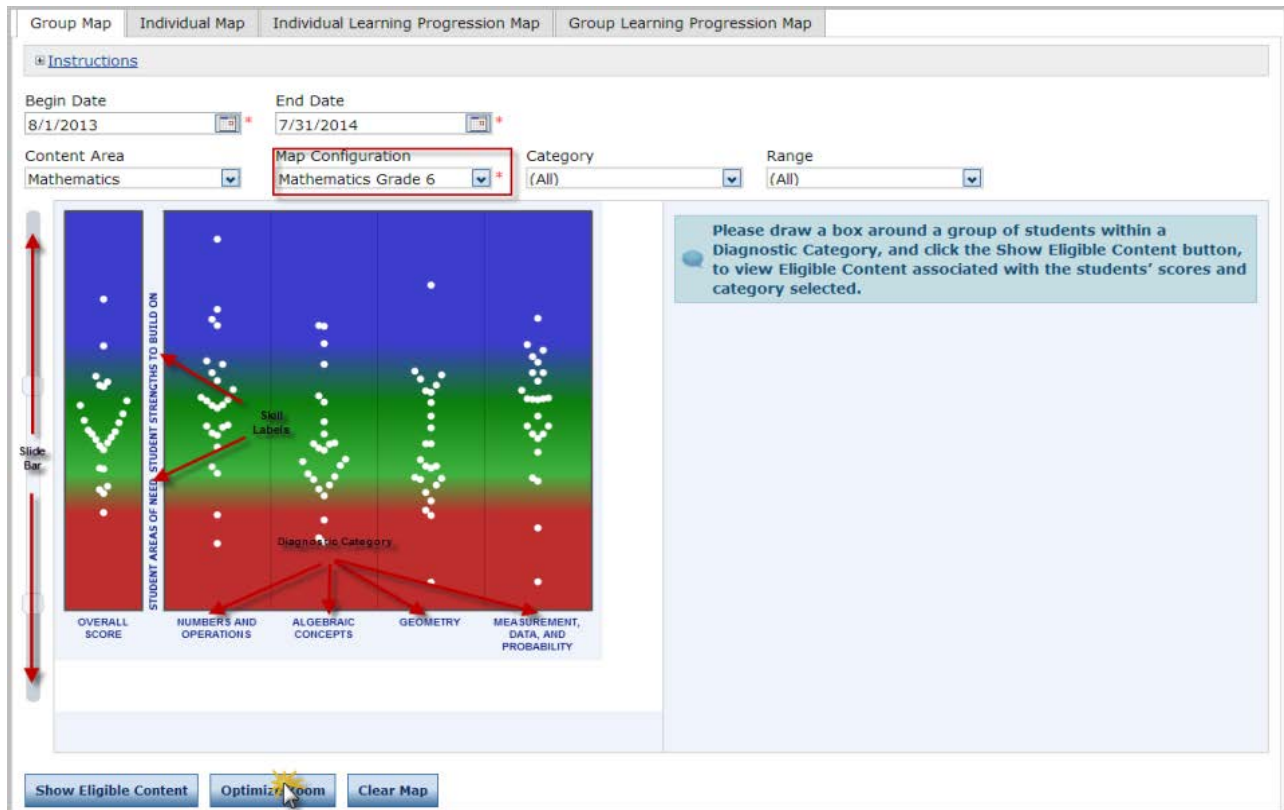
- Begin/End date
- Content area
- Map Configuration
- Diagnostic (Reporting) Category
- Score Range

Group Diagnostic Map

The group-level diagnostic reports provide insightful information and data on classroom performance for teachers, including students’ strengths to build on and areas of need. Group diagnostic maps allow users to view overall classroom performance on a given assessment; to view eligible content associated with student scores; and to drill-down by student.

Sample Group Maps are provided on the following pages.

Sample Group Diagnostic Map



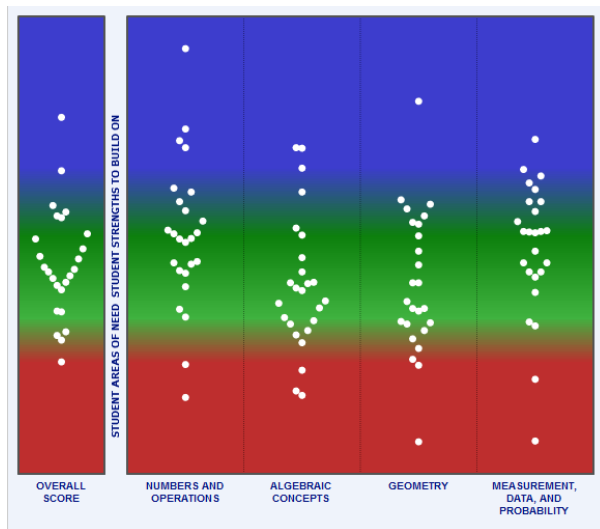
Each white dot on the above map represents a student's individual scale score within each Diagnostic Category and on the overall test. By hovering over a white dot, the teacher can see the student's name as well as other helpful information such as PAscoreID, test date, and scale score. The color gradation allows the teacher to quickly see where their students scored in each diagnostic category, with Red representing *Areas of Need* and Green and Blue representing *Strengths to Build On*.

Initially, the Group Map shows the entire scale range. An **Optimize Zoom** feature allows the user to narrow the window to show only the portion of the scale that includes the highest and lowest scores for the Student Group selected.

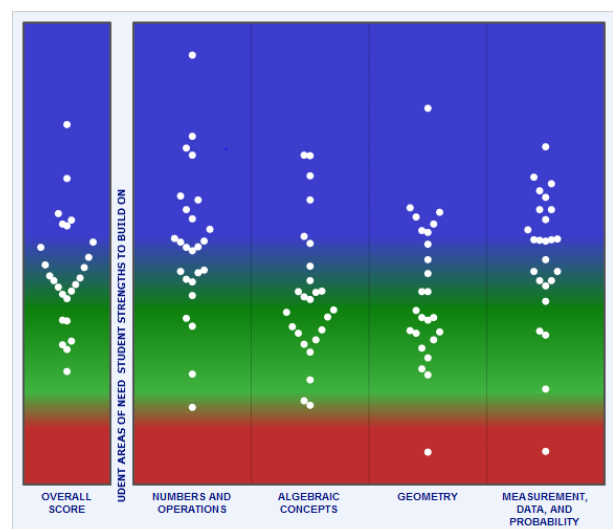
Since the CDT is vertically scaled, teachers can view their students' scores against the benchmark for a different grade. This can be done by simply choosing another Map Configuration in the dropdown box. This is particularly helpful for a teacher at the beginning of the year who would like to configure the map based on the benchmarks set for the previous grade.

The graphic below illustrates how the same group map changes based on the different Map Configuration chosen. You will note that the white dots (student scores) do not change, just the colors change. In the example, it is clear that there are more students in the blue range when viewed against the grade 5 benchmark than when viewed against the grade 6 benchmark. For students at the beginning of sixth grade, this is what is expected. Teachers are able to quickly see the performance of their new students when they start in the fall. This tool can also be used to understand how students at the end of the year fare against the benchmark for the next grade.

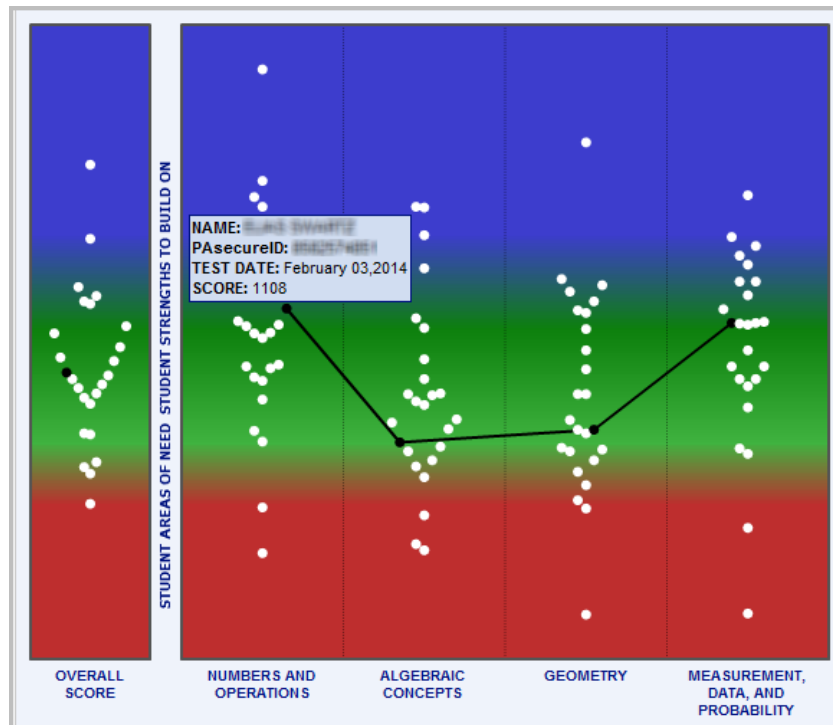
**Sample Student Group—
Grade 6 Map Configuration**



**Sample Student Group—
Grade 5 Map Configuration**



Sample Group Diagnostic Map Showing Individual Student Performance



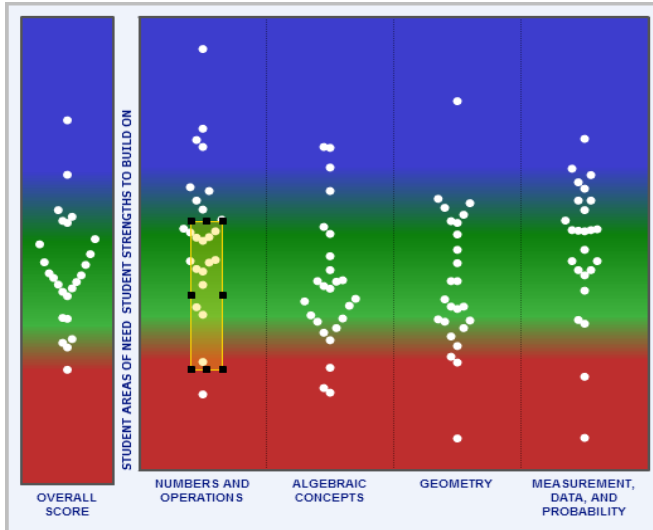
By clicking on a white student dot (above), teachers can view a particular student's results across Diagnostic Categories and see how they compare with the rest of the class. Teachers can utilize these results to diagnose gaps in a student's learning and inform and adapt instruction to better meet the student's needs.

Teachers can also select a group of students on the group map to drill-down for more information, as shown below. A detailed student grid shows scale scores by diagnostic category for all students within the class; the group of students selected from the group map is highlighted in yellow.

When a student or group of students is selected in the Group Map, a **Show Eligible Content** feature is enabled. Once selected, Eligible Content information will display on the right side of the Group Map. The content listed is specifically chosen for the students selected based on their results in the Diagnostic Category. Additionally, each Eligible Content code is a hyperlink to applicable materials and resources on Pennsylvania's Standards Aligned System (SAS). Teachers benefit greatly from having a direct link to relevant resources without the need to leave the CDT reporting environment.

In addition, teachers can select a subgroup of students to create a subgroup diagnostic map. The subgroup can be selected by either drawing a box around the selected students or by checking off specific students in the student data grid.

Group Diagnostic Map with Student Grid and Related Eligible Content



Please draw a box around a group of students within a Diagnostic Category, and click the Show Eligible Content button, to view Eligible Content associated with the students' scores and category selected.

INSTRUCTIONAL ENRICHMENT

This Report Shows Eligible Content associated with the scores of the students and the Diagnostic Category selected. These students may benefit from enrichment in the following:

- [M04.A-F.3.1.2](#): Use decimal notation for fractions with denominators 10 or 100.
- [M04.A-T.1.1.4](#): Round multi-digit whole numbers (through 1,000,000) to any place.
- [M03.A-F.1.1.2](#): Represent fractions on a number line (limit the denominators to 2, 3, 4, 6, and 8; limit numerators to whole numbers less than the denominator; no simplification necessary).
- [M06.A-N.3.2.3](#): Solve real-world and mathematical problems by plotting points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with...
- [M06.A-R.1.1.2](#): Find the unit rate a/b associated with a ratio $a:b$ (with $b \neq 0$), and use rate language in the context of a ratio relationship.
- [M06.A-N.3.1.3](#): Locate and plot integers and other rational numbers on a horizontal or vertical number line; locate and plot pairs of integers and other rational numbers on a coordinate plane.
- [M05.A-T.1.1.4](#): Compare two decimals to thousandths based on meanings of the digits in each place, using $>$, $=$, and $<$ symbols.
- [M06.A-R.1.1.5](#): Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.
- [M06.A-N.3.1.2](#): Determine the opposite of a number and recognize that the opposite of the opposite of a number is the number itself (e.g., $-(-3) = 3$, and that 0 is its own opposite).
- [M06.A-R.1.1.3](#): Construct tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and/or plot the pairs of values on the coordinate plane. Use tables to...
- [M06.A-N.2.1.1](#): Solve problems involving operations ($+$, $-$, \times , \div) with whole numbers, decimals (through

25 of 25 Students have tested

| First Name | Last Name | PAsecureID | NUMBERS AND OPERATIONS | ALGEBRAIC CONCEPTS | GEOMETRY | MEASUREMENT, DATA, AND PROBABILITY | Overall Score | Test Date |
|------------|---------------|------------|------------------------|--------------------|----------|------------------------------------|---------------|------------|
| REBECCA | BRONKHORST | 1381878618 | 1045 | 948 | 1061 | 1029 | 1019 | 02/03/2014 |
| BRANDY | BRONKHORST | 6039457389 | 1124 | 1013 | 1040 | 1138 | 1080 | 02/03/2014 |
| GABRIEL | BRUNNENBERGER | 7073611574 | 1222 | 1051 | 968 | 1235 | 1113 | 02/03/2014 |
| DAVID | PLATNER | 7346030723 | 1094 | 953 | 765 | 766 | 889 | 02/03/2014 |
| AUTUMN | COOK | 4863214896 | 1027 | 1153 | 1141 | 1157 | 1122 | 02/03/2014 |
| ASHLEY | COOK | 6776023843 | 1031 | 1086 | 1106 | 997 | 1053 | 02/03/2014 |
| JAYDEN | HOPPHUS | 7801248125 | 1376 | 1222 | 1294 | 1178 | 1269 | 02/03/2014 |
| OLIVIA | BRONKHORST | 3888448125 | 1090 | 1011 | 983 | 1021 | 1029 | 02/06/2014 |
| CAMERON | ALLEN | 1241121288 | 834 | 919 | 925 | 1029 | 930 | 02/03/2014 |
| SHANE | ALLEN | 6236666328 | 1080 | 931 | 1085 | 1092 | 1049 | 02/03/2014 |
| CARTER | KNAPP | 6384789111 | 1233 | 1190 | 1134 | 1188 | 1186 | 02/03/2014 |
| RAFA | ALLEN | 4461931281 | 1138 | 984 | 1012 | 1123 | 1065 | 02/03/2014 |
| ALEXANDER | LAHOD | 8892078117 | 1006 | 973 | 972 | 1090 | 1008 | 02/04/2014 |
| ZACHARY | LEWIS | 2538433446 | 1088 | 844 | 893 | 1061 | 967 | 02/03/2014 |
| SAVANNAH | HARRIS | 6040484617 | 1153 | 1221 | 1127 | 1043 | 1132 | 02/03/2014 |
| ANDREW | COOK | 1326714670 | 1041 | 980 | 1012 | 1107 | 1033 | 02/03/2014 |
| ZOE | RAUER | 712121888 | 885 | 1029 | 884 | 945 | 936 | 02/03/2014 |
| DAAC | SHAWVER | 3463346128 | 959 | 1012 | 952 | 1138 | 1013 | 02/03/2014 |
| SHARILLA | SHUPPER | 3096179017 | 1043 | 837 | 950 | 862 | 923 | 02/06/2014 |
| STEPHEN | SOHA | 4612817611 | 1075 | 876 | 1103 | 1043 | 1023 | 02/06/2014 |
| LAUREN | STANLEY | 3023238824 | 971 | 1000 | 948 | 1093 | 1001 | 02/04/2014 |
| HORSHAM | STALPNER | 3024860282 | 1251 | 1004 | 938 | 1167 | 1088 | 02/03/2014 |
| BLAKE | SHAWVER | 8802174811 | 1108 | 958 | 972 | 1092 | 1036 | 02/03/2014 |
| ALEXIA | TRAVIS | 4491424178 | 1081 | 938 | 910 | 951 | 968 | 02/03/2014 |
| AUTUMN | TRAVIS | 4627870241 | 1159 | 1097 | 1116 | 1091 | 1116 | 02/03/2014 |

Note: Graphic is blurred to maintain item security and/or student confidentiality.

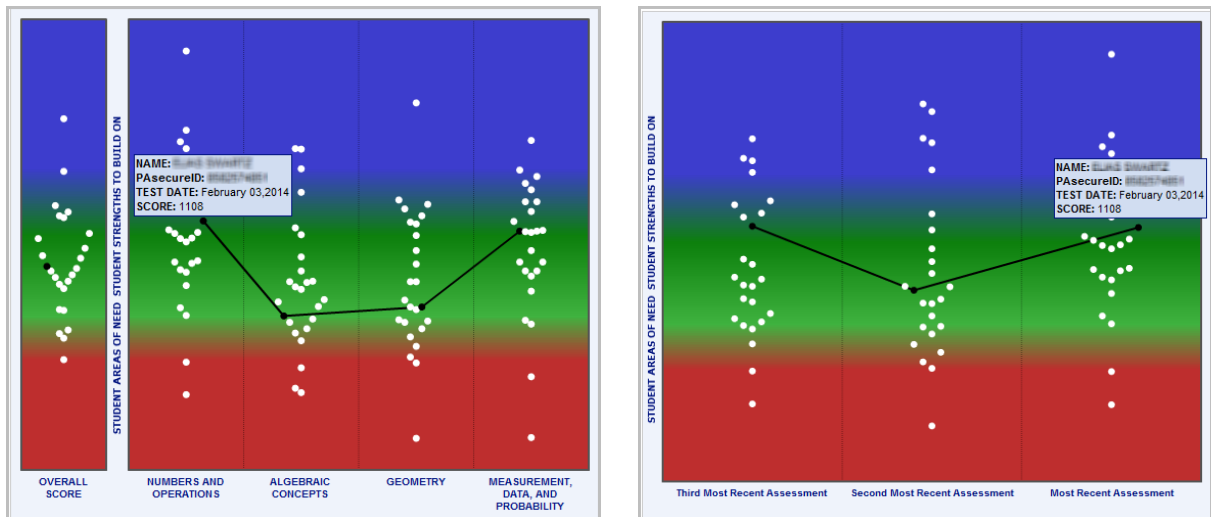
Upper Left: Group Diagnostic Map with a range of students selected in the Numbers & Operations diagnostic category to drill down for more information.

Upper Right: Eligible Content is shown for the students selected in the Group Diagnostic Map. The underlined codes are hyperlinks to relevant resources on PDE's SAS system.

Left: Detailed student data grid showing scores by category for students within the group (partial list is shown). The group of students selected in the Group Diagnostic Map is highlighted in yellow in the grid. The grid includes students who took the test, as well as students who are in the class/group but who have not yet tested and have no scores to report.

Another feature of the Group Diagnostic Map is the ability to delve deeper into a diagnostic category to gain more information about how students are progressing throughout the year. The following example shows a group of students' scores in the Diagnostic Category of Numbers and Operations across three administrations during the school year.

Group Diagnostic Map Showing Results Over Time (by Diagnostic Category)



Several convenient export features are provided with the Group Map, including:

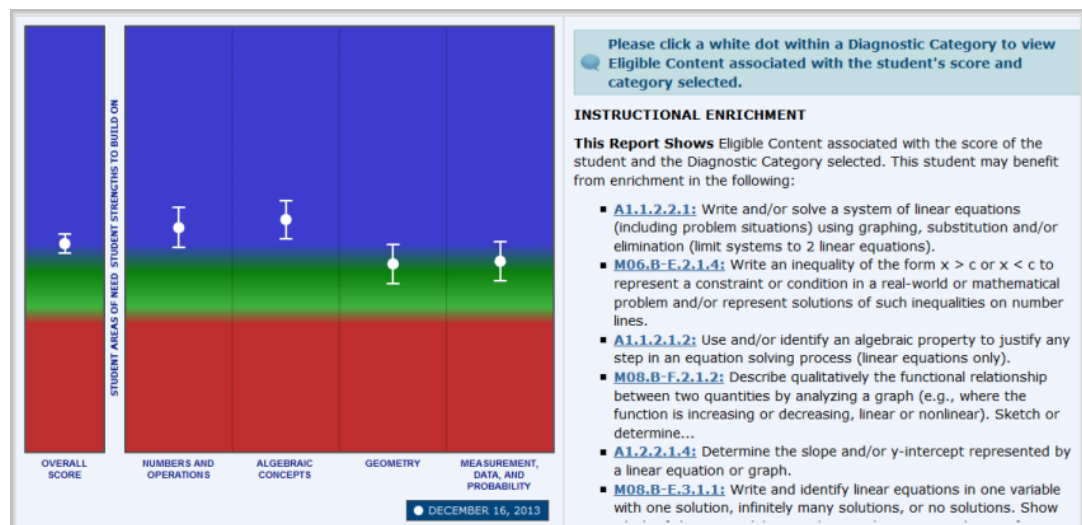
- **Export to CSV** will export the data found in the student data grid to a CSV file, which can easily be opened in Excel and other programs
- **Export to PDF** will export the image of the map, along with the grid, and any eligible content that is displayed to a PDF file
- **Export to Zip** will produce a Zip file of the data
- **Export Individual Data** enables one-click printing of individual student data for all students in the group

Individual Diagnostic Map

DRC's student-level diagnostic reports show how an individual student performed on a given assessment, with an indication of student strengths to build on and areas of need within each diagnostic category. A standard error band is displayed for each score. This interval represents the range where the student would likely score if tested again without additional instruction. The use of error bands supports more-accurate interpretation of scores (i.e., not over-interpreting scores) since error bands that overlap indicate that scores are not significantly different.

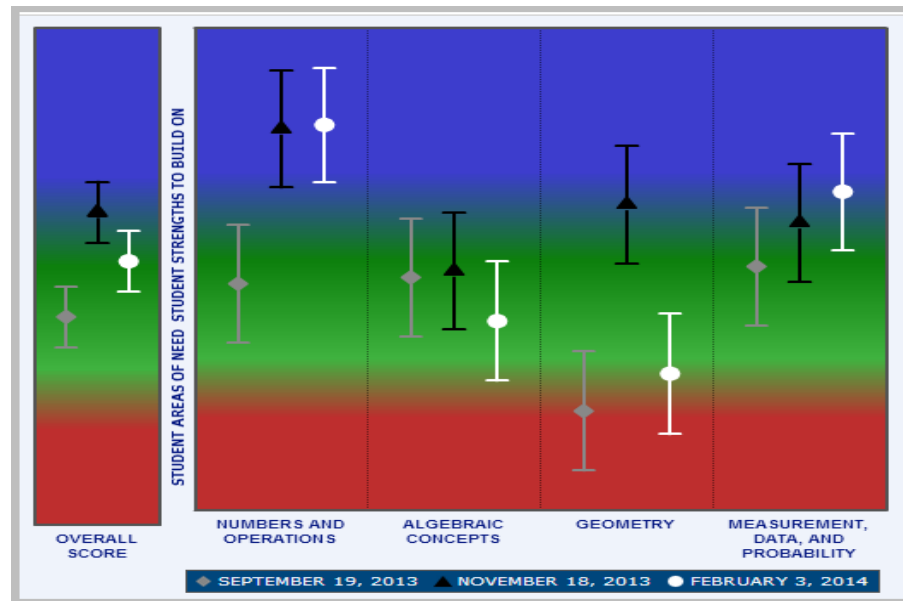
Similar to the Group Map, the Individual Map provides enrichment suggestions and hyperlinks to specific materials and resources in SAS based on a student's score within a Diagnostic Category.

Sample Individual Map and Eligible Content Associated with Student's Score



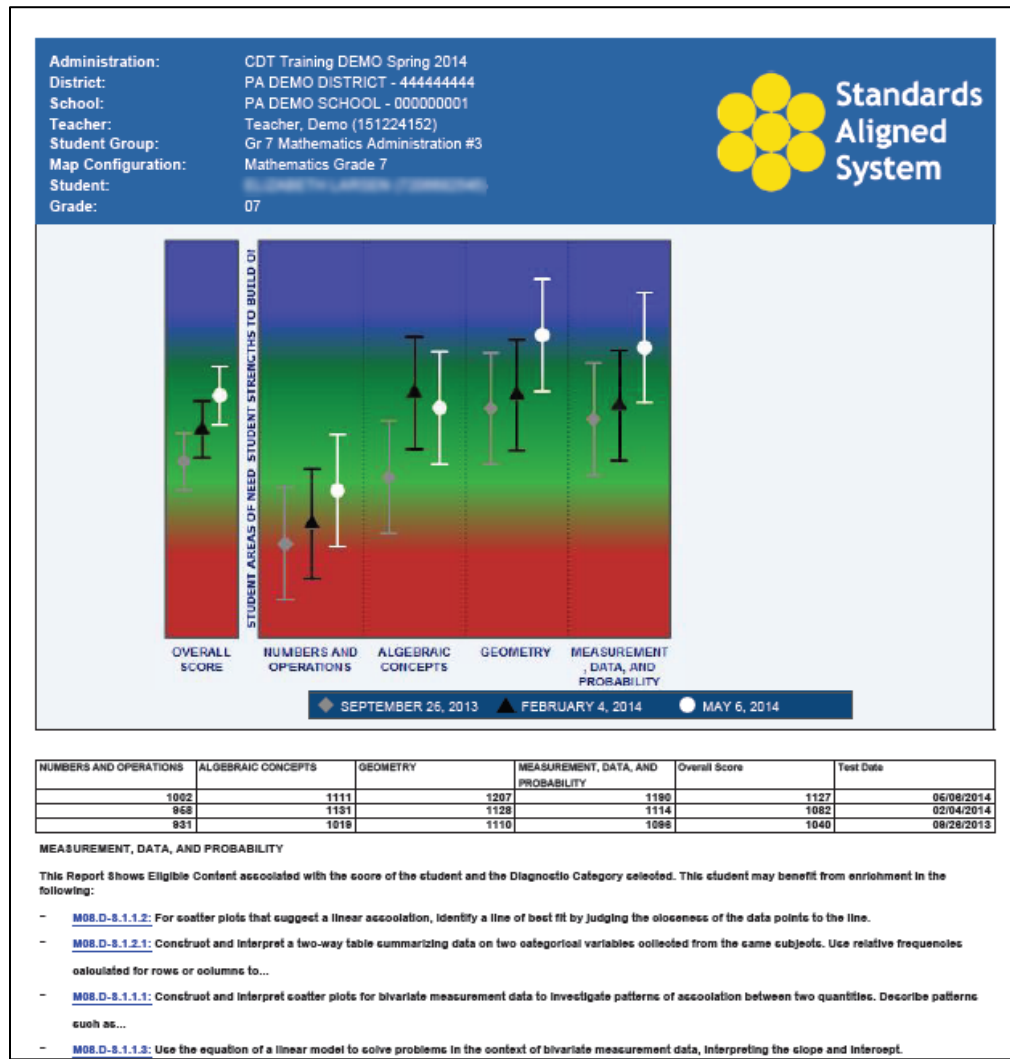
The Individual Map can also show teachers how the student performed across multiple test administrations. In the following example, each test administration is represented in a different color (gray, black, and white).

Sample Individual Map Showing Last Three Administrations



The individual map also contains a data grid and has export features, similar to the Group Map. As indicated in the previous section, teachers can currently print all individual student results for a student group in a grid format with the push of a button. DRC is pleased to announce that in fall 2015, the system will allow batch printing of PDF student reports that include the map images. DRC understands that this capability is very important to teachers since they utilize the map image when engaging with students and parents about performance on the CDT.

Sample Student Report Containing Map Image



Learning Progression Maps

Learning Progression Overview

For Pennsylvania, the Learning Progression (LP) is a path that students travel as they progress toward mastery of the skills needed for career or college readiness (Gong, 2008, Popham, p. 83). Each path follows a route composed of a collection of building blocks that are defined by the content domains for a subject. The building blocks or foundational content standards (assessment anchors as defined by eligible content) are what students will need to master as they progress toward mastery of more sophisticated skills. Where these blocks in the learning progression intersect, they delineate the relationship of a particular point in the learning progression (eligible content) to the blocks in the learning progression path that come both before and after. These intersections may not necessarily be linear, but they articulate movement forward. Ultimately, learning progressions provide teachers with the opportunity to determine whether students have

navigated successfully through the intersections and are able to move forward along the path of learning.

Essentially, Learning Progressions describe learning vertically and show a sequence along which students can move from a beginning learner to an advanced learner. Consequently, learning is not viewed as a series of discrete standards, assessments, and eligible content at a given grade level, but rather a progression along a path that connects knowledge, concepts, and skills or the big ideas—the essence of concepts/processes.

It is important that teachers develop a clear understanding of what students should know and be able to do for a specific subject and grade level, and part of this understanding is knowing how learning connects and builds from one year to the next and how learning progresses from year-to-year within the given subject. What students are expected to know and be able to do (curriculum content standards, assessment anchors, and eligible content) at a given grade and content area describes learning horizontally. The graphic below is a small section of the Mathematics Learning Progression for Pennsylvania. Learning Progressions were developed by PDE, working closely with Pennsylvania educators.

Mathematics Learning Progressions

| Content Code | Eligible Content | Grades | | | | | | | | Algebra I | | Algebra II | | Geometry | | |
|--------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------|---|---|---|---|---|---|---|-----------|---------------------------------------------------------------------|-------------------------------------------------------------|----------------------------------------------------|--------------------------------------------------------|------------------------------------------------------|------------------------------------|
| | | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | Module 1 Operations and Linear Functions & Inequalities | Module 2 Linear Functions and Data Organization | Module 1 Number Systems and Data Analysis | Module 2 Non-Linear Expressions and Equations | Module 1 Geometric Properties and Relations | Module 2 Geometric Reasoning |
| Numbers and Operations: | | | | | | | | | | | | | | | | |
| Number Sense | | | | | | | | | | | | | | | | |
| M03.A-T.1.1.J | Round two- and three-digit whole numbers to the nearest ten or hundred, respectively. | | | | • | | | | | | | | | | | |
| M03.A-T.1.1.F | Order a set of whole numbers from least to greatest or greatest to least (up through 9,999, and limit only to no more than four numbers). | | | | • | | | | | | | | | | | |
| M03.A-F.1.1.F | Compare two fractions with the same denominator (limit denominators to 1, 2, 3, 4, 6, and 8), using the symbols $>$, $=$, or $<$ and justify the conclusions. | | | | • | | | | | | | | | | | |
| M04.A-T.1.1.F | Round multi-digit whole numbers (through 1,000,000) to any place. | | | | | | | | | | | | | | | |
| M04.A-T.1.1.J | Demonstrate an understanding that in a multi-digit whole number (through 1,000,000), a digit in one place represents ten times what it represents in the place to its right. | | | | | • | | | | | | | | | | |
| M04.A-T.1.1.F | Compare two multi-digit numbers through 1,000,000 based on meaning of the digit in each place, using $>$, $=$, and $<$ symbols. | | | | | | | | | | | | | | | |
| M04.A-F.1.1.F | Compare two fractions with different numerators and different denominators (denominators limited to 2, 3, 4, 5, 6, 8, 10, 12, and 100) using the symbols $>$, $=$, or $<$ and justify the conclusions. | | | | | • | | | | | | | | | | |
| M04.A-F.3.1.F | Compare two decimals to hundredths using the symbols $>$, $=$, or $<$ and justify the conclusions. | | | | | | • | | | | | | | | | |
| M05.A-T.1.1.F | Round decimals to any place (limiting rounding to the ones, tenths, hundredths, or thousandths place). | | | | | | | | • | | | | | | | |
| M05.A-T.1.1.J | Demonstrate an understanding that in a multi-digit number, a digit in one place represents 10 times what it represents in the place to its left. | | | | | | | | • | | | | | | | |
| M05.A-T.1.1.F | Explain patterns in the number of zeros of the product when multiplying a number by powers of 10 and explain patterns in the placement of the decimal point when a decimal is multiplied or divided by a power of 10. Use whole-number exponents to denote powers of 10. | | | | | | | | • | | | | | | | |

Detailed learning progressions coupled with the results from diagnostic assessment events generates useful data that can be used to provide teachers with guidelines for how to plan instruction. By using reports generated from these results to show where the learning lies on the continuum, teachers are then provided with the information necessary to adequately plan the next steps towards demonstration of the mastery of the content standards.

Individual Learning Progression Map

The Learning Progression Maps are organized by the Diagnostic Categories associated with the CDT test. These maps provide more detailed information about how a student performed on specific eligible content.

Diagnostic Categories and Eligible Content are displayed as rows and the grade or course is represented by the columns. The vertical gray band indicates the

student’s grade or course, as selected in the Map Configuration. In the example below, grade 6 is chosen. Empty boxes are Eligible Content for which the student was not provided any items. **Red dots** are Eligible Content where the student’s performance was less than the expected performance of a student who is considered just ready for the next grade or course. **Green dots** are Eligible Content where the student’s performance was equal to or better than a student who is considered just ready for the next grade or course.

The teacher can also hover over the Eligible Content code to see the Eligible Content Description (below), links to Materials and Resources in SAS, and a sample item.

Teachers can use the Individual Learning Progression Map to identify foundational skills from an earlier grade that a student has not yet mastered. This is illustrated by the first **Red X** in the row labeled M05.C-G.2.1.1, which is a fifth grade Eligible Content. The teacher can get additional information about this Eligible Content by hovering over the Eligible Content code. A full description of the Eligible Content will display, along with a link directly to relevant materials and resources on Pennsylvania’s SAS website. Additionally, the teacher can view a sample item that is an example of how the Eligible Content could be tested.

Sample Individual Learning Progression Map

| Eligible Content | Grades / Courses | | | | | | | | | |
|---------------------|------------------|---|---|---|---|---|----|----|---|--|
| | 3 | 4 | 5 | 6 | 7 | 8 | A1 | A2 | G | |
| Geometry | | | | | | | | | | |
| Geometrical Figures | | | | | | | | | | |
| M03.C-G.1.1.1 | | | | | | | | | | |
| M03.C-G.1.1.2 | | | | | | | | | | |
| M04.C-G.1.1.1 | | | | | | | | | | |
| M04.C-G.1.1.2 | | | | | | | | | | |
| M05.C-G.2.1.1 | | | | ✖ | | | | | | |
| G.1.2.1.2 | | | | | | | | | | |
| M06.C-G.1.1.5 | | | | | ✔ | | | | | |
| M07.C-G.1.1.2 | | | | | | ✔ | | | | |
| M07.C-G.1.1.3 | | | | | | | | | | |
| G.1.2.1.1 | | | | | | | | | | |
| G.1.2.1.3 | | | | | | | | | | |
| G.1.2.1.4 | | | | | | | | | | |
| M07.C-G.1.1.4 | | | | | | | ✔ | | | |
| M07.C-G.2.1.1 | | | | | | | | | ✖ | |
| M07.C-G.2.1.2 | | | | | | | | | | |

Group Learning Progression Map

The Group Learning Progression Map contains Eligible Content-level data for all the students in the group. The students are displayed in columns along with their individual performance on each Eligible Content, which is displayed in rows. Rows that correspond to the map configuration chosen (i.e., the students' grade) are highlighted. The example below represents a class of sixth grade students.

Sample Group Learning Progression Map with Eligible Content Description, Links to SAS, and Sample Item

| Eligible Content | Summary | Count of Green | Count of Red | Student 1 | Student 2 | Student 3 | Student 4 | Student 5 | Student 6 | Student 7 | Student 8 | Student 9 | Student 10 | Student 11 | Student 12 | Student 13 | Student 14 | Student 15 | Student 16 | Student 17 | Student 18 | Student 19 | Student 20 |
|----------------------------|---------------------------------------------------------------------------------------------------------------------|----------------|--------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|------------|
| Geometry | | | | | | | | | | | | | | | | | | | | | | | |
| Geometrical Figures | | | | | | | | | | | | | | | | | | | | | | | |
| M03.C-G.1.1.1 | | | | | | | | | | | | | | | | | | | | | | | |
| M03.C-G.1.1.2 | | | | | | | | | | | | | | | | | | | | | | | |
| M04.C-G.1.1.1 | ✖ | 0 | 1 | | | | | | | | | | | | | | | | | | | | |
| M04.C-G.1.1.2 | | | | | | | | | | | | | | | | | | | | | | | |
| M04.C-G.1.1.3 | | | | | | | | | | | | | | | | | | | | | | | |
| M05.C-G | | | | ✔ | ✔ | | | ✔ | ✔ | | | | | | | | | | | | | | |
| G.1.2.1.2 | Eligible Content Description Represent three-dimensional figures using nets made up of rectangles and triangles. | | | | | | | | | | | | | | | | | | | | | | |
| M06.C-G | Materials and Resources Sample Item | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| M07.C-G | | | | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| G.1.2.1.1 | | | | | | | | | | | | | | | | | | | | | | | |
| G.1.2.1.3 | | | | | | | | | | | | | | | | | | | | | | | |
| G.1.2.1.4 | | | | | | | | | | | | | | | | | | | | | | | |
| M07.C-G.1.1.4 | ✔ | 6 | 5 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| M07.C-G.2.1.1 | ✔ | 3 | 9 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| M07.C-G.2.1.2 | ✔ | 3 | 11 | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ | ✔ |
| G.2.2.1.1 | | | | | | | | | | | | | | | | | | | | | | | |
| G.2.2.1.2 | | | | | | | | | | | | | | | | | | | | | | | |

Note: Graphic is blurred to maintain item security and/or student confidentiality.

The **Summary** column indicates that the group's performance for the eligible content was equal to or better than (green check) or less than (red X) the expected performance of a student who is considered just ready for the next grade or course. By hovering over the Summary dot, the teacher can see how many students in the student group received items for this Eligible Content and how many items those students received.

The **Count of Green** and **Count of Red** columns indicate the number of students who received each of those colors of dots on their individual learning progression map.

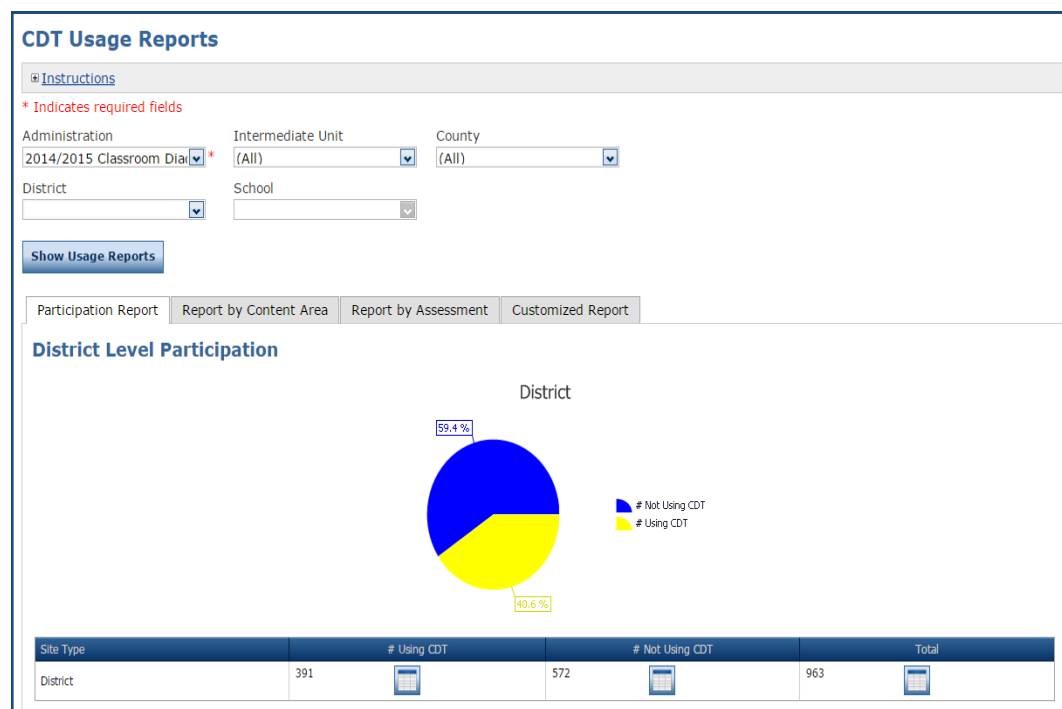
Similar to the Individual Learning Progression map, the teacher can easily access relevant information, a sample item, and links associated with the Eligible Content by hovering over the code.

Educators can use the Group Learning Progression Map to visually identify classroom performance on an Eligible Content. The example illustrates that the majority of students in the group have red checks in Eligible Content M07.C-G.2.1.2, which is a grade 7 Eligible Content. Since this is a grade 6 group of students, this may not be as concerning for the teacher as the red marks in the highlighted box, which corresponds to a grade 6 Eligible Content. This map provides an easy, visual way for teachers to identify trends in the class and take action.

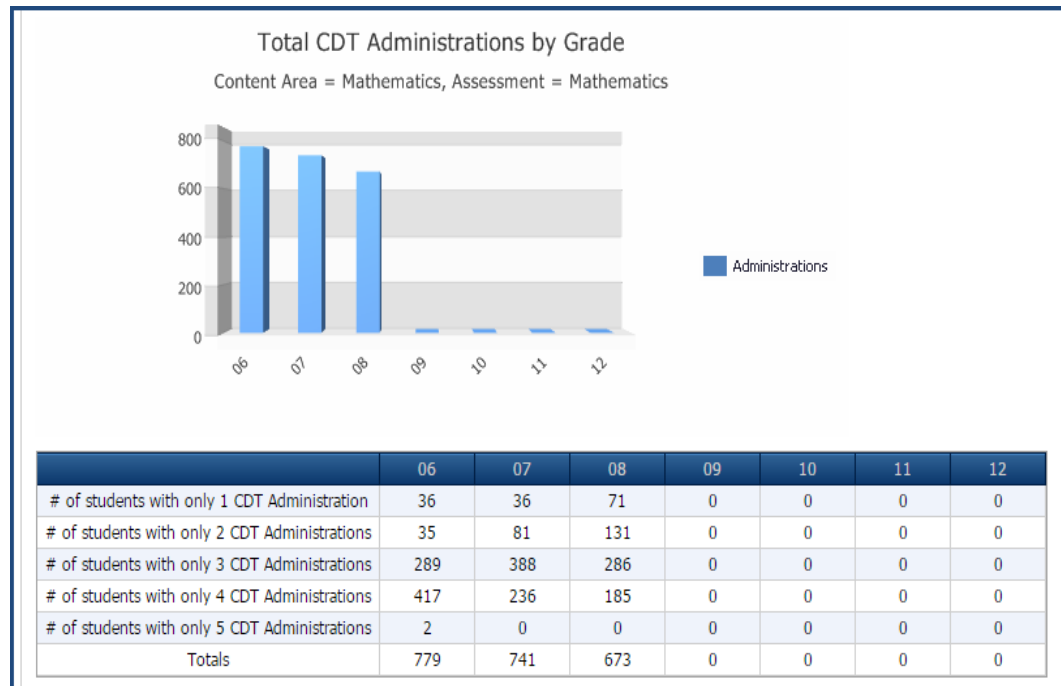
Usage Reports

DRC provides CDT usage reports in a variety of user-friendly formats (pie charts, bar graphs, CSV export files) that allow administrators to easily view summary usage by school, district, and state-level participation for each CDT administration. Users can filter report content to best match their intended use. The figure below provides an example for CDT usage at a district level throughout the state.

District Level Participation Report



Sites have the ability to view the reports for a specific content area or assessment, and also create a customized report. This report will provide the user specific usage information down to the number of assessments students have taken in each grade level (see screenshot below).



Focus Groups and Feedback Sessions to Inform Report Design

Under the new contract, focus groups and feedback sessions could be used to support report development and enhancements for the CDT. We have found that focus groups are an extremely effective tool to gain valuable insight from key Pennsylvania stakeholders on report design, readability, ease of use, and data interpretation. Holding focus groups and feedback sessions with a variety of stakeholders, including educators, administrators, students, and parents/guardians, provides these groups with a voice during report development. Sessions would be held at key points within the report development cycle, so that stakeholder feedback can influence report design development.

Web Portal Application

DRC worked closely with the SAS team to define and implement the CDT web portal authentication protocol. We arrived at an implementation that allows authenticated users to move seamlessly between the SAS and DRC systems without requiring any additional user actions. DRC has been successfully using this protocol to interface with the SAS website as well as link directly to content in the website for specific Eligible Content Codes. This has been used extensively in production by Pennsylvania teachers for over four years. Over that time we have successfully collaborated with the SAS team to address any new features or changes. We will continue to support this process under the new contract.

Professional Development

DRC recognizes how important it is for teachers to receive professional development training in the use of the CDT and the interpretation of the results. We understand that PDE and its Professional Development Core Team utilizes a “train-the-trainer” professional development model. We are committed to providing the Commonwealth with support in the creation of materials to be used for this professional development model, a model designed to help Pennsylvania educators better understand, interpret, and apply CDT results, including how to use the CDT results to inform and strengthen instruction.

Over the last few years we have worked with PDE and its Professional Development Core team to develop PowerPoint presentations and report simulations for teachers, including those simulations designed to help teachers focus instruction upon students extending beyond the standards and those students with areas of need. The PowerPoint presentations and report simulations have provided profiles that serve to help teachers determine students’ strengths and instructional needs. DRC recommends that well-written, step-by-step scripts to accompany report simulations are needed to provide PDE and the Core Team with the necessary support for its “train the trainer” professional development model. Detailed simulations, with scripts, have served to provide for consistency in professional development training (please see *Volume IV; Appendix J, CDT Report Training Simulation*, for an example).

As we have done in the past, DRC will continue to work closely with PDE and its Core Team to identify additional opportunities and/or needs for professional development materials based upon teacher feedback. For example, for PDE and the Core Team’s consideration, we would be pleased to provide a PowerPoint Presentation, with simulations, demonstrating the sharing of results with parents or guardians. These could be used by teachers in parent/guardian conferences.

Furthermore, DRC will support the Core Team with the development and/or revision of tools and resources designed to assist educators and parents and students to better understand the CDT results and use them in creating goals and plans to meet those goals. As such, we will continue to support the development, revision, and enhancement of the following materials:

- Student and Teacher Metacognition Templates
- PowerPoint Presentations
- Simulations, with scripts
- Grade Level Summaries
- Diagnostic Categories Skills List Pamphlets
- Teacher and Student Videos on eDIRECT
- Training Modules

- Technical Support

DRC would be pleased to continue to support other professional development efforts around the CDT. These include:

- Test and Technology Coordinator Training: DRC will update the CDT test and technology coordinator training materials and hold yearly training sessions via WebEx. DRC will hold additional sessions as needed.
- CDT Core Team Meetings: DRC would be pleased to continue attending the CDT core team meetings in Harrisburg. DRC plans to attend 4 one-day meetings yearly. We will plan to have at least two DRC CDT team members in attendance.
- CDT Feedback Session: DRC will continue to host the annual CDT Feedback Session, to occur in Harrisburg. CDT users from across the Commonwealth will be invited and encouraged to share their feedback about all aspects of the CDT experience, including user tools for the administration of the CDT and the CDT reports. DRC will be responsible for meeting facilitation and all meeting arrangements, including recruiting and logistics (hotel, meals, etc.).
- State and National Conferences: DRC will continue to participate in state and national education conferences with members of the CDT Core Team.

4.J. Management of the Assessment Program

4.J.1. GENERAL PROJECT MANAGEMENT

Data Recognition Corporation (DRC) understands the importance of providing effective project management for coordinating the various tasks and activities of the PSSA, Keystone Exams, and CDT. We have many years of experience as a leading provider of project management, planning, and other customized services necessary to successfully implement large-scale, statewide assessment programs, including **direct experience with programs for the Commonwealth of Pennsylvania**. We are prepared to anticipate the unique challenges facing PDE and make informed recommendations for solutions.

DRC is known within the educational assessment community and within PDE for our excellent and responsive service to our clients. Our long-term experience in implementing and maintaining successful state testing programs has demonstrated that the best solutions for assessments are the result of **true collaboration between the testing contractor and the state client**. No other vendors have more first-hand knowledge of Pennsylvania's assessment programs. DRC offers PDE a unique combination of qualifications that cannot be matched by any other vendor in the assessment industry.

DRC is prepared to support PDE's efforts, especially during critical periods when PDE may be required to multi-task on other activities in addition to the Pennsylvania assessments. We are pleased to offer PDE several superior and differentiating factors that will positively influence the Pennsylvania assessments:

- Established and effective project management methodologies.
- A team of seasoned, Pennsylvania-experienced assessment professionals who will bring to this project many years of experience in all aspects of large-scale assessments.
- A proven Project Delivery Process that begins with contract award and ends only with the successful distribution and receipt of all required deliverables.
- A true partnership between DRC, PDE, and other assessment stakeholders, resulting in a highly successful testing program that benefits the students, parents, and educators of Pennsylvania.

As prime contractor, DRC is completely responsible for the quality of work under the contract. **Ms. Shaundra Sand, DRC's Pennsylvania Project Director**, will oversee and coordinate the work of our subcontractors for the Pennsylvania assessments. Ms. Sand has a unique understanding of Pennsylvania's assessment programs, having worked on them for more than 19 years. Should PDE be dissatisfied with the services performed by DRC or any of our subcontractors, we request that we be given notification and a mutually agreed-upon time period to take corrective action. We take our role as the assessment provider for the

Pennsylvania assessments seriously and will do everything in our power to ensure that PDE and the districts and schools of Pennsylvania are completely satisfied with our performance.

DRC acknowledges that the contract awarded in response to Pennsylvania's Request for Proposal is anticipated to begin on January 1, 2016, and will be a five-and-a-half year contract in effect through June 2021. The contract will include an option for an additional three-year renewal. The contract will include the following administrations by year:

Pennsylvania Assessments—Administrations by Year

| | PSSA | Keystone Summer | Keystone Winter | Keystone Spring | CDT |
|-------------------------------------------------|------|-----------------|-----------------|-----------------|-----|
| Year 1: Jan 2016-June 2016 – No Administrations | | | | | |
| Year 2: 2016-2017 | X | X | X | X | X |
| Year 3: 2017-2018 | X | X | X | X | X |
| Year 4: 2018-2019 | X | X | X | X | X |
| Year 5: 2019-2020 | X | X | X | X | X |
| Year 6: 2020-2021 | X | X | X | X | X |

4.J.1.a. Quality Assurance (QA) and Quality Control

Quality Management System

DRC is passionate about providing quality products and services to our clients and recognizes that quality processes are critical elements of our business. **DRC is committed to providing the highest quality products and services to the Pennsylvania Department of Education (PDE) and the educators, students, parents, and stakeholders of the Commonwealth of Pennsylvania.**

A primary factor in DRC's continued success in providing **error-free services** to clients is our company-wide dedication to quality. DRC acknowledges that Pennsylvania requires quality control procedures for the following facets of the program, as outlined in the RFP.

- Test Development
- Printing
- Packaging
- Shipping and Receiving
- Scanning

- Scoring
- Data Analysis/Psychometrics
- File Creation
- Reporting

DRC has an unwavering commitment to check the accuracy of all test item information, all student scores and identification, and all summary data, with an error rate of zero for all data reports and project deliverables. In the following pages, we describe DRC's plan for fulfilling the quality assurance requirements specified in Pennsylvania's RFP for scanning, scoring, data analysis, file creation and reporting. DRC's quality commitments to the test development, printing, packaging, shipping/receiving, and psychometrics processes were fully disclosed in the preceding applicable sections of this proposal. In the event that an error does occur, DRC will notify PDE of any suspected errors or discrepancies in data provided by LEAs and any item scoring or reporting errors that arise during the course of contract execution.

A full version of DRC's Quality Management Plan for the Pennsylvania assessments is included in *Volume IV; Appendix L, Sample Quality Control Plan* of this proposal. Please see the full plan for complete documentation of the proven quality processes embedded throughout each phase of assessment development, management, administration, scoring, and reporting.

With more than 35 years of successful student achievement testing, DRC has developed and refined our quality system to ensure the highest levels of customer satisfaction and quality. **At DRC, quality is both a program and an overall approach to our business.** Our Quality Management System is focused on defining and implementing critical quality control processes to ensure products and services delivered to our clients meet and exceed their requirements. This extends to our relationships with other vendors and partners.

At DRC, quality is a commitment to excellence and is achieved by teamwork and the process of continuous improvement. Quality principles are infused into everyone's roles within our organization. The focus of our Quality Management System is to define and implement quality control processes and embed them throughout all aspects of our projects. DRC has developed our quality approach using the guidelines listed in the *SCASS/TILSA Quality Control Checklist for Processing, Scoring, and Reporting*.

Quality begins with the attitude that a task must be done right the first time. DRC staff members take great pride in their work, and their products reflect that pride. As demonstrated on all current DRC contracts, we understand the tasks that are necessary for successful assessment programs. DRC believes in reasonable and sensible approaches to problem solving. We pride ourselves on our creativity and our ability to anticipate problems, as well as our genuine affinity for discovering multiple solutions to difficult issues.

ISO 9001:2008 Certification

With the rapid pace of business today, customers' wants and needs continually evolve. Our clients are asking us to be more dynamic, flexible and cost efficient in meeting their requirements than ever before. This places a tremendous amount of importance on our processes to meet these needs in a reliable, repeatable fashion.

"We are very proud to have earned this quality standard. Our customers have always expected flawless execution and responsiveness and this certification validates the way we do business."

—Ms. Susan Engeleiter, CEO and President of DRC

DRC has held ISO 9001 certification since 2007. Our current certification is valid through December 2016. DRC intends to renew our ISO certification when the current certification period ends.

Our current certification—ISO 9001:2008—is an internationally recognized quality management standard that defines a set of core quality requirements with which an organization must comply. Some of the requirements in the ISO 9001:2008 standard include:

- Developing a set of procedures that cover key processes within a business.
- Monitoring manufacturing and business processes to ensure the organization is producing quality products and services.
- Keeping proper records.
- Checking outgoing products for defects and taking appropriate corrective action where necessary.
- Regularly reviewing individual processes and the quality system itself for effectiveness.
- Facilitating the continual improvement customers expect.

DRC proudly holds the **most comprehensive scope of ISO certification of any company in the industry**. We are currently ISO 9001:2008 certified in three major areas of the company:

- **Document Services** (Project Management, Document/Graphic Design, Scheduling, Pre-Press, Printing, Bindery, Inserting, and Purchasing).
- **Education Operations** (Distribution, Logistics, Materials Processing, Warehousing, and Document Scanning).
- **Performance Assessment Scoring** in all of our scoring centers.



Becoming ISO 9001 certified requires external validation from a third party registrar who evaluates whether we are meeting the criteria of the ISO 9001:2008 standard within the DRC Quality Management System. These audits are conducted semiannually.

The scope of our ISO 9001:2008 registration is based on a business process approach, rather than the functional approach which many companies use. Embedding the ISO 9001 standard has enhanced an already strong foundation of business process controls for which DRC has been known for many years.

Our ISO 9001 certification process is led by **DRC's Chief Quality Officer, Ms. Lisa Peterson-Nelson**. Ms. Nelson provides executive-level leadership and management of DRC's corporate-wide quality processes. She also serves as the senior quality leader responsible for leading the implementation of ISO 9001 Quality Management System certification across all DRC operational areas. She will continue to oversee the plan to expand the scope of our certification to other areas of the company, while contributing her expertise to our quality standards and systems already in place.

To assure clients of our commitment to information security, DRC's information security policies and procedures are based off of the National Institute of Standards and Technology (NIST) standard, NIST Standard 800-53. This is a nationally recognized standard for information security practices. In addition, DRC is pursuing compliance with the ISO 27001 information security system standards. DRC is actively configuring our systems and processes to comply with ISO 27001. The ISO 27001 standard is the most internationally recognized information security standard in the world. Plans are in place to achieve formal, certified compliance towards ISO 27001 in 2015.

Quality Control and Sign-Offs

For the success of Pennsylvania's assessment programs, PDE's requirements, goals, and constraints must be thoroughly understood, documented, and communicated. These critical activities are the foundation of DRC project management activities. **Ms. Shaundra Sand, Vice President, Education Program Management**, provides high-level oversight and leadership for the overall quality process for Pennsylvania assessments. Ms. Sand has served in a project management capacity for Pennsylvania programs since 1996. Under her guidance, the Pennsylvania Project Management Team ensures that problem-reporting procedures are strictly followed to ensure immediate action is taken to resolve any issues.

As part of DRC's quality control and sign-off procedure for the Pennsylvania assessments, DRC will create detail logs that trace the application of QA procedures to the state score reports after each administration. DRC will be responsible for maintaining quality products and services in all aspects of the assessment program component from initial development of training materials to the production of electronic data files and score reports.

Quality Control Process Overview

Our Project Delivery Quality Control process begins with contract award and ends only with the successful distribution of all required deliverables. Quality control checkpoints are in place at all stages of each assessment program. Our proven quality framework is an integral part of ensuring accurate and timely delivery for Pennsylvania assessments. We can provide PDE with the required evidence that our quality inspections, processes, system tests, and policies are followed.

DRC's Chief Quality Officer, Ms. Peterson-Nelson, carefully audits the project delivery process for Pennsylvania assessments. She currently directs the enhancement of DRC's key work processes for delivery of products and services to clients, and ensures that the Pennsylvania Project Team can leverage the capabilities and innovations of the entire company to enhance our quality approach for Pennsylvania's testing programs. Ms. Peterson-Nelson has over 20 years of experience in quality process improvement. She worked for more than a decade in senior positions in quality process management for two different Fortune 500 companies. She has been with DRC since 2001.

Project Planning and Schedule/Resource Management

DRC's Pennsylvania Project Management Team will ensure that all DRC project staff and subcontractors involved in the Pennsylvania assessments understand and adhere to project scope and that all deliverables are met on time, with an error rate of zero. Project Management staff responsibilities include creating and maintaining project planning and summary documents and MS Project schedules, along with developing and utilizing communication plans, risk management plans, and change management plans.

As Pennsylvania Project Director, Ms. Shaundra Sand will also be responsible for planning, scheduling, monitoring, and documenting all project activities. This includes the development and maintenance of MS Project schedule(s) developed specific to the Pennsylvania assessments. DRC has implemented company-wide use of MS Project as a tool to track progress toward meeting the deliverables of all of our assessment programs. The project schedules will include the quality assurance tasks, with appropriate durations to allow for timely and effective processes that will result in high-quality deliverables. The planned quality assurance tasks and schedule will be submitted to PDE for review sign-off, and approval on an annual basis. The status of the quality assurance tasks will be reviewed during DRC project team meetings on a weekly basis. Ms. Sand will ensure that the global schedule is updated weekly and distributed to all team members.

Using MS Project, Ms. Sand will be responsible for maintaining the project schedule and ensuring management of the following:

- Correctly identifying and communicating the tasks and deliverables.
- Evaluating the status and availability of resources.

- Tracking and documenting project progress.
- Monitoring completion of all quality assurance checks.
- Communicating project status and decisions to all project stakeholders.

Project Monitoring

In addition to the use of MS Project schedules, Ms. Sand will use standard DRC tools to monitor the status of Pennsylvania tasks and the successful completion and client acceptance of all project deliverables. These tools include, but are not limited to:

- Project Communication Plans
- Conference Calls with PDE
- Project Team Status Meetings
- Project Progress Reports
- Open Action Item Reports
- Project Decision Logs
- Master Calendar

Quality Control

DRC's **Information Systems** department resources—**Education Information Systems (EIS)** and **Software Quality Assurance (SQA)**, collectively referred to as Information Services (IS)—take pride in offering valuable, quality products and services to PDE. IS recognizes that quality processes are critical elements of DRC's business, and they incorporate proven quality initiatives throughout all aspects of the Pennsylvania administrations.

Information Systems' strategic quality approach begins at the inception of an administration and continues through the administration's reporting. This strategic quality approach safeguards DRC's requirements analysis processes, software design, development, integration, implementation, and support; it ensures DRC's products and services are accurate and reliable. Information Systems' processes ensure that Pennsylvania deliverables conform to the specified standards and requirements at the state and federal levels.

DRC is committed to embedding quality throughout every aspect of our software design, development, and quality assurance processes, ensuring **100% accuracy** in our scoring and reporting systems.

DRC's quality values start with:

- Building quality into the requirements analysis, software development, and testing processes.

- Following a standardized methodology that focuses on the prevention of software and integration issues.
- Providing highly qualified and trained staff.

DRC's Information Systems staff is comprised of dedicated software professionals specifically trained in the following areas:

- Requirements Analysis, Management, and Traceability
- Scope Management and Change Control Processes
- Software Development and Quality Processes
- Web Interface Development and Design
- Graphical User Interface Standards
- Software Quality Assurance Planning and Coordination
- Software Integration and Testing
- Defect Analysis, Tracking, and Resolution
- Continuous Quality Process Improvements

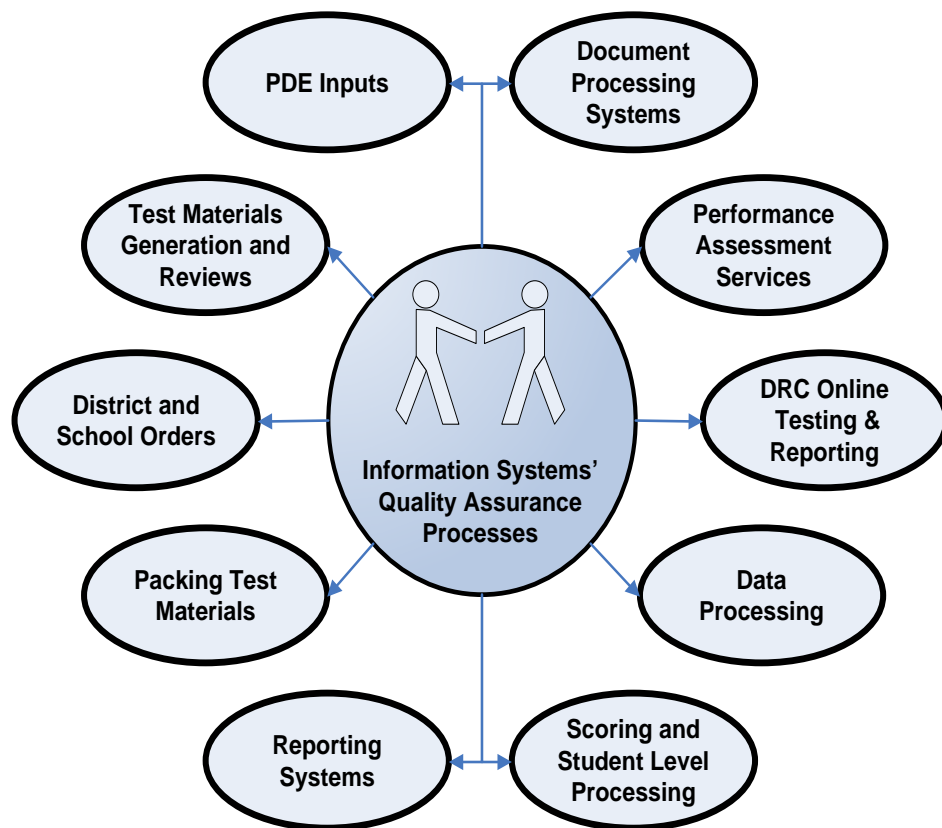
Mr. Thomas Boatman, Senior Director of Quality Assurance, leads and oversees DRC's software quality assurance processes for Pennsylvania assessments. Mr. Boatman has more than fifteen years of software testing and quality assurance experience; more than eight of those years have been for testing programs in Pennsylvania. His expertise includes developing and administering test scripts, performing defect classifications and severity assessments, and developing software quality assurance process flows and guidelines that encompass all phases of a project. Mr. Boatman has ensured adherence to quality processes for several large-scale assessment programs.

Mr. Boatman and his team of software quality assurance professionals **bring 23 years of combined experience on Pennsylvania assessments**, and more than 75 years of combined experience in the field. Several of our analysts have obtained advanced training in their field and achieved professional certification through the rigorous programs of the Quality Assurance Institute (QAI), a worldwide membership organization dedicated to quality assurance in the information services industry. SQA team members are active members of the Twin Cities Quality Assurance Association, a local professional association, which helps to keep them current on innovations and developments in their industry. DRC's staff are some of the most educated and experienced SQA professionals in the testing industry.

DRC's Information Systems staff apply industry-standard quality assurance methodologies throughout all aspects of the program. DRC quality plans will be developed and will be available for PDE's review, if desired. Information Systems

staff follow our Project Delivery Quality Control Process and adhere to the quality control checkpoints for processing, scanning, and editing, described by the State Collaborative on Assessment (SCASS) on Technical Issues in Large-Scale Assessments (TILSA). Key quality control checkpoints occur during:

Areas of Information Systems Impact and Quality Assurance Integration



To achieve excellent quality, Information Systems applies a proactive and integrated approach to industry-standard requirements management, software development, and quality assurance methodologies on the Pennsylvania programs. These methodologies serve as ongoing guidelines during the entire software development life cycle. All requirements, software programming, test plans (unit and production), and procedures are thoroughly documented, reviewed, verified, and validated. The consistent application of the DRC quality methodologies provides:

- High-quality, flexible, and effective applications
- Accurate data
- Timely data delivery and reporting

Information Systems utilizes a five-step quality assurance approach (described in the following table) to ensure quality is built into every phase of a Pennsylvania administration.

Five-Step Quality Assurance Approach

| Phase | Approach |
|----------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project Initiation and Planning | Information Systems activities begin during the project definition and planning phase and ensure that software development and IS processes, procedures, and standards identified in the project plan are appropriate, clear, specific, and accurate. |
| Project Design and Development | Quality processes begin during the project design and development phase to ensure that software requirements are complete, testable, and properly categorized as functional, performance, or user interface. The software quality assurance team works closely with the business analysts and development team, testing all deliverables throughout each program. |
| Software Integration and Test | IS has implemented an established and proven methodology for software integration and testing. The software developer and quality analysts determine the strategic test approach and create detailed test plans/scripts to validate system and software functionality and requirements. Throughout the software integration and test phase, test plans and scripts are run in accordance with the overall test strategy. Any non-conformances of requirements that are discovered are reported, resolved, and retested until requirements are met and the product is ready for PDE acceptance and release to production. |
| Client Acceptance | Prior to the implementation of a system or program(s), the SQA analysts perform a final configuration audit to verify readiness for production. The SQA analysts are responsible for the coordination of acceptance testing to ensure that PDE is both satisfied with the development process and confident that readiness testing was sufficiently performed. |
| Implementation | IS practices are incorporated throughout the implementation phase of a project to ensure successful installation and integration of the system or software programs. These same procedures are again applied when changes or modifications to the system or software programs are implemented. |

Information Systems' combined efforts assure PDE that software-related elements of the Pennsylvania administrations meet industry standards. Compliance with these standards also provides PDE with the information and data required by Federal regulations, such as NCLB and AYP, to:

- Educate students, parents, educators, and the general public on student and school performance and achievement
- Assist schools in the development of strategic plans
- Help policymakers determine schools' effectiveness in enhancing student academic proficiency.

Test Decks

Prior to any Pennsylvania test materials returning to DRC, the Software Quality Assurance staff perform extensive tests using **mock student data** to ensure all scanned data (including demographic data and multiple-choice responses) are captured and accurately stored in a secure database environment. Each record in the database is independently verified against the test decks for validation.

The analysts will follow a software testing methodology that thoroughly evaluates and verifies the scanning and scoring system and verifies each scanner is configured and setup for the applicable Pennsylvania assessment program. This process includes validating test decks, which are comprised of answer documents with and without mock student and school pre-id information for each form/version of the test. The test decks are specifically gridded to include a variety of possible student response permutations and combinations.

The test decks are processed completely through DRC's systems to verify the following:

- Readability of security, student, and school barcodes.
- Data capture of pre-gridded and barcode information.
- Accurate capture of district and school codes.
- Consistent data capture on all scanners.
- Accurate scan positions on all documents and forms.
- Scanner calibration and hardware functionality.

Following the validation of the mock student data, when the first live tests are returned to DRC, the Software Quality Assurance staff also perform a validation of all production data (live student data) processed through the system. **Each student record is verified for accuracy** to ensure high-quality data file development and reporting.

Scanning Quality Procedures

- **Test Decks**—DRC processes test decks configured for Pennsylvania assessments through the production systems.
- **Calibration**—Daily calibration and scanner cleaning processes are conducted to ensure read-level consistency.
- **Standard Edit Processes**—Every scannable document is processed through edit programs to detect potential errors (double marks, smudge marks, omits, etc.)
- **Multiple Reviews**—The Document Processing Supervisor conducts a review of the entire first batch prior to full production to ensure error-free processing.
- **Quality Control Reports**—Daily quality control reports for each editor are reviewed by the Document Processing Supervisor to monitor the accuracy of the online editing process.

Image and Scan Quality Control

Quality control procedures are critical to DRC's document scanning process. All image scanning programs go through quality review before testing materials arrive at our facilities. Throughout the scanning process, batches are checked for quality and scanning accuracy by experienced Document Processing staff. All scanners are calibrated and cleaned on a regularly scheduled basis to ensure accurate and consistent scoring. DRC also has an on-site field service engineer to resolve any technical issues as they arise.

DRC's scanning process produces comprehensive, detailed information, including:

- Student demographic data.
- Student multiple-choice response data.
- TIFF images of complete documents.
- Identifiers to link the TIFF images to the student demographic data.

Our quality control procedures for document scanning are highlighted as follows.

Quality Control Procedures for Document Scanning

- PDE-approved Scope of Work Agreements (SOWA) have been established. All processing and scanning staff adhere to the requirements contained in the SOWA.
- As scanning occurs, a unique serial number is printed on each sheet of paper. This serial number ties documents together and maintains sequencing within batches.
- The scanners pick up pre-defined processing criteria related to pre-printed barcodes, multiple-choice items, and student demographic and identification information. Constructed-response item images are scanned and separated out for image-based handscoring.
- As documents are scanned, the scanner is monitored to ensure that images meet DRC's strict quality standards.
- Regularly scheduled calibration and scanner cleaning processes will be conducted to ensure image and read-level quality and consistency.
- All scanned images pass through a software clean-up program and process. After image clean-up, a random sample of images is presented for image quality approval. If any image fails to meet DRC's quality standards, the entire batch of documents is rescanned.
- Page-scan verification is performed to ensure that all pre-defined portions of a document were correctly captured. A flatbed scanner is used to capture responses and images for any missing pages. These images are then added to the image data file and merged with the appropriate document.

Editing

After scanning, the documents are processed through a computer-based editing program to detect potential errors in specified response fields. Marks or omits that do not meet the pre-defined editing standards are flagged and routed to the Document Processing editing staff for resolution.

Using unique serial numbers printed on the documents during scanning, the editors compare the actual documents to online data. Corrections are then made to the data file according to pre-defined, program-specific guidelines. The editing staff follows strict quality control procedures to produce clean data files that can be submitted for scoring and reporting functions.

Quality Control Procedures for Editing

- Edit specifications have been developed mutually by PDE and DRC.
- Experienced editors meticulously review any potential irregularities detected during scanning and make necessary corrections online to the image data file, referring to the actual document as required.
- Editors determine if the marks are valid (based on assessment requirements) or non-correctable.
- All items flagged during document scanning are presented to editing staff for first-time entry.
- Any changes made to scanned values and all items entered the first time are double-keyed for verification by editing quality staff.
- Once verification by editing quality staff is completed, a quality control report is generated for review during post-editing.
- After all corrections for a batch have been entered and verified, the correction file is stored in a relational database for reference.

Post-Editing

A final edit is performed to confirm that all requirements for final processing have been met. Once the demographic information and multiple-choice data pass all the pre-defined editing processes, the images of the student responses to constructed-response (CR) items are extracted into files for scoring. The CR student response images are routed through the DRC Imaging Workflow System to handscoring terminals at DRC's Scoring Center for scoring by qualified readers. Images are stored so that they can be efficiently retrieved on the basis of student and school identification information, scores, and item information. Upon completion of processing, scannable documents are boxed for security purposes and final storage.

Quality Control Procedures for Post-Editing

- During this processing step, the actual number of documents scanned is compared to the number of scannable documents assigned to the box during Check-In. Any count discrepancies between Check-In and documents scanned are resolved at this time.
- Suspect student precodes, district and school numbers, and documents IDs are reviewed for additional verification.
- All editing quality control reports are reviewed to ensure all changes were processed accurately.
- All corrections during post-editing are made electronically and a new validation report is generated to confirm the changes have been processed accurately and the report is clean.
- After all final processing requirements have been met, the batch is released for CR scoring and student-level processing.

Multiple-Choice Scoring Quality Procedures

DRC understands the activities and coordination required for data processing and scoring of Pennsylvania assessments, and has the proven experience and capabilities needed to score the tests accurately. We prepare and verify the requirement documents for the scoring of test booklets/answer documents well in advance of the receipt of test materials. These specifications contain detailed scoring procedures, along with the procedures for determining whether a student has attempted a test and whether they should be included in statistics and calculations for computing summary data.

The requirement documents are completed and can be reviewed with PDE. After all changes and edits have been made, the final requirement documents are sent to PDE for final approval. DRC ensures all student test booklets/answer documents have been accounted for and processed through scanning, pre-editing, and post-editing processes. Once staff confirms these processes are complete, final scoring processes begin.

All student answer documents returned to DRC are scored. The original scanned data is converted into a master student file. Record counts are verified against the counts from the Document Processing staff to ensure all students are accounted for in the file. Additionally, a detailed review of the error-tracking log is performed to ensure any discrepancies are resolved before proceeding with the scoring routines.

Information Security practices around protecting student data (whether it be in online or hardcopy form) are a major focus for the state of Pennsylvania and DRC. DRC's information security practices are in place to ensure student level data resides within FERPA and Pennsylvania compliant business processes. DRC's

backup, archival and retaining policies along with ISO 9001:2008 certified storage practices ensure the highest level of data protection before, during and after student test administrations.

Employee access to PDE student data is tightly restricted and controlled. DRC grants access to data based on job function. Employees can only access data and areas of the network necessary to do their job. All server consoles are password protected, and all workstations are configured with dual network authentication and password protected screen savers. Network accounts are audited quarterly and require unique passwords that change every 60 days. Accounts are immediately disabled whenever an employee leaves DRC.

DRC will maintain security of all individual test results. Individual test information shall be made available only to PDE, authorized school district personnel, and other entities identified and authorized by PDE. DRC's eDIRECT system accommodates tiered access for all state staff involved in the administration of the each Pennsylvania assessment component, including assessment coordinators, administrators, PDE personnel, and any other personnel needing access to the system. These functions are controlled through **a variety of security levels to ensure a user can only view or edit data for which he/she is authorized**. Users must login with a pre-determined unique user ID and password to gain access to the system.

High-level administrator accounts control the permissions and level of access each sub-user will have. eDIRECT is a permissions-based system, meaning that users with administrative rights need to select what role a sub-user has and assign permissions to that individual. This allows the flexibility for users to have the same roles but different permissions. Each district can set up users with as much or as little permission as deemed necessary. A user's role and permission may be modified at any time.

DRC's strict quality procedures can assure PDE of accurate scoring. **We are prepared and accustomed to handling programs with multiple forms at various grade levels and/or content areas** and have built-in solid checkpoints and reviews throughout the entire scoring process. Standard quality inspections are performed on all data files, including the evaluation of each student data record for correctness and completeness prior to report generation. Student results are kept confidential and secure at all times.

Our Software Quality Assurance staff ensure the quality of school, district, and state data and make certain that each record is verified for completeness and accuracy. Quality checks are performed on the data placement and data file formatting for each data element to be displayed on the reports. All data elements are verified back to the production data file and the data processing rules.

Senior Software Quality Assurance Analysts conduct a second review to ensure methodology, processes, and procedures are followed and verify that the data files are approved prior to report production.

Score Key Quality

The integrity of item, form data, and score keys is evaluated in several ways. Test development specialists, psychometric staff, and software quality assurance analysts check the score keys through a series of validation procedures at varying junctures.

Score Key Quality Procedures

- **Verify for accuracy**—Score keys are verified for accuracy based on multiple reviews by test development specialists, psychometric staff, and software quality assurance analysts. All item data and score keys are reviewed and approved by each group prior to scoring Pennsylvania tests.
- **Take the test**—Multiple staff with specific content knowledge take each form of the test and compare their results against the score keys on the test maps. The score keys and strand information is again verified during this step.
- **Score key file import**—DRC imports the approved keys received into our scoring system. Once the keys are successfully imported, software quality assurance staff re-verify the keys used by the scoring engine.
- **Database accuracy**—All items are scored in the system using the correct and incorrect item distractors. The database is validated to make certain the distractor captured in scanning was saved correctly and that the item was given a correct or incorrect answer.
- **Automated system checks**—The scoring engine has automated system checks built-in to validate score keys and proper merging of multiple-choice and constructed-response items. Additionally, the software quality assurance team performs independent checks on this data.
- **Item Analysis**—Psychometricians conduct classical item analysis on multiple-choice items to identify items that are not performing as expected. Items with potential mis-keys are verified by content experts.

Evaluation of Student Score Data

To provide PDE with the highest level of accurate test results, **DRC conducts a thorough evaluation of all scored data**. File formats and data elements are validated against client-approved layouts, specifications, and processing requirements. Detailed test scripts are executed to confirm accuracy. Some of the steps include quality verification of:

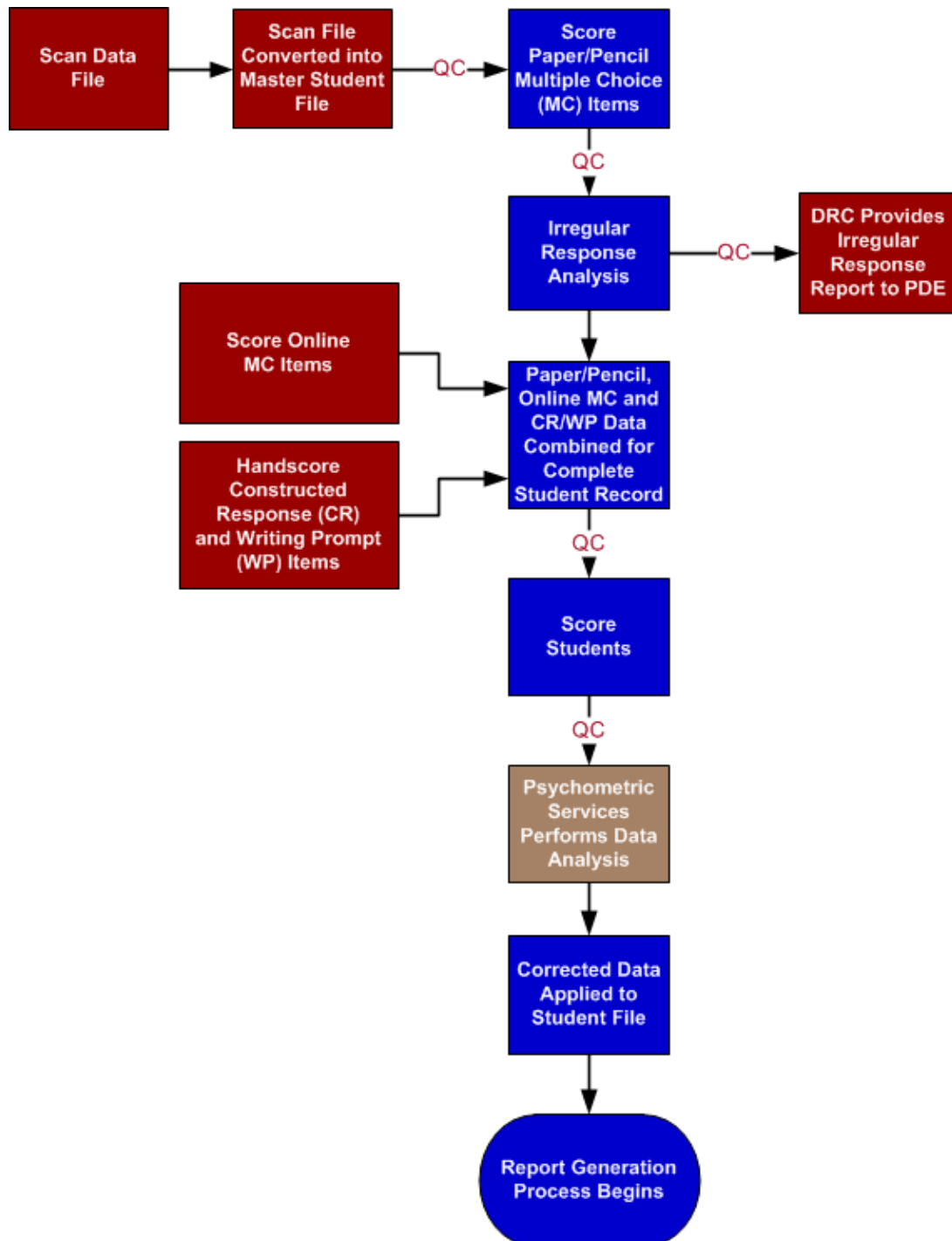
- Answer keys/test maps
- Raw scores
- Raw-to-scale score conversions
- Scale-score comparisons to performance achievement levels
- Disaggregated data
- Processing rules for individual student and summary level data

The quality assurance steps involve processing sample student records through the data processing and scoring system. Each student's data record is carefully reviewed and evaluated to ensure it was **scored with 100% accuracy**.

To reduce the risk of human error, our Software Quality Assurance programmatic test routines are used to thoroughly evaluate each student's data record that is produced for use in final data files and reports. As a separate check to reduce the risk of programming errors, a sample of student scores are calculated by hand, including the aggregation of data into summary scores.

The figure on the next page outlines DRC's multiple-choice and open-ended scoring and quality process.

Process for Merging Student Data and Scores



Data Files

DRC understands the critical nature of scoring large-scale assessments. Our systematic approach ensures successful scoring and 100% accuracy. DRC has the thorough understanding of the requirements needed to monitor, score, and effectively analyze the data for the Pennsylvania assessments.

All **data file development for Pennsylvania is done in close association with PDE** to ensure requirements are met. Each data file produced is **quality checked** for accuracy and completeness a **minimum of three times** by DRC's Software Quality Assurance Analysts and Project Management staff against PDE-approved layouts, specifications, and processing rules.

Reporting

First using mock student data and then using live student data after tests are returned, DRC employs a two-step report generation process. The first step is to perform all calculations and analysis to produce the data elements contained on the reports. The second step takes the data and formats it for presentation on the reports. This process allows the data to be thoroughly verified prior to and independent of formatting of the reports.

DRC incorporates rigorous quality assurance activities throughout the reporting process to ensure the highest level of quality and data integrity. The focus on “building in quality” and “issue prevention” ensures our clients quality products and services.

DRC's primary goal is to ensure the quality of student data and to make certain that each student record is tested and verified for completeness and accuracy. Upon the completion of the thorough data verification process, quality checks are performed on the data placement and report file formatting for each data element displayed on the reports. All reporting data elements are verified back to the production data file and the reporting processing rules. Additional quality cross-checks are performed to ensure accuracy and consistency across all reporting mediums for the assessment. This includes hard copy reports, posting data to our secure web-based Report Delivery System, or any other type of reporting medium.

Similar quality checks are also used to validate data at the school, district, and state level. A second review of each report is conducted to ensure methodology, processes, and procedures are followed and to verify that the reports are approved for production. An additional post-print review is conducted before any hard copy reports are packaged and shipped.

Final Data and Report Review

The final data and reporting review with PDE is a critical component of our reporting process. PDE has the opportunity to review and approve all data and reports prior to final production. DRC's Reporting Team also performs a thorough quality assurance review prior to release of reports. All files and reports are thoroughly tested to guarantee accuracy.

Upon approval from PDE, DRC produces the final student, class, school, district, and state reports. DRC's large-scale assessment reporting experience can ensure PDE that accurate and high-quality reports will be delivered within the prescribed time limits of the contract. Over the years, DRC has **repeatedly demonstrated the ability to provide ongoing communication and to deliver on time accurate data and reports** to states, districts, schools, and students/parents.

As directed by PDE, DRC will retain student response files documents for possible re-scoring for a designated period to be agreed upon by DRC and PDE.

DRC will retain the appropriate report file in case a district needs to have Individual Student Reports (IRS) reprinted for any reason other than a natural disaster. Districts may contact DRC's customer service team to request the reprinting of reports. DRC will establish a set-up fee and a per-report fee for the reprint of the specific reports requested. These fees will be paid by the districts, not by PDE. In the event that the reports are damaged by natural disaster or issues during shipping, DRC will reprint the requested reports at no charge to the district.

Third-Party Quality Assurance Review by Program Consultant, Dr. Richard Kohr

DRC's Program Consultant in Harrisburg, **Dr. Richard Kohr**, conducts extensive QA analyses of individual student, school summary, and disaggregated data files. Dr. Kohr has more than 40 years of experience in virtually all phases of large-scale statewide testing programs, including over 30 years working for the Pennsylvania Department of Education. While at PDE, Dr. Kohr developed analytic strategies for conducting quality assurance analyses on assessment data, which often required the development of specialized computer programs. Dr. Kohr's extensive experience working with Pennsylvania state assessment data gives him the insight to assess whether statistical indices make sense and/or if change from a previous year is reasonable. When Dr. Kohr's analyses turn up something potentially problematic, he communicates the issue with DRC's Education Information Systems (EIS), Software Quality Assurance (SQA), and Research Department. Once DRC resolves the issue, Dr. Kohr re-runs his analyses to verify corrections have been made and/or new problems have not been introduced.

DRC's quality scoring, files, and reporting are the result of a network of resource groups: IS, Research/Psychometrics, and Program Consultant Dr. Richard Kohr. Each of these is fully committed to quality within its own group as well as its duty to check the work of other groups. At DRC, the commitment to quality begins at

contract award and ends with the successful delivery of all required components of the assessment.

Online Systems Quality Control

DRC is proud of the web-based systems that we have created in conjunction with many state departments of education over the years. Our commitment is to deliver high-quality content and error-free, reliable web-based systems to PDE and Pennsylvania educators and students. Recognizing that quality is the most critical element of our business, we have developed and refined our quality system to ensure the highest level of quality and customer satisfaction will be provided to our clients.

DRC's quality assurance staff monitor web-based system development to ensure reliability, maintainability, usability, and adaptability.

Application Testing

DRC tests all system functionality prior to release for operational testing. The remainder of this section describes our software quality assurance and application testing approach. Upon award, we will thoroughly document the specific testing plan for Pennsylvania as well as the results of the application tests, and provide both the testing plan and subsequent results to PDE with sufficient time for PDE to review and request changes. We will demonstrate the final, fully tested version of the system to PDE prior to administration.

Software Quality Assurance

DRC is proud of the web-based systems that we have created in conjunction with many state departments of education over the years. Our commitment is to deliver high-quality content and error-free, reliable systems to Pennsylvania educators and students. Recognizing that quality is the most critical element of our business, we have developed and refined our quality approach to ensure the highest level of accuracy and customer satisfaction will be provided to our clients.

DRC's strategic quality approach begins at the initiation of an assessment program and continues through final reporting. This strategic quality approach safeguards DRC's requirements analysis processes, software design, development, integration, implementation, and support; and it ensures DRC's products and services are accurate and reliable.

DRC's quality values start with:

- Building quality into the requirements analysis, software development, and testing processes.
- Following a standardized methodology that focuses on the prevention of software and integration issues.
- Providing highly qualified and trained staff.

To achieve excellent quality, DRC’s Software Quality Assurance (SQA) staff will apply a proactive and integrated approach to industry-standard requirements management, software development, and quality assurance methodologies on the Pennsylvania assessments. These methodologies serve as ongoing guidelines during the entire software development life cycle. All requirements, software programming, test plans (unit and production), and procedures are thoroughly documented, reviewed, verified, and validated. The consistent application of the DRC quality methodologies provides:

- High-quality, flexible, and effective applications
- Accurate data
- Timely data delivery and reporting

Application Development Environments

DRC manages four distinct environments for our application development:

- Development environment
- Quality Assurance (QA) environment
- Pre-production environment
- Production environment

Our “best practices” process starts with programs created in the development environment, and then migrated to the quality assurance (QA) environment. In the QA environment, the Software Quality Assurance (SQA) group verifies the programs meet all our performance and usability requirements. Once the QA testing is successfully complete, the programs are sent to the pre-production environment. This environment, also known as Staging or User-Acceptance, mirrors the production environment, and allows software release candidates to be reviewed in their final state before deployment to production. Once approved in pre-production, software is deployed into the production environment. This methodology is supported by separate servers for each environment. The separate environments allow for development, testing, pre-production and production to happen concurrently, while not compromising any environment. As each phase is completed, the code is physically migrated to the appropriate location for the next step in the development cycle. The following figure depicts the migration environments and processes.

Application Testing and Quality Assurance for Online Testing

DRC’s online system testing and quality control processes leverage the best practices learned through our years of web-based system development. Our procedures ensure that our test software performs as expected; that tests are presented to students exactly as they were designed to do; that tests are scored accurately; and more. Prior to operational use, DRC’s quality assurance staff will perform full system-level tests in an independent test environment that simulates

the production configuration. Tests are run on all supported computer platforms and browsers and include comprehensive review of system functionality, usability, reliability, security, and overall performance. Systems content is also validated for accuracy during this process.

Our online testing system quality review processes include:

- **Editorial review**—A multi-step editorial review of all item computerized displays is performed, including graphs, charts, illustrations, and tables.
- **Install/uninstall testing**—Installation procedures (for the secure browser), software updates, and patches are fully tested prior to releases.
- **Unit testing**—System features are subjected to functional testing by the software development staff. At this stage, issues can be detected and corrected prior to release to the quality assurance staff.
- **System testing**—The system is validated against requirements by software quality assurance staff and subjected to full functional testing. This process includes verifying system accessibility, links, security, and performance. Issues can be detected and corrected prior to the final release.
- **Test decks**—DRC submits tests through the production systems to ensure all student responses are captured and accurately stored in a secure database environment. Each record in the database is independently verified against the test decks for validation. These test decks are custom configured by program to ensure that all program-specific requirements are being met by the online testing solution.
- **Performance and load testing**—Simulation of heavy loads on the system are performed to confirm that the solution will meet performance expectations.
- **Security testing**—Extensive tests are performed to ensure security requirements are being met on the system and user access is limited to the appropriate security level.
- **Platform testing**—The system is tested on all supported computer platforms and browsers to ensure consistent and reliable performance.
- **Large-scale simulations**—Cross-functional teams of 40–50 individuals perform exploratory tests on all enhancements to the online test client software to ensure usability and reliability across a wide range of usage scenarios.
- **Testing Site Manager (TSM) testing**—DRC verifies that the testing software interacts with a Testing Site Manager (TSM) when present in a school’s network to ensure efficient, uninterrupted testing for students.

- **Database accuracy**—Quality assurance staff perform extensive tests to ensure all data captured in the online system is stored in a secure database environment.
- **Scored data**—Quality checks are performed on the data to ensure that test scores have been computed correctly against the score keys and scoring requirements.
- **Independent PDE review**—The system will be provided to PDE for validation prior to the release to Pennsylvania educators and students.
- **Final production form reviews**—Conduct final review of production forms prior to use by students.

Below, we describe in greater detail our approach to performance/load testing and user acceptance testing.

Performance Testing

DRC conducts performance tests on measurable system components, allowing us to identify the contributing factors that affect performance. System performance tests are run on the following components/scenarios:

- **Open Browser:** Student clicks on the secure browser icon and waits for the landing page to load
- **Log into Student Info:** Student presses the Sign In button after entering username and password
- **Load Test:** Student clicks on the test name and waits for the test to fully load
- **Begin Test:** Student clicks on the Begin Test button and waits for the first item to be displayed
- **Insert Response:** Student moves from one item to another after entering a significant amount of response data (1000 characters). This also applies to multiple-choice item types where the number of characters would be one (1).
- **Reload Test:** After a student pauses and exits a test, load the test again. This is similar to Load Test, however, this will also load all of the student's previous responses.
- **Submit Test:** Student clicks the Submit Test button and waits for the next screen to appear.

Performance tests are based on the anticipated number of students who will test concurrently for a given assessment. **DRC repeatedly runs performance tests at three times the expected rate** to demonstrate our system will perform well above the required capacity without error. When evaluating expected loads, we also take

into account the effect of varying testing patterns throughout the administration window. For example, test loads are typically lower at the beginning of the test window, reach their peak mid-window, and fall off again at the end of the window. Tests loads also trend higher or lower on certain days of the week, and certain times of day. All of these criteria are factored into our performance load testing process to ensure we are prepared for every scenario.

4.J.1.b. Audit

DRC has worked closely with PDE over a number of years to help the Department meet the obligations of its internal auditors. Most recently, we collaborated with our PDE partners and the auditing team to define a plan to meet the requirements for a full system security audit of our INSIGHT testing platform. Through this collaborative effort, DRC has gained a broad understanding of the audit requirements of the Department. In the fall of 2014, we successfully facilitated a third-party security audit of INSIGHT that fully satisfied the auditor's requirements, and we are currently providing quarterly reports to detail the implementation of new processes.

DRC's experience with the initial implementation of this audit requirement positions us well to continue to deliver results that will meet the auditor's requirements. The security of our system and student data is of the utmost importance to DRC. To that end, DRC proposes to continue to use our business partner, TELOS, to provide a thorough and unbiased Service Organization Controls (SOC) report in complete compliance with the AICPA SSAE No. 16 and AICPA Guide standards. The report will continue to be delivered to the Department in the fall of each year and, if requested, DRC will provide quarterly reports to PDE. DRC has full confidence in the security of our INSIGHT testing platform and we have no hesitation with an audit process that lets us demonstrate to PDE the reason for that confidence.

4.J.1.c. Project Schedule

DRC will perform all work within the timelines described in the RFP and Appendices. DRC has created preliminary MS Project schedules for the PSSA, Keystone Exams, and CDT based on the information provided and our working knowledge of the programs. Our proposed schedules are provided in *Volume IV; Appendix O, Project Schedules and Hours by Task*, of this proposal. Also included in the same appendix is a chart indicating the number of person hours allocated to each task, as required by the RFP. As required, the schedules specify:

- **Key activities** related to LEAs such as ordering of materials, receipt of materials, test dates, return of materials, demographic clean-up window, release of individual student scores, final individual student, school and district score file release, and receipt of paper reports.
- **Key transfer/deliverable** dates between DRC and PDE related to development, production, shipping and receipt, administration of online assessments, scoring, data processing, reporting, psychometric activities, and any other activity required.

On the schedule, each deliverable and service has been clearly identified and accompanied by start and finish dates. Upon contract award, DRC's Pennsylvania Project Management Team, led by the **Pennsylvania Project Director, Ms. Shaundra Sand**, will review the master schedule in detail with PDE to ensure that all timelines are approved and that the schedule reflects the desired level of detail for each facet of development, administration, and scoring and reporting of the Pennsylvania assessments. The initial schedule will include deliverables and services from January 1, 2016 through the 2016-17 testing cycle (on or about October 31, 2017). The joint review of the preliminary schedule by DRC and PDE and PDE's approval of the final plan will occur by February 1, 2016. The resulting project plan will become a part of the contract. In each subsequent year of the contract, DRC will provide a preliminary program plan by April 1 with details for the following school year's testing cycle.

DRC utilizes Microsoft Project software company-wide to ensure all client timeline requirements are met. DRC's standard scheduling template requires that all handoffs between internal resource areas, the client, and subcontractors be specified in the schedule. The software enables DRC to track key milestones and deliverables, as well as to identify schedule risks early so that adjustments can be made before delivery dates are in jeopardy.

DRC will ensure that PSSA, Keystone, and CDT deliverables are:

- On time
- Within budget
- Aligned to PDE specifications
- Of the highest quality

For the Pennsylvania assessments, this approach means unparalleled internal and external communication regarding program scope, tasks, and requirements. It also means enhancement of the Pennsylvania Project Management Team's ability to accurately track progress toward the completion of each program task and activity.

Using Microsoft Project, the Pennsylvania Project Team will be responsible for maintaining the schedule and ensuring management of the following:

- Correctly identifying and communicating the tasks and deliverables.
- Tracking and communicating progress.
- Evaluating the status and availability of resources.

- Identifying project managers, resource managers, team members, and executives.

DRC has created preliminary MS Project schedules for the PSSA, Keystone Exams, and CDT based on the information provided in the RFP solicitation and our working knowledge of the Pennsylvania programs. Our proposed schedules are provided in *Volume IV; Appendix O, Project Schedules and Hours by Task* of this proposal. The proposed schedules include the requirements and specifications described in our proposal. The schedule includes the tasks, subtasks, beginning date, end date and the party/functional group responsible for each step in the process.

As previously discussed in our proposal, DRC's Pennsylvania Project Management Team will review the schedule in detail with PDE. The schedule will be used to ensure that all timelines are approved and that the schedule reflects the desired level of detail. The PDE/DRC joint review and PDE's approval of the project plan will occur within two weeks of the full execution of the contract. The resulting project plan will become a part of the contract. In each subsequent year of the contract, DRC will provide a preliminary program plan by April 1 with details for the following fiscal contract year (July 1–June 30).

Using MS Project, DRC will be responsible for maintaining the project schedule and ensuring management of the following:

- Correctly identifying and communicating the tasks and deliverables.
- Evaluating the status and availability of resources.
- Tracking and documenting project progress.
- Monitoring completion of all quality assurance checks.
- Communicating project status and decisions to all project stakeholders.

Joint monitoring of the project schedules will occur on an on-going basis. The status of all project tasks and deliverables will be reviewed during DRC project team meetings on a weekly basis. DRC understands that any schedule adjustments must allow for the on-time fulfillment of final deliverable dates. Any proposed adjustments are subject to PDE's approval and will not be implemented until such changes are discussed with PDE staff. DRC's Pennsylvania Project Management Team will ensure that the global schedule will be updated weekly and distributed to all team members.

DRC fully understands PDE's definition of a Testing Cycle and is keenly aware of all activities that lead to the products or services to be delivered to PDE, LEAs, or third-party vendors for a successful administration. To that end, DRC is pleased to present for PDE's consideration our proposed Milestone Schedules containing **Key Activities and Deliverables** for the PSSA, Keystone Exams, and CDT. Draft

milestone schedules of key activities and deliverables are presented on the following pages:

- PSSA Milestone Schedule
- PSSA Online Milestone Schedule
- Winter Keystone Exams Milestone Schedule
- Winter Keystone Exams Online Milestone Schedule
- Spring Keystone Exams Milestone Schedule
- Spring Keystone Exams Online Milestone Schedule
- Summer Keystone Exams Milestone Schedule
- Summer Keystone Exams Online Milestone Schedule
- CDT Online Milestone Schedule

Pennsylvania System of School Assessment Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|--------------------------------|---------------------------------------------------------------------|-------------------------------------|-----------------|-----------------|
| Student Data Collection | | | | |
| 1 | Districts/schools provide student enrollment counts via eDIRECT | LEA | 9/26/16–9/30/16 | 9/25/17–9/29/17 |
| 2 | DRC receives final PIMS file for precode labels | PIMS | 12/19/16 | 12/19/17 |
| 3 | Districts/schools establish online testing test sessions in eDIRECT | LEA | Begin 2/17/17 | Begin 2/26/18 |
| 4 | DRC receives accountability PIMS file | LEA | 5/19/17 | 5/21/18 |
| 5 | DRC receives accountability PIMS file for grade 11 | PIMS | 6/15/17 | 6/15/18 |
| Testing | | | | |
| 6 | Administration materials arrive at districts/schools | DRC—Materials Packaging | 3/3/17 | 3/9/18 |
| 7 | Secure materials arrive at districts/schools | DRC—Materials Packaging | 3/17/17 | 3/21/18 |
| 8 | ELA assessment | LEA | 4/3/17–4/7/17 | 4/9/18–4/13/18 |
| 9 | Mathematics assessment | LEA | 4/24/17–4/28/17 | 4/16/18–4/20/18 |
| 10 | Science assessment | LEA | 5/1/17–5/5/17 | 4/23/18–4/27/18 |
| 11 | Make-up window (all subjects) | LEA | 5/8/17–5/12/17 | 4/30/18–5/4/18 |
| Materials Processing | | | | |
| 12 | Document processing begins | DRC—Document Processing | 4/14/17 | 4/20/18 |
| 13 | Deadline for materials receipt at DRC for inclusion in reporting | LEA | 5/18/17 | 5/18/18 |
| Handscoring | | | | |
| 14 | Handscoring begins | DRC—Performance Assessment Services | 4/18/17 | 4/24/18 |
| 15 | All handscoring ends | DRC—Performance Assessment Services | 5/24/17 | 5/24/17 |
| Reporting | | | | |
| 16 | PSSA student attributions/demographic update window | LEA | 5/23/17–5/30/17 | 5/23/18–5/30/18 |
| 17 | PDE receives student files | DRC—Information Systems | 6/6/17 | 6/6/18 |
| 18 | PDE receives parent letters (online) | eMetric | 6/6/17 | 6/6/18 |

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|----|------------------------------------------------------------------------------------------------------|----------------------------------|-----------------|-----------------|
| 19 | PDE approves student files [and parent letters (online) —PSSA] | PDE | 6/8/17 | 6/8/18 |
| 20 | Student results are available—student performance files and parent letters | DRC—Information Systems; eMetric | 6/9/17 | 6/11/18 |
| 21 | Grade 11 attributions and match to master window | LEA | 6/26/17–6/28/17 | 6/26/18–6/28/18 |
| 22 | PASA 1% redistribution window | LEA | 7/5//17–7/7/17 | 7/3/18–7/6/18 |
| 23 | PDE receives accountability student file (grades 3–8 PSSA /grade 11 Keystone/grades 3–8 and 11 PASA) | DRC—Information Systems | 7/19/17 | 7/18/18 |
| 24 | District student data files are available | DRC—Information Systems | 7/20/17 | 7/19/18 |
| 25 | PDE receives SPP summary file | DRC—Information Systems | 7/24/17 | 7/23/18 |
| 26 | PDE receives SPP participation file | DRC—Information Systems | 7/24/17 | 7/23/18 |
| 27 | PDE receives summary files | DRC—Information Systems | 8/2/17 | 8/1/18 |
| 28 | PDE approves summary files | PDE | 8/9/17 | 8/8/18 |
| 29 | School and district summary reports are available in the field | DRC—Information Systems | 8/17/17 | 8/16/18 |
| 30 | PDE receives <i>Data Interaction</i> [™] (online) | eMetric | 8/11/17 | 8/10/18 |
| 31 | PDE approves <i>Data Interaction</i> [™] | PDE | 8/17/17 | 8/16/18 |
| 32 | <i>Data Interaction</i> [™] is available in the field | eMetric | 8/21/17 | 8/20/18 |
| 33 | PDE receives <i>preliminary</i> ISR sample set | DRC—Information Systems | 6/28/17 | 6/27/18 |
| 34 | PDE approves <i>preliminary</i> ISR sample set | PDE | 7/13/17 | 7/13/18 |
| 35 | Individual student reports (ISRs) arrive at districts/schools | DRC—Document Processing | 9/5/17 | 9/4/18 |
| 36 | PDE receives RFRM | DRC—Information Systems; eMetric | 9/18/17 | 9/17/18 |
| 37 | PDE approves RFRM | PDE | 9/20/17 | 9/19/18 |
| 38 | RFRM is available in the field | eMetric | 9/22/17 | 9/21/18 |

Pennsylvania System of School Assessment Online Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------|--------------|
| Online Form Production | | | | |
| 1 | Items are pulled into INSIGHT development environment for form creation | DRC—Information Systems | 1/4/17 | 1/10/18 |
| 2 | Items are reviewed in INSIGHT development environment | DRC—Quality Assurance, Information Systems | 1/12-1/27/17 | 1/18-2/2/18 |
| 3 | Forms are migrated to INSIGHT staging environment | DRC—Information Systems | 2/3/17 | 2/9/18 |
| 4 | Forms are reviewed in INSIGHT staging environment | DRC—Quality Assurance, Information Systems | 2/6-2/22/17 | 2/12-2/28/18 |
| 5 | Final forms and items are migrated to INSIGHT production environment | DRC—Information Systems | 3/1/17 | 3/7/18 |
| 6 | User-testing of forms is conducted in INSIGHT production environment | DRC—Test Development, Quality Assurance, Information Systems | 3/2-3/17/17 | 3/8-3/23/18 |
| 7 | Forms are automatically updated on all downloaded test engines (LEAs cannot access until start of testing window) | LEA | 3/20/17 | 3/26/18 |
| Online Testing Tools | | | | |
| 8 | INSIGHT Test Engine is available for PDE review | PDE | 11/18/16 | 11/28/17 |
| 9 | Online Testing User Guide is available on eDIRECT | DRC—Project Management | 2/17/17 | 2/26/18 |
| 10 | eDIRECT Test Setup is available for test session creation | LEA | 2/17/17 | 2/26/18 |
| 11 | INSIGHT Test Engine is available for download | LEA | 2/17/17 | 2/26/18 |
| 12 | Online Tools Training is posted on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 2/17/17 | 2/26/18 |
| 13 | Online Tutorials are available on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 2/17/17 | 2/26/18 |

Winter Keystone Exams Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|--------------------------------|-------------------------------------------------------------------------------|-------------------------------------|-------------------|-------------------|
| Student Data Collection | | | | |
| 1 | Districts/schools provide student enrollment counts via eDIRECT | LEA | 9/7/16–9/13/16 | 9/11/17-9/15/17 |
| 2 | DRC receives PIMS file | PIMS | 10/6/16 | 10/6/17 |
| 3 | Districts/schools establish paper/pencil test sessions in eDIRECT | LEA | 10/12/16–10/16/16 | 10/12/17-10/16/17 |
| 4 | Districts/schools establish online testing test sessions in eDIRECT | LEA | Begin 10/12/16 | Begin 10/12/17 |
| 5 | DRC receives accountability PIMS file | PIMS | 2/2/17 | 2/5/18 |
| Testing | | | | |
| 6 | Administration materials arrive at districts/schools | DRC—Materials Packaging | 11/2/16 | 11/1/17 |
| 7 | Secure materials arrive at districts/schools (WAVE I) | DRC—Materials Packaging | 11/17/16 | 11/16/17 |
| 8 | Secure materials arrive at districts/schools [WAVE II] | DRC—Materials Packaging | 12/19/16 | 12/21/17 |
| 9 | Algebra I, Biology, and Literature assessments (including make-ups) [WAVE I] | LEA | 12/5/16–12/16/16 | 12/4/17–12/15/17 |
| 10 | Algebra I, Biology, and Literature assessments (including make-ups) [WAVE II] | LEA | 1/9/17–1/23/17 | 1/8/18–1/22/18 |
| Materials Processing | | | | |
| 11 | Document processing begins | DRC—Document Processing | 12/16/16 | 12/15/17 |
| 12 | Deadline for materials receipt at DRC for inclusion in reporting | LEA | 2/2/17 | 2/1/18 |
| Handscoring | | | | |
| 13 | Handscoring begins | DRC—Performance Assessment Services | 12/17/15 | 12/19/17 |
| 14 | All handscoring ends | DRC—Performance Assessment Services | 2/14/17 | 2/13/18 |

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|------------------|------------------------------------------------------------------------------|----------------------------------|-----------------|----------------|
| Reporting | | | | |
| 15 | Keystone Exams match to PIMS/master and corrections window | LEA | 2/10/17–2/16/17 | 2/9/18–2/15/18 |
| 16 | PDE receives student files | DRC—Information Systems | 2/22/17 | 2/21/18 |
| 17 | PDE receives parent letters (online) | eMetric | 2/22/17 | 2/21/18 |
| 18 | PDE approves student files [and parent letters (online)—PSSA] | PDE | 2/28/17 | 2/27/18 |
| 19 | Student results are available—district student data files and parent letters | DRC—Information Systems; eMetric | 3/1/17 | 3/1/18 |
| 20 | PDE receives summary files | DRC—Information Systems | 3/14/17 | 3/13/18 |
| 21 | PDE approves summary files | PDE | 3/21/17 | 3/20/18 |
| 22 | School and district summary reports are available in the field | DRC—Information Systems; eMetric | 3/29/17 | 3/28/18 |
| 23 | PDE receives <i>Data Interaction</i> [™] (online) | eMetric | 3/23/17 | 3/22/18 |
| 24 | PDE approves <i>Data Interaction</i> [™] | PDE | 3/29/17 | 3/28/18 |
| 25 | <i>Data Interaction</i> [™] is available in the field | eMetric | 3/31/17 | 3/30/18 |
| 26 | PDE receives <i>preliminary</i> ISR sample set | DRC—Information Systems | 11/10/16 | 11/14/17 |
| 27 | PDE approves <i>preliminary</i> ISR sample set | PDE | 11/28/16 | 11/30/17 |
| 28 | Individual student reports (ISRs) arrive at districts/schools | DRC—Document Processing | 4/13/17 | 4/12/18 |

Winter Keystone Exams Online Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|----------------|---------------|
| Online Form Production | | | | |
| 1 | Items are pulled into INSIGHT development environment for form creation | DRC—Information Systems | 9/13/16 | 9/12/17 |
| 2 | Items are reviewed in INSIGHT development environment | DRC—Quality Assurance, Information Systems | 9/20-10/3/16 | 9/19-10/2/17 |
| 3 | Forms are migrated to INSIGHT staging environment | DRC—Information Systems | 10/7/16 | 10/6/17 |
| 4 | Forms are reviewed in INSIGHT staging environment | DRC—Quality Assurance, Information Systems | 10/10-10/21/16 | 10/9-10/20/17 |
| 5 | Final forms and items are migrated to INSIGHT production environment | DRC—Information Systems | 10/27/16 | 10/26/17 |
| 6 | User-testing of forms is conducted in INSIGHT production environment | DRC—Test Development, Quality Assurance, Information Systems | 10/27-11/10/16 | 10/27-11/9/17 |
| 7 | Forms are automatically updated on all downloaded test engines [LEAs cannot access until start of testing window] | LEA | 11/11/16 | 11/10/17 |
| Online Testing Tools | | | | |
| 8 | INSIGHT Test Engine is available for PDE review | PDE | 7/27/16 | 7/26/17 |
| 9 | Online Testing User Guide is available on eDIRECT | DRC—Project Management | 10/12/16 | 10/12/17 |
| 10 | eDIRECT Test Setup is available for test session creation | LEA | 10/12/16 | 10/12/17 |
| 11 | INSIGHT Test Engine is available for download | LEA | 10/12/16 | 10/12/17 |
| 12 | Online Tools Training is posted on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 10/12/16 | 10/12/17 |
| 13 | Online Tutorials are available on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 10/12/16 | 10/12/17 |

Spring Keystone Exams Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|--------------------------------|------------------------------------------------------------------------|-------------------------------------|-----------------------------|-----------------------------|
| Student Data Collection | | | | |
| 1 | Districts/schools provide student enrollment counts via eDIRECT | LEA | 11/10-11/16/16 | 11/13/17-11/17/17 |
| 2 | DRC receives final PIMS file for precode labels | PIMS | 1/31/17 | 2/2/18 |
| 3 | Districts/schools establish paper/pencil test sessions in eDIRECT | LEA | 3/6-3/10/17 | 3/5-3/9/18 |
| 4 | Districts/schools establish online testing test sessions in eDIRECT | LEA | Begin 3/6/17 | Begin 3/5/18 |
| 5 | DRC receives accountability PIMS file | PIMS | 6/14/17 | 6/14/18 |
| Testing | | | | |
| 6 | Administration materials arrive at districts/schools | DRC—Materials Packaging | 4/14/17 | 4/16/18 |
| 7 | Secure materials arrive at districts/schools | DRC—Materials Packaging | 4/28/17 | 4/30/18 |
| 8 | Algebra I, Biology, and Literature assessments (including make-ups) | LEA | 5/15-5/26/17 | 5/14-5/25/18 |
| Materials Processing | | | | |
| 9 | Document processing begins | DRC—Document Processing | 5/26/17 | 5/25/18 |
| 10 | Deadline for materials receipt at DRC for inclusion in reporting | LEA | 6/9/17 | 6/8/18 |
| Handscoring | | | | |
| 11 | Handscoring begins | DRC—Performance Assessment Services | 5/31/17 | 5/30/18 |
| 12 | All handscoring ends | DRC—Performance Assessment Services | 6/21/17 | 6/20/18 |
| Reporting | | | | |
| 13 | Keystone Exams 12 th grade graduation file provided to LEAs | DRC—Information Systems | 10 days prior to graduation | 10 days prior to graduation |
| 14 | Keystone Exams match to PIMS/master and corrections window | LEA | 6/19-6/23/17 | 6/22/18 |

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|----|---------------------------------------------------------------------------------|-----------------------------------------|-----------|-----------|
| 15 | PDE receives student files | DRC— Information Systems | 6/28/17 | 6/27/18 |
| 16 | PDE receives parent letters (online) | eMetric | 6/28/17 | 6/27/18 |
| 17 | PDE approves student files [and parent letters (online) —PSSA] | PDE | 7/6/17 | 7/3/18 |
| 18 | Student results are available—district student data files and parent letters | DRC— Information Systems; eMetric | 7/7/17 | 7/5/18 |
| 19 | PDE receives summary files | DRC— Information Systems | 7/20/17 | 7/18/18 |
| 20 | PDE approves summary files | PDE | 7/27/17 | 7/25/18 |
| 21 | School and district summary reports are available in the field | DRC— Information Systems; eMetric | 8/4/17 | 8/2/18 |
| 22 | PDE receives <i>Data Interaction</i> [™] (online) | eMetric | 7/31/17 | 7/27/18 |
| 23 | PDE approves <i>Data Interaction</i> [™] | PDE | 8/4/17 | 8/2/18 |
| 24 | <i>Data Interaction</i> [™] is available in the field | eMetric | 8/8/17 | 8/6/18 |
| 25 | PDE receives <i>preliminary</i> ISR sample set | DRC— Information Systems | 5/12/17 | 5/14/18 |
| 26 | PDE approves <i>preliminary</i> ISR sample set | PDE | 5/26/17 | 5/29/18 |
| 27 | Individual student reports (ISRs) arrive at districts/schools | DRC—Document Processing | 8/21/17 | 8/17/18 |

Spring Keystone Exams Online Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------|--------------|
| Online Form Production | | | | |
| 1 | Items are pulled into INSIGHT development environment for form creation | DRC—Information Systems | 2/28/17 | 2/28/18 |
| 2 | Items are reviewed in INSIGHT development environment | DRC—Quality Assurance, Information Systems | 3/7-3/20/17 | 3/7-3/20/18 |
| 3 | Forms are migrated to INSIGHT staging environment | DRC—Information Systems | 3/24/17 | 3/26/18 |
| 4 | Forms are reviewed in INSIGHT staging environment | DRC—Quality Assurance, Information Systems | 3/27-4/7/17 | 3/27-4/9/18 |
| 5 | Final forms and items are migrated to INSIGHT production environment | DRC—Information Systems | 4/13/17 | 4/13/18 |
| 6 | User-testing of forms is conducted in INSIGHT production environment | DRC—Test Development, Quality Assurance, Information Systems | 4/14-4/27/17 | 4/16-4/27/18 |
| 7 | Forms are automatically updated on all downloaded test engines [LEAs cannot access until start of testing window] | LEA | 4/28/17 | 4/30/18 |
| Online Testing Tools | | | | |
| 8 | INSIGHT Test Engine is available for PDE review | PDE | 1/6/17 | 1/5/18 |
| 9 | Online Testing User Guide is available on eDIRECT | DRC—Project Management | 3/6/17 | 3/5/18 |
| 10 | eDIRECT Test Setup is available for test session creation | LEA | 3/6/17 | 3/5/18 |
| 11 | INSIGHT Test Engine is available for download | LEA | 3/6/17 | 3/5/18 |
| 12 | Online Tools Training is posted on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 3/6/17 | 3/5/18 |
| 13 | Online Tutorials are available on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 3/6/17 | 3/5/18 |

Summer Keystone Exams Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016 | 2017 |
|--------------------------------|------------------------------------------------------------------------------|-------------------------------------|-----------------|-----------------|
| Student Data Collection | | | | |
| 1 | Districts/schools provide student enrollment counts via eDIRECT | LEA | 4/4/16–4/8/16 | 4/5/17–4/11/17 |
| 2 | DRC receives PIMS file | PIMS | 6/6/16 | 6/2/17 |
| 3 | Districts/schools establish paper/pencil test sessions in eDIRECT | LEA | 6/20/16–6/24/16 | 6/19/17–6/23/17 |
| 4 | Districts/schools establish online testing test sessions in eDIRECT | LEA | Begin 6/20/16 | Begins 6/19/17 |
| Testing | | | | |
| 5 | Administration materials arrive at districts/schools | DRC—Materials Packaging | 6/30/16 | 6/28/17 |
| 6 | Secure materials arrive at districts/schools | DRC—Materials Packaging | 7/12/16 | 7/14/17 |
| 7 | Algebra I, Biology, and Literature assessments (including make-ups) | LEA | 8/1/16–8/5/16 | 7/31/17–8/4/17 |
| Materials Processing | | | | |
| 8 | Document processing begins | DRC—Document Processing | 8/12/16 | 8/11/17 |
| 9 | Deadline for materials receipt at DRC for inclusion in reporting | LEA | 8/23/16 | 8/22/17 |
| Handscoring | | | | |
| 10 | Handscoring begins | DRC—Performance Assessment Services | 8/16/16 | 8/15/17 |
| 11 | All handscoring ends | DRC—Performance Assessment Services | 8/26/16 | 8/25/17 |
| Reporting | | | | |
| 12 | Keystone Exams match to PIMS/master and corrections window | LEA | 2/10/17-2/16/17 | 2/9/18-2/15/18 |
| 13 | PDE receives student files | DRC—Information Systems | 9/8/16 | 9/7/17 |
| 14 | PDE receives parent letters (online) | eMetric | 9/8/16 | 9/7/17 |
| 15 | PDE approves student files [and parent letters (online)—PSSA] | PDE | 9/14/16 | 9/13/17 |
| 16 | Student results are available—district student data files and parent letters | DRC—Information Systems; eMetric | 9/15/16 | 9/14/17 |

| ID | Description | Responsible Party | 2016 | 2017 |
|----|----------------------------------------------------------------|----------------------------------|----------|----------|
| 17 | PDE receives summary files | DRC—Information Systems | 9/28/16 | 9/27/17 |
| 18 | PDE approves summary files | PDE | 10/5/16 | 10/4/17 |
| 19 | School and district summary reports are available in the field | DRC—Information Systems; eMetric | 10/13/16 | 10/12/17 |
| 20 | PDE receives <i>Data Interaction</i> [™] (online) | eMetric | 10/7/16 | 10/6/17 |
| 21 | PDE approves <i>Data Interaction</i> [™] | PDE | 10/13/16 | 10/12/17 |
| 22 | <i>Data Interaction</i> [™] is available in the field | eMetric | 10/17/16 | 10/16/17 |
| 23 | PDE receives <i>preliminary</i> ISR sample set | DRC—Information Systems | 8/19/16 | 8/23/17 |
| 24 | PDE approves <i>preliminary</i> ISR sample set | PDE | 9/2/16 | 9/7/17 |
| 25 | Individual student reports (ISRs) arrive at districts/schools | DRC—Document Processing | 10/28/16 | 10/27/17 |

Summer Keystone Exams Online Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016 | 2017 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------|--------------|
| Online Form Production | | | | |
| 1 | Items are pulled into INSIGHT development environment for form creation | DRC—Information Systems | 5/17/16 | 5/15/17 |
| 2 | Items are reviewed in INSIGHT development environment | DRC—Quality Assurance, Information Systems | 5/24-6/6/16 | 5/22-6/2/17 |
| 3 | Forms are migrated to INSIGHT staging environment | DRC—Information Systems | 6/10/16 | 6/8/17 |
| 4 | Forms are reviewed in INSIGHT staging environment | DRC—Quality Assurance, Information Systems | 6/13-6/24/16 | 6/9-6/22 |
| 5 | Final forms and items are migrated to INSIGHT production environment | DRC—Information Systems | 6/30/16 | 6/28/17 |
| 6 | User-testing of forms is conducted in INSIGHT production environment | DRC—Test Development, Quality Assurance, Information Systems | 7/1-7/15/16 | 6/29-7/14/17 |
| 7 | Forms are automatically updated on all downloaded test engines [LEAs cannot access until start of testing window] | LEA | 7/18/16 | 7/17/17 |
| Online Testing Tools | | | | |
| 8 | INSIGHT Test Engine is available for PDE review | PDE | 3/24/16 | 3/22/17 |
| 9 | Online Testing User Guide is available on eDIRECT | DRC—Project Management | 6/20/16 | 6/19/17 |
| 10 | eDIRECT Test Setup is available for test session creation | LEA | 6/20/16 | 6/19/17 |
| 11 | INSIGHT Test Engine is available for download | LEA | 6/20/16 | 6/19/17 |
| 12 | Online Tools Training is posted on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 6/20/16 | 6/19/17 |
| 13 | Online Tutorials are available on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 6/20/16 | 6/19/17 |

CDT Milestone Schedule (Draft)

| ID | Description | Responsible Party | 2016–2017 | 2017–2018 |
|-------------------------------|-------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------|--------------|--------------|
| Online Form Production | | | | |
| 1 | Items are pulled into INSIGHT development environment for form creation | DRC—Information Systems | 6/2/16 | 6/1/17 |
| 2 | Items are reviewed in INSIGHT development environment | DRC—Quality Assurance, Information Systems | 6/10-6/23/16 | 6/8-6/21/17 |
| 3 | Forms are migrated to INSIGHT staging environment | DRC—Information Systems | 6/30/16 | 6/28/17 |
| 4 | Forms are reviewed in INSIGHT staging environment | DRC—Quality Assurance, Information Systems | 7/1-7/15/16 | 6/29-7/14/17 |
| 5 | Final forms and items are migrated to INSIGHT production environment | DRC—Information Systems | 7/22/16 | 7/21/17 |
| 6 | User-testing of forms is conducted in INSIGHT production environment | DRC—Test Development, Quality Assurance, Information Systems | 7/25-8/5/16 | 7/24-8/4/17 |
| 7 | Forms are automatically updated on all downloaded test engines [LEAs cannot access until start of testing window] | LEA | 8/8/16 | 8/7/17 |
| Online Testing Tools | | | | |
| 8 | INSIGHT Test Engine is available for PDE review | PDE | 4/13/16 | 4/11/17 |
| 9 | Online Testing User Guide is available on eDIRECT | DRC—Project Management | 7/12/16 | 7/10/17 |
| 10 | eDIRECT Test Setup is available for test session creation | LEA | 7/12/16 | 7/10/17 |
| 11 | INSIGHT Test Engine is available for download | LEA | 7/12/16 | 7/10/17 |
| 12 | Online Tools Training is posted on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 7/12/16 | 7/10/17 |
| 13 | Online Tutorials are available on eDIRECT and within the INSIGHT Test Engine | DRC—Information Systems | 7/12/16 | 7/10/17 |

4.J.1.d. Ongoing Communication

DRC's hallmark in the testing industry is our collaborative, cooperative, and responsive service to our clients. DRC considers itself a partner with our clients in our efforts to enhance and contribute to the quality of education available to all students.

Our **Pennsylvania Project Director, Ms. Shaundra Sand**, will be in frequent communication with PDE and will be authorized and prepared to respond quickly to inquiries. She has extensive experience working closely with staff from state agencies and is qualified, experienced, and capable of providing timely assistance to PDE. Ms. Sand will carry an iPhone that will enable her to respond to PDE staff in a timely manner through either telephone or email.

Ms. Sand will provide immediate notification to PDE of critical issues or risks that arise in the project. **DRC's commitment is to be a trusted advisor that PDE can rely on for support and counsel regarding all aspects of this program.** Her proactive project management approach will ensure that the development and administration of the Pennsylvania assessments will not be hindered or delayed by unforeseen issues or complications. In addition to Ms. Sand's availability, DRC will provide reliable and timely customer service support to respond to district assessment coordinators' questions or concerns. Customer service support will be available throughout the duration of the contract and will include a toll-free customer service telephone number, email address, and fax number. Further details regarding our customer service processes are available under *Subheading 4.M., Customer Service*.

DRC's proposal includes all costs related to telephone calls, telephone conference calls, emails, texts, overnight courier service, facsimile correspondence, and other communication procedures related to project fulfillment. DRC will provide a toll-free telephone number, fax number, and email address for districts to use regarding the PSSA and Keystone Exams. A separate toll-free telephone number will be established to support the CDT program. DRC will also provide and pay for all conference calls and webinars associated with this contract.

At PDE's request, DRC will make available all written communication or summaries of communications with our subcontractors on this contract. DRC further recognizes that PDE reserves the right to participate during all appropriate and applicable meetings and trainings between the DRC and any of our subcontractor(s) identified in this proposal. Finally, copies of all correspondence sent by DRC to local school district personnel will be reviewed and approved by PDE prior to being sent to district personnel.

4.J.1.d.i. Timeliness of Communication

To ensure that communication from PDE to DRC be addressed in a timely fashion, several members of DRC's Pennsylvania Project Management Team, Ms. Sand, Mr. Chris Schiller, and Mr. Kevin Trenholm, will carry iPhones that

will enable them to quickly respond to PDE staff either by telephone or email. They will return urgent calls from PDE staff and respond to email messages as quickly as possible, and by no later than 5:00 p.m. Eastern Time. During time periods when Ms. Sand, Mr. Schiller, or Mr. Trenholm will not be available to take calls and return messages, PDE will be notified in advance and provided with alternate contact information. A project communication plan, containing contact lists and routing protocols will be created for the PSSA, Keystone Exams, and CDT programs and provided to PDE as one of DRC's standard project management tools.

4.J.1.e. Weekly Meetings

For the PSSA, Keystone Exams, and CDT programs, Ms. Sand and her team will work with PDE to schedule, coordinate, and participate in weekly status meetings with PDE staff. To supplement face-to-face meetings, the weekly status meetings will be held via teleconference or WebEx, depending on which method is preferred by PDE and will be most conducive to a successful meeting. We understand that the weekly status meetings will continue for as long as PDE desires. Ms. Sand will work with PDE to ensure the focus of each meeting is appropriate given where the project is in its yearly cycle and that the necessary DRC and subcontractor team members are prepared to participate.

Early weekly meetings will focus on ensuring all activities associated with this new contract are clearly understood by all parties, and PDE preferences for conducting and documenting meetings are established. Subsequent meetings will focus on the progress of tasks and activities relevant to the assessment cycle at those points in time. Prior to each meeting, Ms. Sand will collaborate with PDE to identify topics and draft a meeting agenda for PDE review and approval. The weekly Problem Identification Report will be included as a permanent item on the agenda (please see *Subheading 5.B., Problem Identification Report* for more information). DRC will distribute the PDE-approved agendas to meeting participants no later than 24 hours prior to each meeting. Detailed notes and lists of participants for all meetings will be recorded and distributed to PDE and all DRC and subcontractor project team members within two business days of the conclusion of each call.

As needed, other periodic or on-going conference calls will be scheduled and conducted with PDE's approval. For these ad-hoc or recurring conference calls, DRC will distribute PDE-approved agendas to meeting participants no later than 24 hours prior to each meeting. Detailed notes and lists of participants for all meetings will be recorded and distributed by DRC to PDE and all DRC and subcontractor project team members within two business days of the conclusion of each call.

4.J.1.f. Management Meetings

Effective collaboration requires productive meetings. Whether in person or through teleconferencing, DRC's Project Management professionals are highly skilled in facilitating such meetings.

DRC understands that a periodic planning meeting will occur throughout the life of the contract and will include DRC team members, PDE staff, and, as appropriate, other DRC subcontractor staff. DRC's proposal includes costs for six planning/work sessions in the first two years of the contract period, with three of these meetings occurring in Harrisburg, Pennsylvania, and the other three at the DRC's headquarters in Minnesota. Beginning in year three of the contract, there will be four planning/work session meetings per year, with two meetings held in Harrisburg and two meetings in subsequent years, with one in Harrisburg. DRC will be responsible for all travel, lodging, and meals for up to six PDE staff to attend the meetings held in Minnesota.

DRC will be responsible for planning, coordinating, and covering the costs associated with all planning and management meetings. We will work closely with PDE to ensure the focus of each meeting is appropriate that the proper Pennsylvania team members, including subcontractor staff, are prepared to participate. Early management meetings will focus on ensuring all activities associated with this contract are clearly understood by all parties and that PDE preferences for conducting and documenting meetings are established. Subsequent meetings will focus on the progress of tasks and activities relevant to the assessment cycle at those points in time.

Prior to each meeting, DRC will collaborate with PDE to identify topics and draft a meeting agenda for PDE review and approval. The DRC Pennsylvania Program Management Team will ensure that detailed notes and lists of participants for all meetings are recorded. Meeting notes and records of participants will be submitted to the PDE for review and approval within one week of the conclusion of each meeting.

This regular meeting schedule will **promote success** for the Pennsylvania assessments and ensure **continuous program improvement**. Please see *Volume IV; Appendix K, Travel and Meeting Specifications* for detailed information regarding all meetings required for the PSSA, Keystone Exams, and CDT programs.

4.J.1.g. Technical Assistance to PDE

DRC and our subcontractors stand ready to provide technical assistance to PDE as part of our commitment to the success of the PSSA, Keystone Exams, and CDT programs. DRC's proposal includes the following technical support services:

- Third-party equating verification for the PSSA and the Keystone Exams, provided by eMetric;

- Training of PDE staff, psychometric consulting, and hosting of the PSTAT website.
- Organization and facilitation of the Assessment and Educator Effectiveness Technical Advisory Committee (TAC) meetings and ad-hoc technical assistance, provided by the Center for Assessment.

For the **Assessment Technical Advisory Committee meetings**, DRC will be responsible for reserving the meeting location (including IT capabilities), TAC member honoraria, travel, lodging and meals. Three TAC meetings will be conducted in Harrisburg, PA, each year to cover the state assessments. These meetings will be approximately three days in length, depending on the agenda. DRC's costs are based on the assumption of six TAC members with each TAC member receiving an honoraria fee of \$1,500 per day plus their travel, lodging and meals. DRC will provide appropriate representatives from DRC and its subcontractors to attend the TAC meetings and to participate in phone conferences with the TAC, upon request from the PDE.

For the **Educator Effectiveness TAC meetings**, DRC will be responsible for reserving the meeting location (including IT capabilities), TAC member honoraria, travel, lodging and meals. Three Educator Effectiveness TAC meetings will be conducted in Harrisburg each year to cover the state assessments. These meetings will be approximately three days in length, depending on the agenda. DRC's costs are based on the assumption of five TAC members receiving an honoraria fee of \$1,500 per day plus their travel, lodging and meals. DRC will provide appropriate representatives from DRC and its subcontractors to participate in phone conferences with the TAC, upon request from the PDE. In the RFP Questions and Answers, PDE indicated that it will not be necessary for DRC staff to attend Educator Effectiveness TAC meetings. Therefore, DRC has not included costs for staff travel and attendance. In the future, should the need arise, DRC stands ready to assist the PDE by sending staff to these meetings.

DRC will work closely with PDE and the Center for Assessment to plan and participate in TAC meetings. DRC will provide clearly stated inquiries and supporting background materials in a timely fashion for review by PDE and the TAC prior to TAC meetings. DRC understands that all psychometric processes, including test design, scaling, equating, standard setting, and validation procedures must go before the TAC for review and must receive PDE approval, as is the procedure followed under our current contract with PDE. DRC will be responsible for preparing, printing and distributing the final documents at each TAC meeting, as well as arranging for the secure disposal of confidential/secure meeting documents, when appropriate. The Center for Assessment will be responsible for taking minutes and distributing meeting summaries to PDE and TAC members within two weeks following each TAC meeting.

Please see *Volume IV; Appendix K, Travel and Meeting Specifications* for additional details regarding the TAC meeting arrangements.

4.J.1.h. Invoices

DRC will provide a monthly payment schedule for services performed and deliverables provided for PDE approval. After the payment schedule is approved, DRC will submit monthly invoices according to the procedures and requirements set forth by PDE. With each invoice, DRC will provide a status report indicating all tasks completed during the pay period covered by the invoice. PDE approval of each invoice and status report will be required before payment is issued to DRC.

DRC understands PDE's request for a year-end reconciliation of the Manufacturing/Shipping/Distribution and Receiving/Scanning/Editing/Scoring line items to account for unexpected overages or shortfalls in the number of booklets produced in relation to the estimated numbers provided by PDE in the RFP worksheets. DRC has a substantial amount of experience processing such reconciliations for PDE in the past to account for quantity shifts related to PSSA online testing participation and the requirement for all 11th-grade students to participate in the Keystone Exams. DRC will work with PDE each year to compare the actual booklet production and processing counts against those estimated in this RFP and will promptly process all necessary reimbursements.

DRC understands that PDE's fiscal year runs from July 1 to June 30. DRC will provide a final report that provides a review of each phase of the assessment program and includes recommendations for improvement, as well as completion of all tasks outlined in the RFP, the Proposal, and the Revised Budget Summary with the final invoice for each fiscal year. The report accompanying the final invoice of the fiscal year will be marked "Final" and is subject to PDE approval prior to payment. The final report and the invoice will be provided to PDE on or before August 1 of each year. DRC acknowledges that the funds for payment of this contract are set aside on a fiscal year basis and failure to complete all tasks as outlined in the contract and failure to submit a final invoice by the stipulated deadline will result in the loss of state appropriated funds for this payment and, consequently non-payment.

4.J.1.i. Risk Management

DRC recognizes **that managing risks is crucial to the success of a large-scale assessment program**. Our thorough and stringent quality assurance plan helps mitigate risks, or avoid them altogether. Please see *Subheading 4.J.1.a., Quality Assurance (QA) and Quality Control* and *Volume IV; Appendix L, Quality Control Plan* for the detailed quality assurance steps performed by DRC at each stage of the assessment cycle. DRC's approach to risk planning is based on proactive planning to prevent and mitigate risks to all project elements before they can escalate into project issues, which can impact scope, schedule, cost, and/or quality.

DRC's project staff undergoes extensive risk management training, covering topics such as identifying and managing risks, risk probability and impact, risk response strategies, and documenting risks. This training enables our staff to identify, analyze, control, and mitigate project risks in advance. DRC's Pennsylvania

Project Director, Ms. Shaundra Sand, will function as the risk manager for all work performed on the Pennsylvania assessments, by DRC or our subcontractors. Working with the project team, Ms. Sand will develop the project work breakdown, scope of work agreements, and a Risk Register. She will schedule and oversee risk reviews, in conjunction with other DRC and PDE staff and our subcontractors.

Ms. Lisa Peterson-Nelson, DRC's Chief Quality Officer, will also provide support to the risk management process, providing an additional level of program security; please see *Section 5, Personnel*, for more information on Ms. Peterson-Nelson.

DRC is confident that our project risk management process and experience will enable us to meet all contract deliverables and timelines. DRC's formal Project Risk Management Process includes:

- **Risk Management Planning**—Determine resource and time requirements and establish an agreed-upon basis for evaluating program risks.
- **Identification of Risk**—Identify risks throughout the project life-cycle and record them in the project's Risk Register. Methods for risk identification include brainstorming with project team members and other experts, and interviewing experienced project participants and stakeholders.
- **Qualitative and Quantitative Risk Analysis**—Analyze project elements to determine the greatest risks to successful completion of the project. Qualitative Analysis ranks the identified risks for further action using a Probability and Impact (P & I) scale. Quantitative Analysis determines the effect of impact of a risk through numerical/statistical analysis; usually stated in terms of cost and/or schedule impact.
- **Risk Response Planning**—Respond to possible risks by developing contingency plans, and identifying risk minimization activities and ways to avoid a risk altogether. Risk response strategies can include Avoidance, Transference, Mitigation, and Acceptance.
- **Risk Monitoring and Control**—Identify, analyze, plan, and monitor newly arising risks and update the project team throughout the contract.

DRC's project managers understand that risk analysis is not optional, but rather a critical management process that will directly affect the success of the project. By taking ownership of project risks and encouraging discussion of risks, DRC's Pennsylvania Project Team will ensure a well-run and high-quality program for PDE. A DRC Risk Register sample is located in *Volume IV; Appendix M, Sample Risk Management Plan* of this proposal.

4.K. Online Training

In conjunction with DRC's plan to continue to develop, host, and maintain the current PSTAT online test administrator training module, DRC will also collaborate with PDE and our partner, eMetric, to expand the current website or produce a new Learning Management System (LMS) to include functionality for District Assessment Coordinator and School Assessment Coordinator (DAC/SAC) training.

DRC completely understands the critical role of the DACs and SACs in the successful administration and handling of each assessment. To that end, DRC has worked side-by-side with PDE for many years to develop meaningful and thorough assessment handbooks and administration training presentations. In collaboration with PDE, we will utilize our extensive knowledge of the most important elements from those sources to produce an online training website that meets PDE's expectations and requirements. The LMS will present the coordinators' specific responsibilities, as detailed in the Handbook for Assessment Coordinators, in a format that is clear, concise, interactive, and easy to use. DRC annually updates all handbooks and administration training presentations with input from PDE, and the same approach will be taken with this LMS to ensure that all training provided is current and accurate.

DRC successfully transitioned oversight of the current PSTAT website from PDE to DRC in the fall of 2014. Through the transition and the live administration, DRC has gained unparalleled experience and knowledge in supporting such a system with both technical and customer service support. This experience has provided us a unique insight into the expectations of the field and PDE and positions us as the most capable and prepared to expand the website.

Although the RFP does not specifically address the tracking of participation or successful completion, DRC understands the importance of such elements in a module that will play a critical role in ensuring that DACs and SACs have received the information they need. We are proposing to utilize the same eMetric test delivery platform that will be used for the test administrator training site, iTester3. Using this platform will allow an expansion of the website to include registration, role-based content access, test delivery, certification, and user management for the DAC/SAC training. This would make it possible for DACs and SACs to complete their administration training via an online system that fully tracks their participation, gauges their readiness, and reports their successful completion. Upon award, DRC looks forward to collaborating with PDE and eMetric to design an LMS through which PDE can gain visibility, expedience, and assurance of thorough DAC/SAC training.

4.L. Website

As described in *Subheading 4.D.1., Online Ordering and Tracking System*, DRC eDIRECT is a configurable, secure, web-based system that seamlessly integrates the tools and resources needed by test coordinators, test administrators, and other agency personnel to coordinate and administer assessments, access program communications and resources, and monitor student performance. The eDIRECT portal will provide LEAs with secure access to important program correspondence, documents, reports, training materials, and other materials approved by PDE.

4.M. Customer Service

DRC takes great pride in our customer satisfaction, and this attitude will be apparent as we respond to both the needs and requests of the Commonwealth and Pennsylvania assessment coordinators. In order to ensure customer satisfaction, DRC will provide experienced, responsible, informed, and responsive personnel who understand all dimensions of testing programs and who are in a position to act decisively to resolve project challenges.

Mr. Niall Finn, Customer Service Manager, will oversee the customer service function for the PSSA, Keystone Exams, and the CDT. Mr. Finn will provide high-level oversight to ensure all Pennsylvania Project Team members have the resources and information necessary to support PDE and Pennsylvania’s districts and schools.

DRC will provide reliable and timely customer service and technical support to respond to PDE, district, and school staff questions or concerns. DRC has extensive experience managing high caller traffic; during peak assessment periods, the Pennsylvania Project Team often receives and resolves over 1,000 calls each week. Each of these callers receives prompt, responsive, personalized service from our customer service staff, each of whom is dedicated to the Pennsylvania Project Team, rather than in a central “call center.” Unlike many testing companies that employ automated calling systems, which can strain the patience of school personnel, DRC assures PDE that a trained member of the Pennsylvania Project Management Team will answer all calls directly. **We enjoy getting to know our customers and welcome the opportunity to satisfy every call made by an assessment stakeholder.**

DRC will provide a toll-free telephone number, fax number, and email address for districts to use regarding the PSSA and Keystone Exams. A separate toll-free telephone number has been available for a number of years to support the CDT program; however, it’s important to note that DRC’s customer service team will answer questions about any Pennsylvania assessment from either toll-free number—callers are not transferred to the CDT line if they call the PSSA/Keystone line with a CDT question. The customer service team will be available to support PDE, districts, and schools throughout the whole year. Trained staff will be available from 7:30 a.m. to 4:00 p.m. Eastern Time each day. For two weeks prior to the PSSA and Keystone test windows, through the entire test window, and for two weeks following each test administration, DRC phone and email support will be available from 7:00 a.m. to 6:00 p.m. Eastern Time on all work days.

We manage our staff’s schedules so that the customer service line is constantly supported by a “live” person during the time determined by the program. Our

DRC’s Customer Service Representatives are:

- Client-focused, experienced, courteous, and responsive.
- Knowledgeable of all dimensions of testing programs.
- Resourceful and able to resolve project challenges.

customer service function is organized such that only staff trained in the Pennsylvania assessments will respond to calls. Customer service staff will provide consistent and immediate response to callers through the use of a customer service database. This database will track all customer contacts and includes functionality to record all of the activity from the initial contact through the resolution for issues or questions that require additional research and follow up. The database can be used to produce reports for PDE regarding all calls received, as well as frequency reports organized by call topic. This information is valuable in reviewing performance and identifying areas for improvement in subsequent administrations.

Lines will be staffed so that the average wait time is less than 20 seconds. Customer Service Representatives (CSRs) will work to resolve district requests and questions within the same business day or by the caller's requested timeline. Callers with complex issues will receive regular status updates until resolution is complete. Calls regarding policy will be identified and forwarded to PDE for resolution. In extremely rare cases, if no CSRs are available, callers will be able to leave voicemail messages. Such calls received during staffed hours will be returned within one hour or less. During the test window, and during the two weeks before and after each test window, calls will be returned within 30 minutes. Messages left outside of the staffed hours will be returned immediately upon staff returning on the following business day. DRC will immediately contact the appropriate PDE staff in the event of a sensitive or urgent issue.

In the unlikely event that telephone service is interrupted, DRC will email PDE and assessment coordinators that telephones are down and will send another email once service has been restored. CSRs will also have access to cell phones during emergency situations. DRC will track all customer interactions, from initial contact through issue resolution, providing consistent and immediate response to callers. If requested, DRC will provide PDE with a weekly report that summarizes the numbers and types of contacts, corresponding responses, and resolution wait times. Samples of DRC's customer services monitoring tools and reports are included in *Volume IV; Appendix P, Customer Service Supporting Documentation*.

In addition to the toll-free customer service number, email address, and fax number, the following communication links will be available throughout the duration of the contract:

- Access to information on enrollment and registration, materials delivery and collection, inventory methods, test administration, and packaging materials for return.
- A process for districts to order additional materials as needed after the initial shipment.
- A system for tracking the delivery and return of materials and the delivery of reports.

The DRC customer service team will initiate email communication to inform districts and schools of important program developments and to remind them of

upcoming deadlines and deliverables. Any such correspondence will be reviewed and approved by PDE.

As part of customer service training, PSSA, Keystone Exams, and CDT program manuals will be developed that include a list of frequently asked questions (FAQs), a program overview, deadlines, etc. Customer Service Representatives will receive regular, immediate assessment information updates in order to provide accurate service to callers. The manuals and FAQ documents will also be updated accordingly. CSR performance and accuracy will be monitored via direct supervision and district/state feedback; re-training will be provided as necessary.

Technical Support

Using the toll-free telephone numbers, fax numbers, and email addresses and hours of operation described above, trained DRC staff working specifically on the Pennsylvania assessments will provide first-level technical support, end user support, and Help Desk support associated with the computer-based test administrations. This includes technical support for the software installation and computer set-up for testing. For questions requiring specialized technical support, the Pennsylvania Customer Service Team will refer inquiries to the Pennsylvania Production Support Team. This internal DRC team is responsible for operational configuration of the systems utilized for each project, and provides the second level of support when users call in with issues on the system. Members of the Production Support Team are very involved in the direction and decisions made by the Pennsylvania Project Management Team in order to provide effective configuration and support. Members of this team have extensive experience as technology experts in school districts of all sizes. This background makes their ability to support the districts and schools even more valuable. They are co-located with DRC's project management staff and are readily available to answer questions and support DRC's online testing projects.

Customer Service and Technical Support Testimonials

DRC has attained a reputation for providing a level of customer service that is superior to any other testing organization. **Our clients appreciate our dedication, commitment, and quick responses;** Alaska, Louisiana, Pennsylvania, and South Carolina assessment coordinators will readily attest to our client-focused, professional, and personal service. Recently, DRC received the following letter of recommendation from Dr. Uma Jayaraman, the Assessment Development Coordinator for the School District of Philadelphia.



THE SCHOOL DISTRICT OF PHILADELPHIA
OFFICE OF CURRICULUM & ASSESSMENT

440 North Broad Street, Suite 211

Philadelphia, PA 19130

Uma Jayaraman, Ed. D
Assessment Development Coordinator

Tel: 215-400-6546
Fax: 215-400-4212

February 28, 2014

To Whom It May Concern:

Philadelphia City School District is the largest school district in the state of Pennsylvania and the nation's 7th largest school district. I have worked as the District's Assessment Development Coordinator since 2001 (except for 2003-5). In this capacity I am responsible, along with my colleague Jeff Robinson who has been in this position for 4 years, for the administration of the PSSA and Keystone Examinations to our large population of students (210, 000 - 135, 000 over these years) and the enforcement of state and federal policies governing the administration of these high stakes tests.

To execute my functions in the above capacity, I have to work very closely with the Data Recognition Corporation (DRC). In my more than a decade of association with DRC, I cannot recall a single instance when DRC did not answer my question or resolve our issues satisfactorily.

Being so large, we have unique challenges and DRC never shirked from going out of its way, if necessary, to accommodate our needs and provide additional assistance and supports to get our work done on time. There are over 250 schools in the school district, each with a test coordinator that works closely with the district coordinator. The test coordinators communicate with DRC's customer service all the time with questions big and small. Not one of them has communicated any complaints or negative comments regarding their experiences dealing with DRC's customer service representatives.

DRC, along with the PDE, conducts Test Coordinators' Trainings for us annually. They deliver the materials and the presentation in a professional manner, on time, and answer all the questions from the audience. Their web portal, eDirect, is quite versatile and user-friendly that even our novice test

coordinators (1/2 to 1/3 of our test coordinators are new every year) find easy to navigate. Their information products such as videos, manuals, and other documents are easy to understand and are available in good time.

This recommendation will not be complete without a mention being made of Kevin Trenholm, DRC's Project Manager for Pennsylvania. In spite of heavy demands on his time, Kevin is always accessible. He has a great understanding of all the aspects of test administration, including technical, educational and personnel related. He is a problem-solver and a great person to work with. If a problem unique to Philadelphia City arose, rather than quoting the limitations of the contract, he will find ways to solve the problem. This occasionally involved working with DRC's developers to do something they had never done before.

Needless to say, I recommend the delivery of DRC's service in the highest terms and ardently hope that our association with DRC continues as we move forward to a new and challenging phase in the delivery of assessments.

Sincerely,

Uma D. Jayaraman
ujayaraman@philasd.org

The following recent quotes are representative of the numerous comments DRC has received from Pennsylvania district staff.

Pennsylvania

“You guys are amazing!! Thank you for the quick response. You make me look good to my district.”

“One more thing...I'd just like to say thanks to everyone in the customer service dept at DRC. We really appreciate your very timely responses when it comes to PSSA and CDT testing. Please convey our sincere appreciation of your customer service efforts to the other folks at DRC!”

“I cannot thank you guys enough for the fantastic support given me today during the load of my school’s students for the Keystone exam. I misread the required date for upload to PIMS. It would have been a major effort to bubble up all the 143 effected students. Your assistance saved us uncountable man-hours of work effort. I especially appreciated your patience in the numerous calls I had to make to get the students loaded. Each of you are to be commended for exceptional customer service!!!!!!”

“I just wanted to let you know how much I appreciate DRC’s quality customer service with all of the PSSA processes. DRC does such a great job with everything from data entry, training, attributions, test administration, reporting, etc. We could not ask for a better publisher. The customer service is beyond compare, trust me, I know. I work with many publishers and I wish we could use DRC for ALL of our testing needs. People often complain and send comments when they are not pleased with a customer, but I just wanted to take this opportunity to let you know how PLEASED we are with the services provided by ALL of the staff of DRC. I know how difficult it can be to work with some of our schools, but your staff always does it with such grace and patience.”

4.N. Turnover Tasks

Transitioning to a new vendor can be a risky endeavor for all parties involved. DRC's approach to mitigating this risk centers on our **determination to forge a strong partnership with our clients through communication and sharing of requirements and goals for their assessments**. Over the past several years, DRC has successfully transitioned many assessment programs for states such as Idaho, Ohio, Oklahoma, and Washington. Because DRC is the incumbent vendor for the PSSA, Keystone Exams, and the CDT, a beginning contract transition would be unnecessary. As a result, PDE will not experience any additional costs from DRC that another vendor would need to include in the first year for contract transition. Additionally, districts and schools would continue to follow familiar procedures, thus reducing their work burden while reducing overall program risk that can result from introducing a new vendor.

DRC understands that a project transition must be planned for the end of the contract and therefore has detailed in the following section our standard procedures related to contract transition and turnover tasks in the following Turnover Plan.

DRC'S TURNOVER PLAN

Introduction

DRC's first step in project transition is to create a checklist of deliverables. We have learned from experience that it is helpful to include as much detail as possible identified in these checklists, including expected format for delivery of files and documents (electronic vs. hard copy, file type, etc.). A standard list of the contract transition deliverables is included at the end of this section. The final transition deliverables for the PSSA, Keystone Exams, and CDT will be finalized with PDE upon contract award.

We also believe that having face-to-face transition meetings between the new contractor, PDE, and the previous contractor can be extremely helpful for all parties involved. The meeting should take place after the checklist has been developed and shared with the previous vendor. This allows the meeting to be focused on understanding everything that must be accomplished during the transition process and the parties responsible for each transition task, rather than requests for information.

DRC has found that good communication and thorough documentation is essential to a successful transition. DRC ensures that our state department clients are involved in any communication between our staff and other contractors. PDE will be copied on all emails and written correspondence, and participate in any phone or in-person meetings. This is an absolute necessity to guarantee that PDE is not caught off-guard by any requests for information or possible challenges that arise during the transition. In addition, DRC will ensure that any documents and data files exchanged between DRC, PDE, other contractors, and other entities as

requested by PDE are transferred using secure, high-quality data exchange procedures.

Steps of the Turnover Plan

At the end of this contract, DRC will provide outgoing transition support, ensuring that the project is successfully transitioned to PDE or a new contractor. This support will include assisting PDE to plan and execute the complete transition, in coordination with PDE staff and the staff of any entity taking over the project under a new contract. DRC will be prepared to provide copies of existing policies and procedures and any required metrics and statistics, along with all other required documentation and deliverables.

The success of an Outgoing Transition Plan depends upon the completeness and accuracy of documentation of deliverables, processes, procedures, systems, analysis plans, etc., throughout the life of the contract. DRC has a commitment to thorough and accurate documentation to drive the Pennsylvania assessments program. These documents, along with the historic data, will be provided to the new vendor within the number of days of contract end designated by PDE. DRC will also conduct an orientation program to introduce the new vendor's personnel to all of the documentation, similar to the meeting held with the incumbent in DRC's Incoming Transition Plan.

DRC will remain responsible for providing services and resources until the end of the contract period or the successful transition of the program to the new vendor. We will focus project management processes and disciplines on adhering to an orderly approach to meet the transition goals for all outgoing phases including:

- 1. Initiate Outgoing**
- 2. Planning**
- 3. Execution**
- 4. Outgoing Transition Tasks**

Initiate Outgoing

The Pennsylvania Project Director, with support from designated project team members, will initiate the outgoing plan and establish the project's operational framework during a time period specified by PDE. PDE will collaborate with DRC's Program Manager to establish initial expectations for project deliverables, scope, and internal procedures, and organize the project team for completing the closedown activities.

Planning

DRC's Pennsylvania Project Director and other key Pennsylvania Project Team members, in support of the transition effort, will establish objectives, standards, and procedures for the Pennsylvania Project Team to make sure we meet PDE's

expectations during the finalization and phase-out of the project. The final Outgoing Transition Plan will be reviewed and approved by PDE.

Execution

DRC’s Program Manager and the Pennsylvania Project Team will carry out the plans as specified, and in compliance with the approved outgoing plan.

During the transition of the contract from DRC to the new vendor or to PDE, DRC will ensure that all relevant documents and materials are transferred efficiently among all parties. Our standard checklist for deliverables that need to be transferred is provided in the following table. This checklist will be customized for the Pennsylvania assessments.

Deliverables Checklist

| Deliverable | Format |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Test development —all critical documents and materials used in the test development process | Electronic files, i.e., Microsoft Word or Excel |
| Item and test specifications —all item format details, test map requirements, test blueprints, and technical reports | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Test books —all paper and electronic test booklets and electronic answer documents from previous test administrations; test maps for each form from the previous year’s administration with keys and metadata | Booklets as PDF; test maps as Microsoft Word or Excel |
| Passages and artwork —all photocopies of the original passages with source documentation, copies of contracts, original electronic art files and applicable permission information | Hardcopy and electronic text files, and native art files |
| Item bank, item and test statistics —all item-level metadata and previous usage statistics, available test-level statistics, previous anchor range finding papers, rubrics, constructed-response materials such as training material protocols, previous operational and field test usage of each item year and form item position status | Native art files; text output of all the item stems and options; export (MS Excel, HTML, or CSV) of all item characteristics and metadata; single PDF of each item by grade and content |
| Program administration —all critical documents and materials used with the test administration process | Electronic files, i.e., PDF, Microsoft Word or Excel |
| General program documentation —all critical documents and materials used for general program documentation and summary reports | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Reports —sample copies of all reports provided to districts and schools | Hardcopy and/or electronic |
| Manuals/guides —sample copies of all guides and manuals (hard copy and electronic versions) for the operational test administrations, and copies of all electronic materials posted on the state website during the operational test administration | PDF |
| Scoring information —all critical documents and materials used in the scoring process | Electronic files, i.e., PDF, Microsoft Word or Excel |

| Deliverable | Format |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Scoring/reporting specifications —all documentation regarding scoring rules, aggregation rules, roll-up algorithms, and tables used to calculate student, school, district, and state results | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Psychometric and related assessment information required for the program —all critical documents and materials used for psychometric analyses and related procedures | Equating process documentation in PDF or MS Word; scaling constants in MS Excel; LOSS and HOSS, cut score tables, raw score to scale score conversion tables, and rounding rules all as electronic MS Word or Excel |
| Professional development —all critical documents and materials used for professional development | Electronic files, i.e., PDF, Microsoft Word, Excel, or PowerPoint |
| Editing Specifications —all documentation that outlines how the state would like answer documents edited during the scanning process | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Equating data files —all documentation that outlines layouts for files including item statistics, master file, pre-id, school/district score data and state-level score data | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Performance scoring specifications —all training papers, anchor sets, calibration papers, rubrics, and constructed-response scoring rules; previous year’s score distributions for each item and historical reader agreement rates | Hardcopy or electronic files |
| Technical reports and other validity and reliability reports —all electronic copies of past technical reports produced by the previous contractor and electronic copies of any other reports that discuss the validity or reliability of the assessments | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Project plan —all documents that outline the tasks/deliverables and corresponding schedule for those tasks/deliverables | Electronic files, i.e., PDF or Microsoft Word |
| Schedules —all previous project schedules containing dates/durations for the following tasks: <ul style="list-style-type: none"> • Developing items, forms, and materials • Enrollment and pre-identification • Packaging and distribution • Receiving and scanning • Scoring and reporting | Electronic files, i.e., Microsoft Project |
| Packaging specifications —all documentation concerning packaging algorithms and shipping points | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Print specifications —all spreadsheets detailing print specifications for test booklets, scannables, answer documents, labels, envelopes, and manuals | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Program administration —all critical documents and materials used with the test administration process are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word or Excel |

| Deliverable | Format |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------|
| Test development —all critical documents and materials used in the test development process are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Scoring information —all critical documents and materials used in the scoring process are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Psychometric and related assessment information required for the program —all critical documents and materials used for psychometric analyses and related procedures are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word or Excel |
| General program documentation —all critical documents and materials used for general program documentation and summary reports are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word or Excel |
| Professional development —all critical documents and materials used for professional development are transferred efficiently between PDE and/or contractors. | Electronic files, i.e., PDF, Microsoft Word, Excel, or PowerPoint |

OUTGOING TRANSITION TASKS

Ms. Sand will discontinue operations of the project in an orderly, controlled manner that will include a final review of the project processes and the project outcomes. The Outgoing Transition Checklist is used to document the status of the transition activities. It is also used to brief the status of the activities to PDE. DRC will provide a timely transition and will coordinate all transition activities with PDE. DRC will also conduct a post-project review to identify the areas to be improved and to measure PDE’s customer satisfaction. The following table illustrates the Outgoing Transition Checklist.

| Item | Yes | No | N/A |
|--------------------------------------------------------|--------------------------|--------------------------|--------------------------|
| 1. Conduct orientation to program with new vendor | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 2. Transition policy and procedures | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 3. Transition historic database documentation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 4. Transition historic database | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 5. Transition all business and technical documentation | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 6. Post-project review and PDE debriefing | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| 7. Close out contract | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

Conclusion

DRC will collaborate fully with PDE on all contract transition activities at the end of the contract with the goal of making each transition as seamless as possible. Upon contract award, we will be happy to further discuss transition needs with PDE.

5. MANAGEMENT REPORTS

Bi-Weekly Reports

For the Pennsylvania assessment program, the Project Director, Ms. Shaundra Sand, will prepare bi-weekly reports that summarize issues that warrant PDE's attention, along with actions taken and any issue resolution that has occurred. The report will further detail any outstanding issues and planned resolution. To the extent that the issue affects the overall project, the report will list possible courses of action with advantages and disadvantages of each, and will include DRC's recommendations with supporting rationale.

The initial reports will focus on ensuring all activities associated with this new contract are clearly understood by all parties. Subsequent reports will focus on the progress of tasks and activities relevant to the assessment cycle at those points in time. All reports will detail agreements and decisions made and pending, the status of relevant tasks and activities, timelines for scheduled activities, and any unforeseen outcomes or problems. Upcoming deadlines and a schedule of important work that is to occur within a month of the report will also be included. The frequency of these reports will be evaluated by PDE and adjusted as necessary.

Prior to the preparation of each report, Ms. Sand will collaborate with PDE to identify any specific topics that PDE would like to have detailed on the report. These reports will be provided in a format approved by PDE and submitted to PDE on an agreed-upon schedule for as long as PDE deems necessary.

6. OPTIONAL SERVICES AND ASSOCIATED TASKS

1. Option 1: English Composition Exam

DRC was the contractor who worked with PDE to develop the standalone English Composition Field Test that took place in 2011. DRC proposes that an Item with Data Review be conducted on these items for this new Keystone Exam. We propose to continue this assessment activity by working with PDE to bring the English Composition Keystone Exam to full operational status by following development and test designs similar to the other Keystone Exams. As explained in the RFP, the English Composition standalone field test should yield enough items to populate four (4) years of test administrations (about 12 operational administrations) and an item and scoring sampler.

ENGLISH COMPOSITION TEST DESIGN AND BLUEPRINT

A high-level outline of our proposed test design is included below. Our design meets the needs of the program, including reporting at the school and district levels. DRC is prepared to work closely with PDE as the program evolves, ensuring a flexible and responsive approach to test development.

The Keystone Exams English Composition Plan is shown in the following table. This table is organized by module and broken down between multiple-choice (MC) and writing-prompt (WP) items. Placeholder Items are slots reserved within the form design to allow for the option of adding field test items to future spring administrations.

Keystone Exams English Composition Operational Test Plan per Form for Spring

| English Composition | Module | Core | | Placeholder | | Total Core Items | Total Core Points |
|---------------------|--------------|------|----|-------------|----|------------------|-------------------|
| | | MC | WP | MC | WP | | |
| | 1 | 6 | 1 | 3 | 0 | 9 MC 1 WP | 30 |
| | 2 | 6 | 1 | 3 | 0 | 9 MC 1 WP | 30 |
| | Total | 12 | 2 | 6 | 0 | 18 MC 2 WP | 60 |

The proposed blueprint is organized into two thematic modules based on the expressed emphasis contained within the AAEC. The Reporting Categories (which mirror the modules) are organized as:

- Literacy
 - English Composition
 - Module 1 = Informative/Explanatory
 - Module 2 = Argumentative

DRC understands that PDE may want to review and revise the proposed content blueprints. Upon award of the contract, DRC will meet with PDE to discuss and finalize the Reporting Categories and to confirm our understanding of the proposed content blueprints. We will make all requested changes to the content blueprints per PDE's request.

**English Composition Blueprint:
Percent and Points of the Core by Reporting Category**

| Exam | Module | Reporting Category | Percent |
|---------------------|---------------------------|-------------------------|-----------------|
| English Composition | 1 | Informative/Explanatory | 50% 30 pts. |
| | 2 | Argumentative | 50% 30 pts. |
| | Total English Composition | | 100% 60 pts. |

The following table shows the role of the module in the percent and point distribution proposed for the English Composition Keystone Exam.

Operational English Composition Exam: Module Map by Percent and Points

| Exam | Module | | Total Exam |
|---------------------|----------------|----------------|-----------------|
| | 1 | 2 | |
| English Composition | 50% 30 pts. | 50% 30 pts. | 100% 60 pts. |

The next two tables provide high-level design considerations for item types on the proposed English Composition Keystone Exam, examining how the item types used relate as a percentage of the entire core in both non-weighted and proposed weighting. Weighting is proposed as follows:

- MC = 1 point, no weighting
- Conventions Score from Writing Prompt = 0–4 scale, no weighting
- Mode Score from Writing Prompt = 0–4 scale, weighted by a factor of 5 (0–20 scale)

The proposed distribution allows for a reasonable balance between the two item types, especially when framed against the unique nature of each of the content areas and the number of Assessment Anchors and Eligible Content associated with each module.

English Composition Exam High-Level Design Considerations: Item Types and the Relationship to Raw Points and AAEC Coverage: Non-Weighted

| Exam | MC as a % of Core | WP as a % of Core | # of Raw Points | | # of Assessment Anchors | # of Eligible Content |
|---------------------|-------------------|-------------------|-----------------|-------------------------|-------------------------|-----------------------|
| | | | per MC | per WP | | |
| English Composition | 83 | 17 | 1 | 4 Conventions 4 Mode | 8 | 53 |

English Composition Exam High-Level Design Considerations: Item Types and the Relationship to Raw Points and AAEC Coverage: Weighted

| Exam | MC as a % of Core | WP as a % of Core | # of Weighted Points | | # of Assessment Anchors | # of Eligible Content |
|---------------------|-------------------|-------------------|----------------------|--------------------------|-------------------------|-----------------------|
| | | | per MC | per WP | | |
| English Composition | 75 | 25 | 1 | 4 Conventions 20 Mode | 8 | 53 |

ENGLISH COMPOSITION TEST DEVELOPMENT PROCESS

Operational Forms

DRC understands that the English Composition Keystone Exam will be presented in both paper/pencil and computer-based modes, and that the paper/pencil version will be printed as a consumable, standalone English Composition booklet that will contain MC items, MC response bubbles, writing prompts, and writing prompt response space. For each Keystone Exam, the number of items is the same for both modules, with each module measuring unique content as expressed in the corresponding Assessment Anchor groupings. For more information on modules, see *Subheadings 4.B.2.a., Keystone Exams Test Design and Blueprints* and *4.B.2.b., Modules* in our proposal.

English Composition Exam Development Design

As shown in the two operational layout tables that follow, DRC will work with PDE to develop the English Composition Keystone Exam to be two (2) sections (modules) starting in 2017. The core can be described as follows.

English Composition Development Design

| | |
|-----------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|
| 12 core MC items | 12 points |
| 2 core 4 pt. WP items | 48 points <ul style="list-style-type: none"> • Up to 8 Conventions Score points • Up to 40 Mode Score points (weighted) |
| Total | 60 points |

**English Composition Operational Section Layout Plan for Spring, Summer,
Winter, and Breach**

| Module/ Section | Number of MC | MC Item Breakdown | Number of WP | WP Item Breakdown | Estimated Section Testing Time (in minutes) |
|--------------------|-----------------|----------------------------------------|-----------------|----------------------|------------------------------------------------------|
| 1 | 9 | 6–core items 3–placeholder items | 1 | 1–core item | 75 |
| 2 | 9 | 6–core items 3–placeholder items | 1 | 1–core item | 75 |

**STEPS AND PROCEDURES FOR DEVELOPING ENGLISH COMPOSITION
PROGRAM**

One of the initial steps DRC proposes to bring the English Composition Keystone Exam to operational status is for DRC to assist PDE to complete the data review step in the test development plan. DRC proposes to follow the same steps for this data review outlined under *4.C.1.g., Arrangements for Content, Bias, and Data Review Committee Meetings* and *4.C.1.j., Procedures and Responsibilities of the Content, Bias, and Data Review Committees and PDE’s Oversight of the Committees’ Actions*. Results of this data review will be used to build the operational (core) English Composition Exam.

Because only the results of a single field test event will yield the operational items, there will be only one item pool available for PDE to select items for cores. Per the RFP, the 2011 field test had enough items to populate about 12 operational cores (about 4 years of administration—Spring 2017, Spring/Summer/Winter 2018, Spring/Summer/Winter 2019, and Spring/Summer 2020, and an item and scoring sampler (13 total cores). DRC proposes to work with PDE to pull all 13 cores at the same time so that each core is built with equal consideration, thus creating cores that are as parallel as possible to each other in components both content and statistical.

As an extension of the current Keystone Exams program, DRC proposes to use the same item and test development features extensively discussed earlier in this proposal for the English Composition Exam. The test development process for the English Composition Exam will include all work plan activities for test document creation described under *Subheadings 4.C.5., PSSA Item and Test Development Process* and *4.C.6., Keystone Exams Item and Test Development Process*. DRC will pull the 13 different cores and then conduct a face-to-face meeting with PDE to review and approve the cores.

Following the approval of the 13 cores, DRC will provide PDE with guidance to assign one of each of the 13 cores to one of each of the 13 planned uses. Then, as scheduled, DRC will prepare the exam documents according to standard Keystone Exams document preparation practices (outlined under *Subheadings 4.C.5., PSSA Item and Test Development Process* and *4.C.6., Keystone Exams Item and Test Development Process*). In future administrations, from Spring 2018 onward, DRC will replicate the form production cycle and prepare typeset booklets for PDE's approval.

Construction of the thirteen core English Composition forms will be a collaborative effort between PDE and DRC's integrated development team of assessment specialists, psychometricians, and scoring specialists. Test forms will be constructed such that all test forms meet content blueprints and psychometric criteria. All test forms will represent the content in proportion to the standard coverage specified in the test blueprint. The psychometric equivalence of new forms will be established by selecting tests with similar test characteristic functions and conditional standard errors of measurement. Concurrent assembly of all fourteen test forms ensures that DRC can select test forms of equivalent difficulty and reliability that optimally support all test administrations of the Keystone Exams. More detailed information on the psychometric analysis that will be used to support construction of the new English Composition Keystone Exam can be found in *Subheading 4.H.1., Psychometric Analyses*.

Long-Term Development Process

Since all cores will be pulled at the same time, future test form production can be limited to the typesetting and print phases of development, providing time and cost savings to PDE since it will no longer be necessary to build cores on an annual basis. More detailed information on the psychometric analysis that will be used to support the implementation of the new English Composition Keystone Exam can be found in *Subheading 4.H.1., Psychometric Analyses*.

Handscoring

DRC is excited to have the opportunity to score this operational assessment. Our content specialists, both in handscoring and test development, have worked with PDE to develop scoring guidelines for the English Composition Keystone Exam. Additionally, rangefinding was conducted and training materials were created for field test scoring. DRC then scored a sample of the field test responses.

All processes (hiring, training, qualifying, monitoring, scoring, and 10% double-read for quality control purposes) described in *Subheading 4.G.1., Scoring*, will be replicated for the English Composition Keystone Exam. We understand that each student will write two responses: one for the Informative/Explanatory mode and one for the Argumentative mode. If this option becomes operational, DRC proposes having our team of proposed ELA specialists oversee the implementation of the scoring under the direction of Mr. Nick Hook.

Standard Setting

Keystone Exam Option Standard Setting

Should PDE choose either option 1 or 2, DRC proposes conducting standard settings for the English Composition or the Civics & Government Keystone Exams. Standard settings for the Keystone Exams would take place following the first operational administration of each new Keystone Exam. Should PDE approve the plan presented here, DRC would complete the standard setting for the English Composition in the summer of 2017 and the standard setting for the Civics & Government in the summer of 2018. The cut scores and performance levels will be based on the blueprints and content standards for the new assessments or exams.

DRC has successfully conducted numerous standard setting meetings for the Commonwealth of Pennsylvania, including the 2011 Keystone standard setting and DRC will be conducting the upcoming PSSA ELA and mathematics standard setting this June (2015). DRC has also successfully conducted standard settings and validations for other clients (including Alabama, Alaska, Arkansas, Idaho, Iowa, Louisiana, Minnesota, Nebraska, New York, North Carolina, Ohio, Oklahoma, and South Carolina); please see *Volume IV; Appendix R, Standard Setting Experience*, for DRC's standard setting experience. Also, DRC has provided a sample of a standard setting technical report in *Volume V: Appendix V, Technical Reports; Keystone Standard Setting Tech Report*.

In each case, the standard setting study was:

- customized for the client;
- presented to and accepted by the respective technical advisory committees;
- implemented;
- documented; and
- presented to the school/state board for final approval.

DRC's experience in standard setting has shown that the following practices contribute to the validity of the standard setting:

- Utilizing the performance descriptors to the greatest extent possible
- Documenting the critical processes and elements of the study
- Using the standard errors of measurement to inform selection of the final cut scores
- Documenting the teaching experience and demographic characteristics of the standard setting participants

Strict adherence to these practices and processes will ensure that the results from the meeting will yield legally defensible outcomes that meet or exceed industry standards.

DRC's Proposed Standard Setting Team

The standard setting training sessions will be led by **Dr. Marc Julian**. Dr. Julian has extensive experience in the design and implementation of standard setting for large-scale assessment programs. Dr. Julian was directly involved in the first large-scale implementation of the Bookmark standard setting methodology and has 20 years of experience with this method. Dr. Julian will work in concert with other members of the DRC Psychometric Services Team on the design and implementation of the standard setting for the Keystone Exams.

Standard Setting Description

DRC has been involved in both standard setting and standards validations for statewide assessments developed for No Child Left Behind (NCLB) testing programs, as well as state-specific high school graduation and end-of-course examinations that generally fall outside of NCLB. DRC has implemented a variety of standard setting processes in fulfilling these contracts. These processes range from Bookmark (Lewis, Mitzel, Green & Patz, 1999) and its variations to modified Angoff (1970), Body of Work (Kingston, Kahl, Sweeney & Bay, 2001), and Contrasting Groups (Livingston and Zieky, 1982).

Since 2003, DRC has conducted more than 48 standard settings for 15 states. Of these, over half used a form of the Bookmark process. Although DRC generally recommends Bookmark, there are circumstances where other methods are better suited. In these circumstances, DRC recommended and implemented alternative processes. As standard setting processes and methodologies continue to evolve, DRC reviews the emerging research methods and incorporates modifications to existing methods or implements new approaches should the circumstances require it.

With PDE approval, DRC proposes to continue to use the Bookmark (Lewis, Mitzel, & Green, 1996) standard setting method to set standards for the new Keystone Exams. The Bookmark method was previously used to set standards for the Keystone Exams. DRC recommends using the Bookmark procedure for standard setting because the judgment task required of the judges is considered less complex and the method is ideally suited for assessments where items can be reliably ordered by difficulty. Furthermore, it is ideally suited for situations wherein performance level descriptions or other components of testing programs are being maintained as new assessments are developed.

This standard setting will include:

- validation of the performance level descriptors for the assessments.
- articulation of the thresholds performance level descriptors (e.g., just barely proficient) that distinguish between performance levels.

- appropriate training of standard setting committee members in the Bookmark method for purposes of determining standards based on their knowledge, judgment, and use of consequential data.
- DRC staff that will lead and facilitate the standard setting meetings. This includes
 - appropriate training of standard setting committee members in the Bookmark method.
 - review of performance levels descriptors and articulation of knowledge, skills, and abilities of students at the thresholds between performance levels.
 - multiple rounds of standard setting judgments.
- impact data presented to panelists that has been computed and verified by DRC psychometric services staff.
- recommended scale score cut scores for each content area.
- technical documentation/reporting to PDE on the strategies and procedures used prior, during, and after the standard setting. Documentation of standard setting data collected, results of analysis, achievement level descriptors, and recommended standards based on committee judgment will be included.
- a brief but timely executive summary containing the recommended cut scores from the panel group, along with the impact data provided to the group.

Methodology

The Bookmark standard setting method has two components: the **ordered-item booklet** (OIB), which presents test items in order of their scaled item difficulty as determined by Rasch model calibrations, and an **associated item map**, which presents both content and other statistics associated with ordered items. The panelists record their individual judgments directly on the associated item map in conjunction with placement of bookmarks in the OIB.

The items within an OIB are ordered by their scale item difficulty from easiest to most difficult. The easiest item is placed in the front of the booklet, while the most difficult item is placed at the back. The Rasch model expresses expected performance on each item, and item difficulty is expressed on the same metric; the Bookmark procedure capitalizes on this important feature. Judgments about how “just barely proficient” or “just barely advanced” students would perform on a set of items can be made directly in the scale score metric, in the context of item content and grade-level expectations. In particular, the standard setting panelists place a bookmark within the OIB where they feel that “just barely proficient” students (i.e., students at a threshold between performance levels) should know and be able to answer correctly with a two-thirds probability. The Bookmark

method provides an integrated way of setting expectations for student performance at particular cut points on the scale in terms of test content within the same procedure.

Following several rounds of placing bookmarks for different cut scores, final cut scores are established by determining the median table value of cut scores across the median of individual panelists within each table. (Medians are generally preferred to means because they reduce the influence of extreme judgments, should any exist.)

As applicable, ancillary materials will be placed under a separate cover in order to facilitate the review of those materials. In addition to the OIB, participants will be provided with an item map and supplies, such as paper and adhesive notes. The item map is a table in which each row represents an item in the OIB, ordered in the same manner, with additional information as follows: (1) the scale location for the item, (2) the content categorization, (3) the source of the item (i.e., form and item number), and (4) space for panelists to record notes.

Standard Setting Panel

DRC will work with PDE in the recruitment of Pennsylvanian educators for this process. DRC also proposes to provide training for panel members as part of this process.

The standard setting committee will be composed of a diverse group of teachers, exceptional child (EC) specialists, English as second language (ESL) specialists, and curriculum specialists from across the Commonwealth of Pennsylvania who have reviewed items in the past or have been recommended for the standard setting process. The groups are divided by content area. DRC acknowledges this group must be familiar with the subject matter (content), the student population, the instructional environment, and other variables as determined by PDE. DRC also acknowledges that it needs to select members for the panel who are diverse in gender, ethnicity, and regional residence reflecting the diversity of Pennsylvania.

Department Participation

DRC suggests that PDE have representation at the standard setting meeting and that, if feasible, a representative be updated and consulted after each round of the process. DRC recommends this level of participation so that PDE is involved in all aspects of the meeting and can provide timely input. PDE representatives also may be asked questions regarding content standards, assessment items, and education policy.

Materials

Materials that are central to the process include:

- Performance level descriptors, to define what students at each level should know and be able to do.

- Threshold level descriptions that articulate knowledge and skills of students just entering each performance level (e.g., just barely proficient, just barely advanced, etc.).
- An operational form of the test. While states vary as to whether they provide participants with actual operational test booklets, DRC has found that it is useful for participants to see the items in exactly the same form as students saw them so that participants can experience the test in the same way that it is experienced by the students. DRC feels that the use of operational test booklets adds face validity to the standard setting process and allows the panelists to feel that their work is set within a real-world context.
- the OIB, to be used for placing the bookmarks.

The OIB will contain items arranged in item difficulty order, where difficulty estimates have been defined using the Rasch model to express all items on a common scale of measurement. For any item, all preceding items should be easier and all following items should be more difficult. Each multiple-choice item will appear once in the booklet. Each constructed-response item (polytomous item) will appear multiple times in the OIB because there is an item difficulty estimate for the transition between adjacent score points. Numerous samples of student work at each score point are provided, along with item-specific scoring guides.

Bookmark Training

Training of the panelists is critical to the proper functioning of the standard setting process. An important aspect of the project will be the participants' understanding of the procedure. One important aspect of the training is the emphasis that it is not the role of panelists to make judgments about the wording or the difficulty of items. Rather, the role of the panelists is to carefully weigh the knowledge and skill levels necessary to have a two-thirds chance of correctly answering multiple-choice items.

Each panelist will receive extensive training in a large-group setting prior to making any recommendations. Panelists will receive an orientation to the Bookmark method and practice the mechanics of the process using a short "practice test" composed of non-secure training materials taken from a public source (e.g., released NAEP items).

The Bookmark Placement Task

Participants express their judgments of cut scores by placing a tab or bookmark between the ordered items judged to represent the cut point. A separate bookmark is placed for each of cut score. Training will emphasize the following points:

- The bookmark represents a judgment of the demarcation between items that a student at the threshold of a performance level (a student minimally qualified to attain a given achievement level) should know and be able to do, and those the student is unlikely to know or be able to do.
- Bookmark placement should not be thought of as separating two items, but rather two groups of items. In other words, placement should not hinge on distinctions drawn for adjacent items with similar locations. Rather, the collective locations of the group of items below the bookmark should be compared with the collective location of the group of items above the bookmark.
- Students with an ability estimate where the bookmark is placed will have a higher probability of success on easier items (before the bookmark placement) and a lower probability of success on more difficult items (after the bookmark placement).

Bookmark Process

The standard setting process will involve three or more rounds of placing and reviewing the bookmarks. There is no intent to reach a consensus; the panelists will be instructed to place their bookmarks where they believe they should be, not where others in the group believe they should be. The first round will focus on each individual's placement of the bookmarks, before group discussion.

Subsequent rounds will offer the opportunity to revise the individual bookmarks after increasing levels of feedback. The feedback for Round 1 will include only the locations of the bookmarks for all panelists for each level. This will give the panelists the opportunity to see how their decisions compare to the other members of the group and to discuss the differences. Frequently, differences are traced to differing interpretations of the performance level descriptors (PLDs). During group discussions, DRC proposes to encourage panelists to discuss and provide clarifying statements that support or refute fellow panelists' interpretations of the PLDs and how they relate to their judgments.

Round 1

The first round of the Bookmark process begins with a review of the ordered item booklets as individuals. Participants review each item, ordered in terms of difficulty, and are asked to determine and prepare to discuss what subject area knowledge, skills, and competencies are required to correctly respond to each item. In this way, items are directly compared, one to another, in terms of the content and skills that must be mastered for each successively more difficult item.

At this stage, participants are encouraged only to identify those skills that a given item requires for mastery of the underlying content. The Round 1 bookmark placements are made individually, and discussion among group members is discouraged. This is intended to ensure that the Round 1 judgments are independent and to try to reduce the influence of others' opinions, or the opinion of

a dominant group member. DRC believes that this round often provides the best estimate of the true inter-rater variability.

At the completion of Round 1, initial bookmarks defining the boundaries between each of the performance levels from all panelists will be compiled by DRC staff and used to compute the group level results.

Round 2

Panelists begin Round 2 with an extensive discussion of their Round 1 ratings. This discussion typically begins at the small group level, led by the table leader. The discussion centers on what students should know at each of the achievement levels. Results of the Round 1 judgments will be presented to the panelists at the beginning of Round 2, including a list of the Round 1 bookmark placements made by each panelist at the each of the tables.

Following small group discussion, a large group discussion (i.e., across tables) will be facilitated to incorporate more perspectives into Round 1 placements. Impact data, based on the test administrations of the assessments, will be provided to help panelists frame the effects of their judgments.

After the large group discussion, individual panelists will review their original bookmark placements and make final bookmark placements. The judgments are entered into a spreadsheet program, and the median cut score is calculated for each small group and for the full panel. (The latter is used to estimate the impact of the proposed standards.)

All individual recommendations are then collected, recorded, and analyzed. Feedback on the overall panel recommendation and the projected impact will be provided to the group as a whole.

Round 3

Panelists begin Round 3 with an extensive discussion of their Round 2 ratings. As in the previous rounds, the judgments from the prior round form the basis for the initial discussion. Each small group discusses where they believe the cuts should fall and why.

Following small group discussion, a large group discussion (i.e., across tables) will be facilitated to incorporate additional perspectives into where the bookmarks should be located. Impact data, based on previous administrations of the assessments, will be provided to help panelists frame the effects of their judgments.

Following the Round 3 large group discussion, individual panelists will again review their placements of the bookmarks (in the OIB) and make final bookmark placements. These judgments are again entered into a spreadsheet program and the median cut score is calculated for each small group, as well as for the full panel. (The latter is used to estimate impact data.)

All results, for all rounds, are summarized and recorded in a technical report for submission to PDE. Upon approval, DRC will generate the final scale score cut scores for each test and performance level.

Use of Impact Data

It is commonplace in standard setting to include impact data at the end of the process “as a reasonableness check of the recommended cut scores” (O’Malley, Keng & Miles, 2012). The use of the impact data adds validity evidence to support cut score interpretation (p. 306).

DRC has found it useful to show the panelists the effect their recommendations will have on students to help ground the panelists in the reality of student performance. This leads to more defensible levels for the achievement standards and more confidence in the process by the panelists. Impact data will consist of frequency distributions of students’ scores from the spring operational assessment, presented to the panelists before the third round of deliberations. It will include the number and percentage of students who fall into each of the performance levels.

DRC has used other empirical data as impact data, such as NAEP, SAT, and ACT results, in several states. Upon award, DRC would be happy to discuss using other empirical data as impact data.

Computation of Standard Errors

Two forms of error are relevant to standard setting. One is the standard error associated with the panelists’ ratings and the second is the standard error of measurement of the ability estimate at the cut scores. The following topics describe the two types, along with their respective roles in the process.

Standard Error of Panelists’ Ratings

Standard errors associated with this process represent the likely range of recommendations that might result had the panels of educators conducted the same process under the same conditions. While standard errors of the panelists’ results will be computed for each round, the standard error of the final group recommendations will be based on the variability of the Round 1 results. Round 1 is used because it represents the greatest degree of independence among the panelists. Later rounds tend to reflect more collaboration and discussion, typically resulting in reduced standard errors.

Standard of Error for Student Scale Scores

Another relevant form of standard error is commonly referred to as the *standard error of measurement*. It differs from the standard error of the panelists’ ratings in that it is a measure of the expected error of the person scale score (ability estimate) itself. The standard error of measurement applies to the scale scores associated with each raw score and varies depending on the test information function.

The most informative use for the standard error of the scale score in standard setting processes is at the cut scores, because they are the critical decision scores for consequences and outcomes. DRC proposes to consult with the national technical advisory committee to determine whether these values may be more relevant than the ones based on the panelists' ratings. Alternatively, the two could be used in combination. Whatever the final decision, standard errors will be used to help determine and reflect reasonable bounds of the recommendations.

Evaluation of Standard Setting by Panelists

After the standard setting is complete, DRC proposes to provide an opportunity for the panelists to evaluate the standard setting process in the form of an evaluation questionnaire. The results will be submitted in the technical documentation.

Standard Setting Technical Report

A draft of the standard setting technical report will be presented to PDE, and, if desired, the Pennsylvania TAC. At a minimum, this draft will include the following:

- History/purpose of the test
- Standard setting method
 - Name and description
 - Documentation from the state on selection of judges
 - Standard setting process
 - Documentation on construction and implementation of materials used during the process
 - Copies of non-secure materials used
 - Training
- Panelist and group ratings for each round, including standard errors
- Final performance level descriptors
- Documentation of feedback received during the process
- Descriptive summary of the panelists' evaluation of the process and their confidence in their judgments
- Recommended cut scores

Volume V; Appendix V, Technical Reports, includes a sample standard setting technical report that DRC completed after the standard setting for the Keystone Exams in 2011.

Security

DRC is cognizant of the need for strict security requirements for large-scale assessment programs. Throughout our organization, we have implemented outstanding security procedures, including employee education and awareness about security issues, tightly controlled access to our buildings, and state-of-the-art data security.

DRC requires signed security agreements from all meeting participants and retains the agreements for the duration of the contract. At the beginning of the standard setting meetings, each committee member will be asked to sign a Confidentiality Letter specifying the confidentiality agreement and security regulations. DRC will ensure that no confidential materials related to the project will be released without PDE's explicit approval.

DRC staff will monitor the security of all test-related materials throughout the process. For example, during the meetings, secure materials (e.g., ordered item booklets and samples of student work) will never be left unattended. In addition, all materials sent to meetings will be sent through a secured mailing process and have tracking documentation. DRC will number each set of materials used during the meetings so that any missing material will be immediately noted when materials are checked in and out each meeting day. DRC prohibits the use of personal computers and cell phones in meeting rooms.

Standard Setting Meeting Logistics

DRC will be responsible for all administrative and logistical arrangements and costs for the standard setting meetings. This support will include, but not be limited to, maintenance of committee membership databases, mailing of meeting notifications to selected committee members, the production of all training, reference and support materials, and facility arrangements including meeting rooms, meals, refreshments, and lodging for committee members. Financial support to committee members includes the payment of committee member substitute teacher reimbursement (\$150 per day on regular school days), committee member stipends (\$100 per day on non-school days), and travel-related and other relevant expenses for the meeting participants. Costs for all relevant committee review meeting tasks and expenses as required by the RFP are included in our cost proposal, provided under separate cover.

2. Option 2: Civics & Government Exam

CIVICS & GOVERNMENT EXAM OVERVIEW

Providing customized test development services that are responsive to evolving needs has been a hallmark of DRC’s relationship with PDE throughout our history as PDE’s test development contractor. We propose to sustain this mission by working with PDE as it expands its current Keystone Exams program to include Civics & Government. We are committed to a custom assessment development process equal to that of the other Keystone Exams, one that will result in items that provide an accurate measure of what all assessed students know and can do based on the identified assessable content from the Keystone Exams Assessment Anchors and Eligible Content.

DRC brings to this development effort unique qualifications that no other development contractor can offer. DRC serves as the current contractor responsible for development of assessment items for the PSSA and Keystone Exams, and DRC helped PDE to develop the Assessment Anchors and Eligible Content that are to be used to measure content on the Civics & Government Keystone Exam. We developed the item specifications tied to these very documents that reflect the desired levels of Depth of Knowledge to be assessed by the content standards.

CIVICS & GOVERNMENT TEST DESIGN AND BLUEPRINT

A high-level outline of our proposed test design follows. Our design meets the needs of the program, including providing items for Item Samplers, breach forms, reporting at the school and district levels, and banking in the item bank for the construction of the following year’s core forms. DRC is prepared to work closely with PDE as the program evolves, ensuring a flexible and responsive approach to test development.

The Keystone Exams Civics & Government Plan is shown in the following table. This table is organized by module and broken down between multiple-choice (MC) and constructed-response (CR) items. Core items are also distinguished from items that serve the role of field test (FT). Note that the test plan for spring includes FT items, but for the summer and winter administrations the FT positions will be filled with placeholder (PH) items.

Keystone Exams Civics & Government Operational Test Plan per Form for Spring

| Civics & Government | Module | Core | | Field Test | | Total Core Items | Total Core Points |
|---------------------|--------------|------|----|------------|----|------------------|-------------------|
| | | MC | CR | MC | CR | | |
| | 1 | 24 | 2 | 8 | 1 | 32 MC 3 CR | 30 |
| | 2 | 24 | 2 | 8 | 1 | 32 MC 3 CR | 30 |
| | Total | 48 | 4 | 16 | 2 | 64 MC 6 CR | 60 |

The proposed blueprint is organized into two thematic modules based on the expressed emphasis contained within the AAEC. The Reporting Categories (modules) organized are:

- Social Studies
 - Civics & Government
 - Module 1 = Government: Forms and Functions
 - Module 2 = Citizenship in Modern Democracies

DRC understands that PDE may want to review and revise the proposed content blueprints. Upon award of the contract, DRC will meet with PDE to discuss and finalize the Reporting Categories and to confirm our understanding of the proposed content blueprint. We will make all requested changes to the content blueprint per PDE's request.

**Civics & Government Blueprint:
Percent and Points of the Core by Reporting Category**

| Exam | Module | Reporting Category | Percent |
|---------------------|---------------------------|-----------------------------------|-----------------|
| Civics & Government | 1 | Government: Forms and Functions | 50% 32 pts. |
| | 2 | Citizenship in Modern Democracies | 50% 32 pts. |
| | Total Civics & Government | | 100% 64 pts. |

The following table shows the role of the module in the percent and point distribution proposed for the Civics & Government Exam.

Operational Civics & Government Exam: Module Map by Percent and Points

| Exam | Module | | Total Exam |
|---------------------|----------------|----------------|-----------------|
| | 1 | 2 | |
| Civics & Government | 50% 32 pts. | 50% 32 pts. | 100% 64 pts. |

The next table provides the high-level design considerations for item types on the proposed Civics & Government Keystone Exam, examining how the item types used relate as a percentage of the entire core. The proposed distribution allows for a reasonable balance between the two item types, especially when framed against the unique nature of each of the content areas and the number of Assessment Anchors and Eligible Content associated with each module.

Civics & Government Exam High-Level Design Considerations: Item Types and the Relationship to Raw Points and AAEC Coverage

| Exam | MC as a % of Core | CR as a % of Core | # of Raw Points | | # of Assessment Anchors | # of Eligible Content |
|---------------------|-------------------|-------------------|-----------------|--------|-------------------------|-----------------------|
| | | | per MC | per CR | | |
| Civics & Government | 75 | 25 | 1 | 4 | 8 | 53 |

The following table shows the anticipated number of items to be field tested each year for the Civics & Government program based on information contained within the RFP. Items will be developed in excess of these numbers to account for normal attrition that occurs throughout the review and approval process. DRC notes that per the RFP, the initial round of development has been completed.

Anticipated Yearly Development Plan Civics & Government for Use in Field Test Positions

| Exam | Forms to Populate | Selected-Response Items | | Constructed-Response Items | | | |
|---------------------|-------------------|-------------------------|----------------|----------------------------|--------------|---------------------|-----------------|
| | | Multiple-Choice | Evidence-Based | Open-Ended* | Short Answer | Text-based Analysis | Writing Prompts |
| Civics & Government | 20* | 320 | — | 40 | — | — | — |

*The initial operational test will include 28 forms, but the field test positions of some of those 28 forms will not contain field test items. Instead, they will contain re-embedded field test items from the standalone field test event. The items in these forms will represent the intended core to be used on the initial Winter administration. More information about this described below.

In the RFP, PDE has identified the number of field test forms that it anticipates will be required to build sufficient cores to meet expectations for cognitive complexity. The standard embedded field test events for the Civics & Government Keystone Exam are designed to yield three cores: Spring, Summer, and Winter. In both cases, the Spring standalone field test (date to be determined) will yield cores for the following year. For example, the Spring 2017 Civics & Government Exam will yield the core for the Keystone Exams administrations in Spring 2018, Winter 2018/2019, and Spring 2019 (and a possible Breach form). The table below shows the number of field test forms anticipated by the RFP.

Number of Field Test Forms per Grade

| Test Event | Number of Field Test Forms Anticipated by the RFP |
|-------------------------------------------------------------------------------------------------|---------------------------------------------------|
| Keystone Exams—Civics & Government Standalone Field Test Event in 2017 | 4 |
| Keystone Exams—Civics & Government Initial Spring Embedded Field Test Event in 2018 | 28 |
| Keystone Exams—Civics & Government Standard Spring Embedded Field Test Event in 2019 and onward | 20 |

Proposed test map plans for the recommended placement of the embedded field test items within operational forms is provided as follows.

Proposed Embedded Field Test Map for Civics & Government Exam

| Exam | # of FT Items per Form | Description of Field Test Item Location |
|---------------------|------------------------|------------------------------------------------------------------------------------------------------|
| Civics & Government | 16 MC; 2 CR | Embedded in both modules of a two-module test; testing modules are a mix of operational and FT items |

CIVICS & GOVERNMENT ITEM AND TEST DEVELOPMENT PROCESS

Operational Forms

Like the other Keystone Exams, DRC understands that the Civics & Government Keystone Exam contains items that perform different roles within the test design to meet specific needs outlined in the PDE-approved test design. For more information about this process for the Keystone Exams, see *Subheading 4.C.6., Keystone Exams Item and Test Development Process*.

DRC understands that the Civics & Government Keystone Exam will be presented in both online and paper/pencil modes, and that the paper/pencil version will be printed using a combination of a test booklet and an answer booklet. The test booklet will contain stimulus information and the MC item text. The answer booklet will contain the response bubbles corresponding to the test booklet MC items, and it will contain the CR items and their corresponding response spaces.

For an individual Keystone Exam, there is the same number of items in both modules, and each module measures unique content as expressed in the corresponding assessment anchors groupings in each module (there is essentially no overlap of content between the two modules). For more information on modules, see *Subheadings 4.B.2.a., Keystone Exams Test Design and Blueprints* and *4.B.2.b., Modules* in this proposal.

Civics & Government Exam Development Design

As shown in the operational layout tables below, DRC will work with PDE to develop the Civics & Government Keystone Exam to be two (2) sections (known as modules) starting with a date yet to be determined. The core can be described as follows (core overlap values are approximate).

Civics & Government Core

| | |
|-----------------------|------------------------------|
| 48 core MC items | 48 (~24 core overlap) points |
| 4 core 4 pt. CR items | 16 (~8 core overlap) points |
| Total | 64 points |

Civics & Government Operational Section Layout Plan for Spring

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in minutes) |
|--------------------|-----------------|----------------------------------------------|-----------------|--------------------------------------------|---------------------------------------------------|
| 1 | 32 | 24–core items 8–embedded field test items | 3 | 2–core items 1–embedded field test item | 50 |
| 2 | 32 | 24–core items 8–embedded field test items | 3 | 2–core items 1–embedded field test item | 50 |

Civics & Government Operational Section Layout Plan for Summer, Winter, and Breach

| Module/ Section | Number of MC | MC Item Breakdown | Number of CR | CR Item Breakdown | Estimated Section Testing Time (in minutes) |
|--------------------|-----------------|--------------------------------------|--------------|-----------------------------------------|---------------------------------------------------|
| 1 | 32 | 24–core items 8–placeholder items | 3 | 2–core items 1–placeholder item | 50 |
| 2 | 32 | 24–core items 8–placeholder items | 3 | 2–core items 1–placeholder test item | 50 |

Steps and Procedures for Developing the Civics & Government Program

As an extension of the current Keystone Exams program, DRC proposes to use the same item and test development features extensively proposed earlier in this RFP for the Civics & Government Keystone Exam. The item and test development process for the Civics & Government Keystone Exam include all work plan activities described under *Subheadings 4.C.5., PSSA Item and Test Development Process* and *4.C.6., Keystone Exams Item and Test Development Process*.

Item Development Work Plan Tasks Detailed under *Subheading 4.C.5*

1. Meet with PDE: item development planning meeting
2. Select and train item writers
3. Develop items and passages, including graphics
4. Review and revise items prior to submission to PDE (internal editing checks)
5. Prepare items for review by PDE
6. Prepare all materials for new item review meetings
7. Support PDE with the new item review committee meeting processes
8. Prepare written summary reports of the new item review meetings
9. Revise items and conduct internal review process (Face-to-Face Review)
10. Select items for field testing; submit selections to PDE for approval

Process for Selecting Items for Forms under *Subheading 4.C.5*

1. Using the pool of items approved by Pennsylvania educator committees, DRC test development specialists will select items to match the approved test blueprints.
2. DRC test development specialists will check to see that each item clearly aligns with anchor and/or content standards where applicable, and that each item meets psychometric guidelines for excellence.
3. DRC test development specialists will verify that each item meets technical quality for well-crafted items, including:
 - One clearly correct answer
 - Clear and concise wording
 - Grammatical correctness
 - Appropriate range of difficulty
 - Free of offensive, inappropriate, or biased content
 - Meets the principles of universal design and maximum accessibility.

Current Status of the Civics & Government Program

As stated in the RFP, the first round of initial item development has been completed, and all items are currently ready to be prepared to take to Bias and Content Item Review meetings in anticipation of the initial standalone field test event. DRC proposes to complete the preparation of these items following standard procedures outlined in this proposal. The items will be reviewed one final time for alignment to the AAEC and adherence to Pennsylvania style norms and the Principles of Universal Design. DRC proposes that the item and bias reviews will take place using the same procedures extensively described under 4.C.1.g., *Arrangements for Content, Bias, and Data Review Committee Meetings* and 4.C.1.j., *Procedures and Responsibilities of the Content, Bias, and Data Review Committees and PDE's Oversight of the Committees' Actions*. After completing the item and bias review steps, DRC proposes working with PDE to construct the standalone field test forms using the same procedures outlined under *Subheading 4.C.3., Field Item Testing*.

As explained in the RFP, the initial standalone field test will require only four forms, and these four forms will yield enough items to populate the two core forms. Per the RFP, PDE anticipates that these two operational forms are going to be the Spring 2018 and the Winter 2018/2019 administrations. Further, the Winter 2018/2019 core will be re-embedded in field test positions within the Spring 2019 forms. The following table provides DRC's proposal for the standalone field test forms for Spring 2017.

DRC proposes that the Spring 2017 field test form should be the same size and contain the same number of MC and CR items as would appear in an operational form. By making the forms the exact same size, the field test event will mirror the planned operational (core) event. Therefore, the standalone field test event would consist of 64 MC field test items and 6 CR field test items per field test form. DRC also proposes that a common field test link be included in each standalone field test form for psychometric use.

2017 Civics & Government Keystone Exam Spring Standalone Field Test Plan per Form

| Civics & Government | Module | Field Test Items per Form | | Common Items Repeated Across the 4 Forms | | Total No. of Items per FT Form (Repeated Common Items + Unique Items) | |
|---------------------|--------------|---------------------------|-----------------|------------------------------------------|----------|-----------------------------------------------------------------------|----------|
| | | Unique MC Items | Unique CR Items | MC Items | CR Items | MC Items | CR Items |
| | 1 | 24 | 2 | 8 | 1 | 32 | 3 |
| | 2 | 24 | 2 | 8 | 1 | 32 | 3 |
| | Total | 48 | 4 | 16 | 2 | 64 | 6 |

**2017 Civics & Government Keystone Exam Spring
Standalone Field Test Plan per 4 Forms**

| Civics & Government | Module | Field Test Items per 4 Forms | | Common Items Repeated Across the 4 FT Forms | | Total No. of Items per 4 FT Forms (Repeated Common Items + Unique Items) | |
|---------------------|--------------|------------------------------|-----------------|---------------------------------------------|----------|--------------------------------------------------------------------------|----------|
| | | Unique MC Items | Unique CR Items | MC Items | CR Items | MC Items | CR Items |
| | 1 | 96 | 8 | 8 | 1 | 104 | 9 |
| | 2 | 96 | 8 | 8 | 1 | 104 | 9 |
| | Total | 192 | 16 | 16 | 2 | 208 | 18 |

Construction of the Civics & Government forms will be a collaborative effort between PDE and DRC’s integrated development team of assessment specialists, psychometricians, and scoring specialists. Test forms will be constructed such that all test forms meet content blueprints and psychometric criteria. All test forms will represent the content in proportion to the standard coverage specified in the test blueprint. The psychometric equivalence of new forms will be established by selecting tests with similar test characteristic functions and conditional standard errors of measurement. Concurrent assembly of all test forms within a cycle ensures that DRC can select test forms of equivalent difficulty and reliability that optimally support all applicable test administrations of the Keystone Exams. More detailed information on the psychometric analysis that would be used to support construction and implementation of the new Keystone Exam can be found in *Subheading 4.H.1., Psychometric Analyses*.

Handscoring

DRC proposes **Mr. Jon Rodebaugh** as the Civics & Government Keystone Exam handscoring content specialist. Mr. Rodebaugh has overseen Louisiana high school social studies since 2009 and has been employed by DRC since 2000. Many of the constructed responses for this program are focused on the functions of government and citizenship. DRC understands that, similar to the operational English Composition Keystone Exam, there will be two modules with two constructed responses per module.

The standalone field test in 2017 and the embedded field test in 2018 will yield ample material for rangefinding meetings each year. Mr. Rodebaugh has facilitated numerous rangefinding meetings and is adept at preparing materials for these meetings. He will also be responsible for all training materials and will oversee scoring. As with any Pennsylvania assessment, all handscoring processes described above will be in place for this exam. Mr. Rodebaugh’s full qualifications can be found in *Section 5, Personnel*.

Standard Setting

Please see the subheading titled *Standard Setting* under Option 1 for a complete description of our proposed plan.

3. Option 3: Performance Based Assessments (PBAs)

PBA OVERVIEW

DRC understands that PDE wishes to develop a Performance Assessment component to complement the State Assessment System. With DRC's unparalleled experience developing assessments and curriculum-related products and services for the Commonwealth, we are the best team ready to work with PDE to develop performance-based assessments for Pennsylvania. In addition, with our experience in working on PBAs for national consortia, DRC is also primed to provide PBAs that meld the best of the national efforts, leveraging our knowledge and understanding of Pennsylvania's standards to generate PBAs that integrate well with the Commonwealth's existing State Assessment System.

Overview of Proposed PBA Development Process

The following is a high-level overview of the proposed steps in the PBA development process. DRC proposes to work at PDE's direction to follow these steps to ensure consistent PBA that reflect the quality and value of the existing State Assessment System.

Proposed PBA Development Steps

| Activity | Specifications/Milestones for Task Completion |
|----------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Project kickoff | Finalize goals for PBA development |
| Define task purpose | Create a detailed outline for each task that identifies the specific concepts, knowledge, and /or skills that will be assessed in the task |
| Choose the performance activity | <ul style="list-style-type: none"> • Develop a topic <ul style="list-style-type: none"> ○ Choose age-appropriate, real-world situations where students would realistically use information from several sources to solve a complex problem that requires the use of concepts and procedures, problem solving, and communication of reasoning to justify the solution • Develop scenario <ul style="list-style-type: none"> ○ Map out task scenario • Identify sources that will be made available to students to complete the task • Identify evidence collection points in task |
| Submit to PDE for feedback | <ul style="list-style-type: none"> • PDE will meet with Development Team via conference call or WebEx meeting to provide task feedback |
| Develop task | <ul style="list-style-type: none"> • Write and edit performance task |
| Develop scoring criteria | <ul style="list-style-type: none"> • Develop scoring rubric <ul style="list-style-type: none"> ○ Determine total number of points for task ○ Develop holistic or analytic scoring rubric |

| Activity | Specifications/Milestones for Task Completion |
|---------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| Submit to PDE for review | <ul style="list-style-type: none"> • PDE provides feedback to development team and development team to implements request |

Proposed PBA Design

DRC is pleased to support PDE as they consider the use of PBAs as a supplement to the PSSA, and we present this proposed plan to PDE for the development and administration of Performance Based Assessments in mathematics and English language arts in grades 3–8. These PBAs would be administered operationally for the first time in the 2017–2018 school year and would supplement the PSSA scores while being administered during a separate testing event. DRC has experience in the development of Performance Tasks as a part of work on another program that assesses students’ progression towards readiness for college and careers. In addition to our experience working with the Pennsylvania Department of Education and Pennsylvania educators DRC is positioned well to provide guidance in the development of a Performance Based Assessment program for Pennsylvania.

Mathematics Test Design

DRC proposes that Performance Tasks (PT) for mathematics be developed to align with the Standards for Mathematical Practice, which define the habits of mind necessary for students to reach a level of mathematical proficiency. The mathematical skills required by the proposed PTs would be based on using the eligible content statements as assessment limits; however, the primary goal of the PTs would be to allow students to demonstrate the key habits of mind found in the Standards for Mathematical Practice that follow.

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and make sense of regularity in repeated reasoning.

Each Performance Task would consist of a stimulus and four associated items: two short-answer (SA) items that would be scored on a 0–1 rubric, one short-constructed-response (SCR) item that would be scored on a 0–2 rubric; and one extended-constructed-response (ECR) item that would be scored on a 0–3 rubric. The stimulus would consist of text, diagrams, tables, graphs, and/or charts that would provide students with the necessary context and data to solve the series of

items. The SA items would be independent and discrete, while the SCR and ECR items would introduce interdependencies as they build upon previous tasks and/or reasoning. We feel that this design will allow for PTs that make use of rich, real-world problem-solving situations that are not constrained by the content found within a single eligible content or assessment anchor while minimizing the test administration time needed for this testing event.

English Language Arts Test Design

DRC proposes that Performance Tasks for English language arts assess the Pennsylvania Core Standards for writing across different modes and conducting research. This proposal is based upon an assessment that is administered using print forms due to the limited enrollment in online assessments for grades 3 through 8. However, DRC would be happy to discuss technology-enhanced options such as the use of multi-media or videos, which would allow additional skills not addressed in the AAECs to be assessed (e.g., speaking and listening).

Each Performance Task would consist of two to three sources (passages or other stimuli) and three items: two SCR items and one essay. Each SCR would be scored on a 0–2 scale, while each essay would be scored on a holistic rubric allowing a score range of 1–4. Each Performance Task would be aligned to one of three modes. The modes for different grade spans are shown in the following table.

ELA Performance Task Modes

| Grade span | Mode #1 | Mode #2 | Mode #3 |
|-------------------|----------------|-----------------------------|----------------|
| Grades 3–5 | Narrative | Informative/ Explanatory | Opinion |
| Grades 6–8 | Narrative | Informative/ Explanatory | Argumentative |

Bias, Fairness, and Sensitivity Review

DRC proposes a separate review of all Performance Tasks by an experienced committee of reviewers for issues of bias, fairness, and sensitivity. This committee will be comprised of Pennsylvania educators as well as national experts approved by PDE. The meeting will take place shortly before the Performance Task Review.

Performance Task Review

DRC proposes that the Performance Tasks be reviewed by committees of Pennsylvania educators. This meeting would have the purpose of reviewing items for:

- Alignment to the PCS
- Rigor-level alignment
- Technical design criteria

- Principles of Universal Design
- Bias, fairness, and sensitivity
- Accessibility

This meeting would include content-specific committees for the following grade spans: 3–4, 5–6, and 7–8. Each committee would be comprised of experienced Pennsylvania educators selected by PDE. Upon conclusion of the Performance Task Review for each content area, DRC content experts will meet with PDE staff to reconcile the recommendations of the Bias, Fairness, and Sensitivity Committee and the Performance Task Review Committee. All decisions made by PDE will be considered final and will be implemented by DRC staff prior to inclusion of any Performance Task, stimulus or source material, or item in a standalone field test form.

Face-to-Face Forms Review

DRC understands that PDE will have final approval of the selection of items and test forms, and we agree to work cooperatively to ensure a smooth flow of information between PDE’s assessment specialists and DRC’s test development team. We propose to facilitate this approval process by conducting face-to-face meetings with PDE to review the content of the proposed forms. DRC proposes a face-to-face forms review meeting prior to the standalone field test and again for the first operational administration. For the standalone field test, PDE would review and approve the multiple-choice items used to create a link between the existing PSSA scale and the Performance Tasks for each content area. Additionally, PDE would have the opportunity to review and approve each Performance Task after all previously requested revisions have been completed. For the face-to-face forms review meeting prior to the 2018 operational administration, PDE will review and approve the operational selections for three operational forms: 2018, 2019, and 2020.

Standalone Field Test Event

Because of the nature of these tasks and the extended time needed to complete them, we recommend that these tasks be administered outside of the window of the operational assessment. DRC proposes that a standalone field test event take place in January 2017. This field test event would include eight forms per grade and content area to ensure that enough complete Performance Tasks would survive to populate the following three years’ operational forms. In order to provide a link to the existing PSSA scale, DRC recommends that operational-ready items for each content area (mathematics and ELA) be included in each field-test form. For ELA, these items would be a combination of passage-based reading comprehension items and standalone language items.

In acknowledgement of the limited number of students expected to test online, DRC proposes a single-mode field test administered in print. However, DRC is open to discussing the possibility of online or mixed-mode field testing and

operational events, as this could make it possible to assess additional areas of the PCS that are not currently assessed on the PSSA (e.g., Speaking and Listening in the ELA assessments).

DRC proposes the use of a single scannable booklet for both the field test and operational forms.

The actual testing time needed for the field test event for mathematics and ELA is shown in the tables that follow. Additional time (10–15 minutes) would be needed for administrative tasks such as distributing assessment materials and reading directions aloud.

Mathematics Estimated Testing Time for Grades 3–8 Standalone Field Test

| Item Type | Number of Items per Form | Estimated Testing Time (in minutes) |
|----------------------------------------------------------------------------|--------------------------|-------------------------------------|
| Stimulus | 1 | 50 |
| SA | 2 | |
| SCR | 1 | |
| ECR | 1 | |
| Form will also include an operational ready PSSA set for linking purposes. | | |

English Language Arts Estimated Testing Time for Grades 3–8 Standalone Field Test

| Item Type | Number of Items per Form | Estimated Testing Time (in minutes) |
|----------------------------------------------------------------------------|--------------------------|-------------------------------------|
| Passage | 3–4* | 90 |
| SCR | 2 | |
| Essay | 1 | |
| Form will also include an operational ready PSSA set for linking purposes. | | |

* Two to three stimuli would be associated with each Performance Task; one passage would be associated with the passage-based items used for linking (field test administration only).

Item Data Review

DRC proposes that all Performance Tasks that are flagged due to statistical concerns be reviewed by committees of Pennsylvania educators during an item data review to be held during the summer of 2017. Content-specific committees would be convened for grades 3–5 and grades 6–8 for review of item difficulty (p -value), item discrimination (item-total correlation), score point distribution, and Differential Item Functioning. Committees would provide consensus recommendations regarding the future usability of each Performance Task on a future operational assessment.

Operational Forms Construction

For each operational administration, one form would be developed for each grade and content area. The form will contain one performance task, including the stimulus or passage set and item types described in the following tables. These designs are intended to minimize seat time while providing the opportunity for students to demonstrate skills that are not currently assessed on the PSSA using real-world tasks that provide for meaningful assessment. Operational assessments would be administered beginning in January 2018.

**Mathematics Estimated Testing Time for Grades 3–8
Operational Administration**

| Item Type | Number of Items per Form | Estimated Testing Time (in minutes) |
|-----------|--------------------------|-------------------------------------|
| Stimulus | 1 | 35 |
| SA | 2 | |
| SCR | 1 | |
| ECR | 1 | |

**English Language Arts Estimated Testing Time for Grades 3–8
Operational Administration**

| Item Type | Number of Items per Form | Estimated Testing Time (in minutes) |
|-----------|--------------------------|-------------------------------------|
| Passage | 3 | 60 |
| SCR | 2 | |
| Essay | 1 | |

Because these tasks will be memorable, we recommend releasing the operational task annually following a release schedule that will be determined in consultation with PDE. Through the use of annotated released tasks, PDE will have a strong tool to communicate to students, teachers, and parents the expectations for performance. DRC would be happy to discuss options for providing preliminary performance task item and scoring samplers to communicate to students, teachers, and parents performance expectations prior to the first operational testing event.

Scoring Considerations

DRC understands that no performance tasks are currently used in either the PSSA or the Keystone Exams but that PDE is interested in the development and administration of these tasks for students in grades 3–8. The operational plan that DRC is proposing for the Performance-based Assessments (PBA) includes one performance task per student per grade for mathematics and ELA. The field test plan proposed includes eight PBAs per field test per grade per subject.

The mathematics PBA will consist of two one-point items, one short constructed-response item, and one extended constructed response item. DRC is proposing that these mathematics PBAs be treated as one unit and that rangefinding committee members and readers score these as a whole. In other words, the scoring guidelines will encapsulate the scoring rules for each piece of the task. Since several parts of the task will most probably be interdependent, the same scorer will assess each piece and assign scores to the four parts. Training materials will reflect this method. The handscoring reports, however, will include data for each part of the PBA task. DRC is proposing **Ms. Dorie Rieger** and **Ms. Roberta Lawler** as the handscoring content leaders for this endeavor.

The ELA PBAs that DRC is proposing consist of two short constructed responses and one essay. Unlike the mathematics PBAs, however, DRC envisions having separate scorers for the short constructed responses and the essay. Each piece of the ELA PBA will have its own scoring guidelines, and training materials will be developed for each item and essay. Grades 3–5 will have PBAs developed in the narrative, informative/explanatory, and opinion modes, while grades 6–8 will be assessed in the narrative, informative/explanatory, and argumentative modes. Please be assured that all current PSSA scoring protocols would be followed for this assessment. DRC anticipates that its current ELA Pennsylvania team will oversee all processes related to handscoring. This team consists of **Mr. John Kobe**, **Ms. Melinda Peulen**, and **Ms. Annie Van der Merwe**.

As with all of our current Pennsylvania assessments, DRC’s mathematics and ELA handscoring teams will collaborate with test development content specialists and PDE to create scoring guidelines that reflect the true intent of each standard being assessed. We are confident that we can do a superior job for PDE.

PBA Psychometric Considerations

DRC understands that incorporating PBAs into existing testing programs must be done carefully so that the reliability and validity of the assessment is enhanced. DRC has extensive history working with PBA tasks, and our research designs and analysis plans have been structured to accommodate changes without disrupting the quality of the testing program. For field testing, our initial plan would be to include linking items from PSSA to express all PBAs on the PSSA scale of measurement.

Once the PBAs have been linked to the PSSA scale, form construction activities that encompass both the PBA and the PSSA core forms can be concurrently considered. DRC will work with PDE and the TAC to confirm how to best incorporate student performance on the PBA into the PSSA. However, by linking the PBA tasks to the PSSA scale of measurement, we can easily report performance on the PBA and the traditional PSSA form using the same calibration, equating, and scaling procedures. With the introduction of new content or item formats to the PSSA, DRC Psychometric Services will thoroughly evaluate how changes to the test impact the reliability and validity of test scores. Depending on the difficulty of the PBA tasks relative to other PSSA items, it may be desirable to conduct a standards validation wherein the panelists would evaluate the PBAs relative to the PSSA performance-level descriptions and the associated cut scores.

4. Option 4: Expansion of CDT to Include Kindergarten through Grade 2

DRC is pleased to propose our solution for the development of CDT assessments in English language arts and mathematics for students in Kindergarten through grade 2. DRC understands that the CDT for students in grades 3 through high school is comprised of multiple-choice items with four answer options and evidence-based multiple-select items with two parts. DRC further understands that the item type, font size, and number of answer choices remains consistent across all items within the CDT, regardless of the grade- or course-alignment of the item. This includes items aligned to the PCS for Kindergarten through grade 2 that are available to allow the abilities of struggling students in grades 3 through 5 to be adequately assessed.

Given the unique characteristics of young learners, DRC proposes that the K–2 CDT will be a different assessment from the CDT available for grades 3 through high school. This different assessment will make use of a different logo to make it clear to educators, parents, and students in Pennsylvania that the K–2 CDT is not the same assessment system that is used for older students. The presentation of items will differ from the multiple-choice items and evidence-based multiple-select items found in the current CDT, and the psychometric scale will differ such that student scores will not be comparable from K–2 to grades 3 and above. Key features of DRC’s K–2 proposed design include:

- The K–2 CDT will use diagnostic categories that differ from those of the existing CDT to ensure that the information reported is best suited for early elementary educators, students, and parents/guardians.
- The K–2 CDT will contain items aligned to the PCS in pre-Kindergarten through grade 3 to ensure that diagnostic information is available for students performing both below and above their current grade level.
- The K–2 CDT will include an optional “screener,” or pretest, containing six to ten pre-Kindergarten items for each content area. This screener will be designed to gauge a student’s readiness to participate in a computerized testing administration. Educators can use this brief assessment as an “off ramp,” or place to exit the assessment, for students who are not ready for a computerized assessment to minimize the frustration of students who would not be successful in completing the assessment.
- The K–2 CDT will follow a “Multi-Stage Adaptive Model.” This is different from the traditional adaptive CDT because the CAT engine will assign sets of items to a student based on their performance on a previous set of items. (The current CDT assigns items to a student based on his/her performance on previous items). More information on the “Multi-Stage Adaptive Model” is included later in this section.
- The K–2 CDT will use the same reports that are available for the current CDT. This will allow educators access to group and individual maps showing the performance of students within a student group for the most recent testing event, as well as up to two previous test administrations, in addition to group and individual learning progression maps that allow educators to “drill down” to look at performance trends across content and across students within a group. These reports also provide links to suggested materials and resources within the Standards Aligned System (SAS), as well as sample items indicative of the content to which items administered to the student(s) align.

ITEM DEVELOPMENT

Prior to item development, DRC proposes to have a face-to-face meeting with staff from PDE’s assessment, teaching and learning, and early childhood groups to finalize the test blueprint, learning progressions, and diagnostic categories. The learning progressions are key to the development of items aligned to the PCS in English language arts and mathematics, as the learning progressions detail the development of skills and understandings found in the standards. To expedite the process of finalizing the learning progressions from pre-Kindergarten through high school, DRC will provide draft learning progressions for the addition of pre-Kindergarten standards to the current learning progressions.

Following this meeting, DRC will develop a sample set of items for review and approval by PDE. These items will be provided for electronic review by PDE staff, and a conference call will be scheduled to occur upon completion of this review.

The purpose of this call is to ensure that DRC fully understands PDE’s vision for the development of these items. After this conference call, DRC will develop the remaining items needed to provide 710 items for each content area. The items will be aligned to pre-Kindergarten, Kindergarten, and grades 1 through 3. The items across the grade span included in the K–2 CDT will use the same presentation to ensure a consistent test experience for all students, regardless of their performance above or below grade level. All items will be autoscored, technology-enhanced items or multiple-choice items. In addition, items will have the following qualities in consideration of the unique characteristics of young learners:

- Graphics are in color, and all text is in a sans-serif font that is easily read on the screen by young readers. Human Voice Audio (HVA) for all students provides an additional support in a manner consistent with students’ previous experiences.
- Passages used for ELA will not include scrolling. Instead, students will click on an area on the right side of the passage screen to move to the next page or an area on the left side of the passage screen to move to a previous page. This functionality mimics a “flip book” to accommodate for the fine motor control typically found in younger students.
- Response areas are large, asking students to click on a picture or word(s) rather than to select an answer bubble. In addition to accommodating for the fine motor control of younger students, selecting responses in this manner is more similar to students’ prior experiences with paper and pencil assessments.
- Drag-and-drop items include large response spaces. Larger spaces provide more opportunities for success for students who might “let go” of an object before reaching the desired location.
- Onscreen mathematics manipulatives such as base-ten blocks or number lines, are provided in some mathematics items to assist students in determining their final answer. This allows students to have the tools necessary to perform calculations with appropriate scaffolding that does not cue the correct answer, but rather enables students to determine the correct answers.
- Technology-enhanced item types are designed to mimic item types that students have experienced in other classroom and paper and pencil assessments. Drag and drop items are similar to sorting manipulatives, and counting with a click-to-highlight item is similar to pointing to objects in order to count them. Additionally, matching items that allow students to select items (words, phrases, and/or pictures) that go together are similar to item types that young students have experienced in classrooms.

- Multiple-choice item types are designed to be appropriate for young learners. Multiple-choice items designed for K–2 students include three answer options rather than four or more options to accommodate characteristics of young learners. In addition, these answer options have response areas, such as selecting a graphic or word, that are larger than typical multiple-choice answer bubbles to accommodate for the fine motor control of young students.
- Evidence-based selected-response item types are designed to be appropriate for young learners. Evidence-based, selected-response items designed for K–2 students include three answer options for each of the two parts and will have a maximum score point of 2. Each part, Part 1 and Part 2, have only one correct answer. Students receive a score ranging from 0, 1, or 2 points and can receive credit for either Part 1 or Part 2 regardless of their response to the other part.

ONLINE TOOLS

DRC understands that young students may have limited experience with online testing; therefore, online tools will be as similar as possible to those encountered in students' previous experiences. Tools available for students are described below:

- Students use a **pointer tool** to select pictures or text to answer questions.
- A **line guide tool** is available to help a student follow along with the text. The line guide has a handle that students can use to move it up or down.
- A **ruler** is available for some items. Students can move the ruler to different places on the screen and can rotate it.
- **Human Voice Audio (HVA)** is available for all students (not just as an accommodation).

DRC's system is capable of providing additional tools such as a **highlighter** and **sticky note tool**, and we would be happy to discuss the appropriateness of using each of these tools for the intended assessment based on the types of items that are developed.

Additionally, DRC understands the importance of allowing students to use the device they are most comfortable with based on instruction and other classroom experiences. Therefore, the K–2 CDT will be available via multiple operating systems and hardware, including computers, netbooks, and tablets running Windows, Mac, and Linux operating systems, in addition to Chromebooks, iPads, and select Android devices.

Students will have an opportunity to explore the Online Assessment System and practice using the available tools through **Student Tutorial videos** and **Online Tools Training** available for each content area and grade.

ITEM REVIEW

Prior to item review, PDE will be provided the opportunity to review and provide requests for revision or replacement of each of the items developed for the K–2 CDT. This review will take place electronically to allow PDE to experience the technology-enhanced items that make up this development.

DRC is pleased to propose an item review by Pennsylvania educators in which the items are reviewed electronically. Due to the technology-enhanced nature of all items in the proposed development, it is necessary for educators to experience the items online as a part of the review process. As such, DRC would like to propose a four-day meeting with educators assigned to each content area (ELA and mathematics). DRC will work with PDE staff to determine the criteria for those educators needed for the item review and will provide the pool of candidates for selection by PDE staff of educators to invite, as well as alternates. DRC will then complete all aspects of the meeting planning, including inviting attendees, securing meeting space and sleeping rooms, and/or parking as necessary, and arranging for food and beverage to be provided during the meetings.

During the first day of the item review meeting, DRC content experts would provide training in both the use of the online assessment system and in the item review criteria. The item review criteria include the following:

- Alignment to the PCS
- Rigor-level alignment
- Technical design properties of each item
- Adherence to the Principles of Universal Design
- Freedom from issues of bias, fairness, and sensitivity

Upon completion of this training, each educator will be asked to sign a Security/Confidentiality agreement. Upon receipt of the signed Security/Confidentiality agreement, each participant will be provided login information (i.e., a username and password) to access a set of items via a secure browser on a provided device, such as a computer, Chromebook, or iPad. Each member of a content- and grade-specific committee will independently review a small set of items via the secure browser. Then, DRC and PDE staff will facilitate a discussion of the items. The goal is to come to a committee consensus regarding an item's status as Accepted As Is, Accepted with Revisions, or Rejected. Committee members will be provided with documents to capture the individual educators' and consensus rating of the specified criteria for each item as well as any comments regarding suggested revisions of the items.

FIELD TEST

DRC proposes a standalone field test to take place in Spring 2017. The voluntary field test would include 50 fixed forms for each content area. These forms will include forms to be administered in Kindergarten, grade 1, and grade 2. The items aligned to pre-Kindergarten standards would be administered along with Kindergarten items to Kindergarten students, and items aligned to grade 3 standards would be administered along with grade 2 items to students in grade 2. Each fixed form would consist of 20 items, which would be a combination of unique field test items, common items across all forms within a grade for horizontal linking, and common items appearing on multiple grades to be used for vertical linking.

DIRECTIONS FOR ADMINISTRATION MANUALS

DRC understands that the K–2 CDT differs from assessments with which Test Administrators and students may be familiar. Therefore, DRC proposes the development of a Directions for Administration Manual for each content area for the standalone field test.

DATA REVIEW

DRC proposes that item statistics be used as a means of detecting items that deserve closer scrutiny rather than as a mechanism for automatic retention or rejection. Toward this end, a set of criteria will be used as a screening tool to identify items needing a closer review by committees of Pennsylvania educators.

For an item to be flagged, the criteria include:

- Point-biserial correlation for the correct response of less than 0.10
- A differential item functioning (DIF) code of either C- or C+

Items not identified for this review either have good statistical characteristics and, consequently, are regarded as statistically acceptable, or have extremely poor statistical quality and, consequently, are regarded as unacceptable, removed from the CDT item pools, and need no further review.

At the item data review meetings, committee members will first be trained with regard to the statistical indices used in item evaluation. This training is followed by a discussion with examples concerning reasons that an item might be retained regardless of the statistics. The committee review process involves a brief exploration of possible reasons for the statistical profile of an item (e.g., possible sensitivity/bias, grade appropriateness, instructional issues) and a decision regarding acceptance. DRC content-area test development specialists will facilitate the review of the items. Each committee will review the pool of field test items and make recommendations on each item.

BENCHMARKING ACTIVITY

As with the existing CDT, K–2 CDT scores will be placed along a continuum from “Areas of Need” to “Strengths to Build On.” These are represented in the dynamic reporting suite with the colors red, green, and blue. “Areas of Need” are in the red range, while “Strengths to Build On” are in the green and blue ranges. The center of the green range for each CDT grade or course will be established by panels of Pennsylvania educators during benchmarking activities. The center of green is the point that separates students into two categories: solidly ready for the next grade or course or not solidly ready for the next grade or course.

The Randomly Ordered Item Booklet (ROIB) Angoff (Yes/No) method will be used to set CDT benchmark cut points. A panel of educators will work to establish cut points for Kindergarten, Grade 1, and Grade 2 for each content area. After a training session describing the process and definition of roles, a discussion will be held in which panelists are asked to describe what “solidly ready for the next grade or course” means. Thereafter, panelists will be asked to review approximately 40 test questions and make individual yes/no judgments as to whether a “solidly ready” student would be successful in answering each question. The judgments are made over two iterations, or rounds, with a sequence of Round 1 judgments, show and verification of Round 1 results, group discussion, and Round 2 judgments.

After cut points are set for each grade within a content area, the vertical articulation of cut points across grades will be reviewed for each content area. Given that each content area is vertically scaled, it is expected that cut points will increase as grade increases. For example, the grade 2 cut point would not be lower than the grade 1 cut point on the vertical scale. In some cases, post-smoothing may be required to ensure increasing cut points across grades and smooth transitions.

MULTI-STAGE ADAPTIVE MODEL

DRC proposes that the K–2 CDT will follow a “Multi-Stage Adaptive Model.” This is different from the traditional adaptive CDT because the CAT engine will be assigning sets of items to a student based on their performance on a previous set of items. Each item “set” will be a fixed-form, mini-test (or testlet) with 10–15 items. The multi-stage adaptive model is more appropriate for K–2 students as it allows PDE to administer fewer items and for those items to target specific content standards. It also provides PDE with the option of choose to provide a print-on-demand (POD) feature, should PDE desire to provide this additional option as part of the K–2 CDT program.

In the first administration of the year, every student for a grade will start with the same set of items of average difficulty for their grade level (Stage 1). For Stage 2, the student will move to a set of more difficult items, another set of average items, or a set of less difficult items, depending on how they did with the first set of items. This pattern continues through a total of four stages for the first administration. Students may receive items either above or below grade level, depending on their performance on previous item sets.

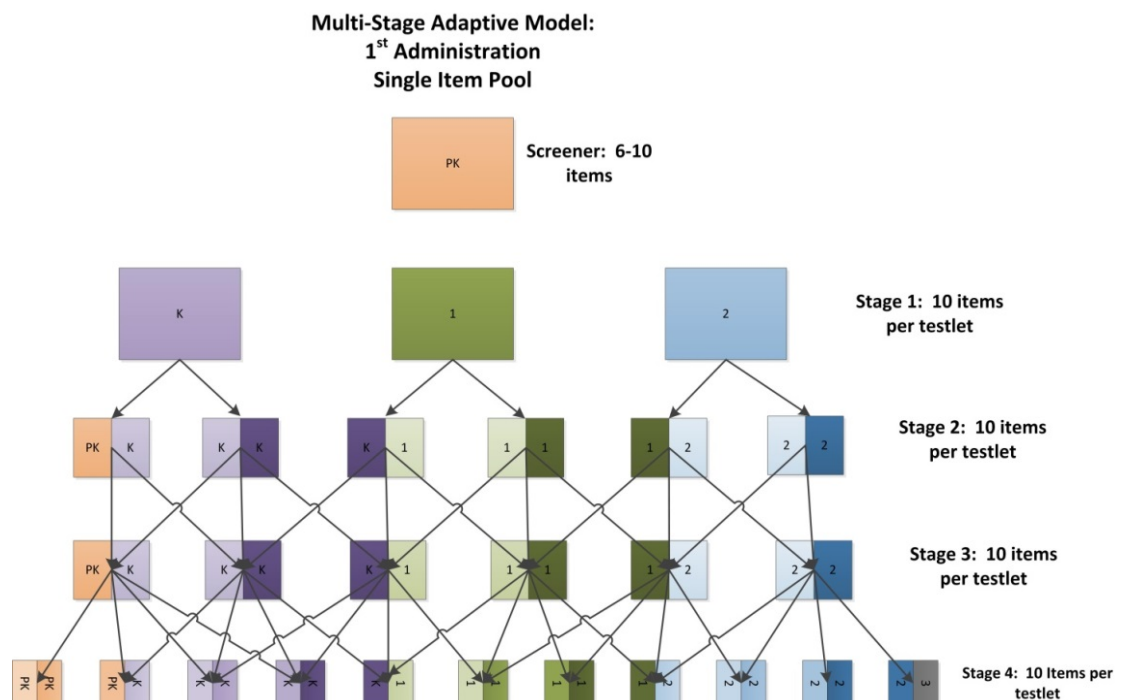
In subsequent administrations within a year, students skip the screener and the on-grade set of items. The CAT engine will start the student at a level of difficulty matching their previous administration score. There will be three stages in subsequent administrations, each stage containing 10–15 items.

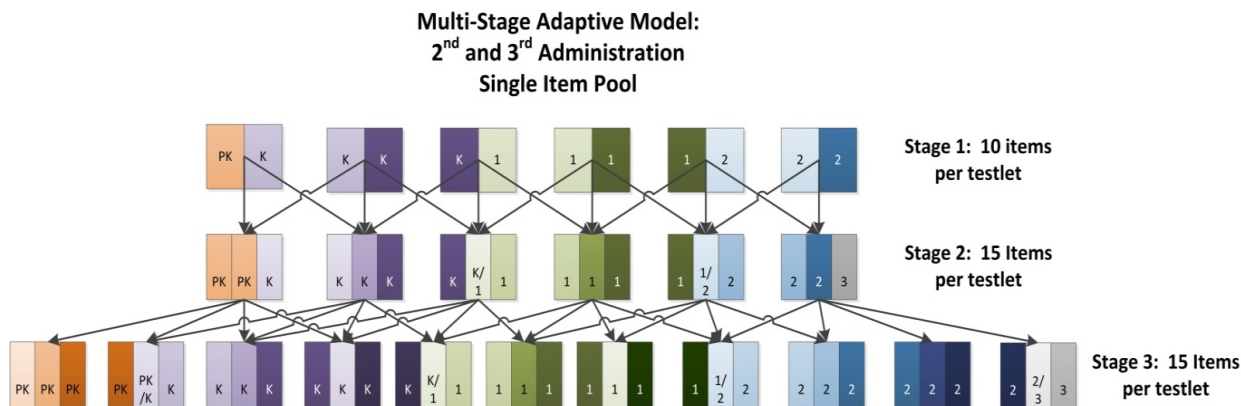
A total of 40 items will be administered for each CAT. (These 40 items could be divided between two days.)

The diagram that follows reflects the current design plan for the first administration. Note that there will be one pool of items across all grades for each content area (ELA and mathematics). The various colors within a stage represent overlapping items between sets within a stage. In the first administration, there are ten items per testlet. Beginning in Stage 2, those ten items are divided into two groups of five. The easier items also appear on the next easiest testlet, while the more difficult items also appear on the next more difficult testlet.

In the second and third administrations, Stage 1 follows the same pattern as Stages 2 through 4 in Administration 1, including ten items per testlet with overlapping items.

In Stages 2 and 3, each testlet is made up of fifteen items. Five of those items appear on the next easiest testlet within the stage; five items are unique to that testlet; and the remaining five items appear on the next more difficult testlet.





ONLINE USER GUIDES

DRC understands that the K–2 CDT differs from assessments with which Test Administrators and students may be familiar. Therefore, DRC proposes the development of an Online User Guide that will be available for all potential users of the CDT. This User Guide will provide the following information:

- General information regarding the K–2 CDT, including an introduction, key dates, and how to access customer service support
- Roles and responsibilities for District Technology Coordinators, District Assessment Coordinators, School Assessment Coordinators, Teachers, and Test Administrators
- Information about the Pennsylvania Online Assessment, including the Student Tutorials, Online Tools Training, and K–2 CDT
- Instructions for downloading the Pennsylvania Online Assessment Software, accessing eDIRECT, and using the test setup system
- Directions for Assessment Administration, including issues of assessment security, recommended assessment schedule, advance considerations for test administration, preparing students for the assessment, features of the online assessment, and accommodations available

DRC proposes that this user guide be posted online, and understands that providing a single document for all users will provide an efficient way for educators to access all information needed to prepare for the administration of the K–2 CDT to students in their classrooms, schools, and districts.

DESCRIPTION OF INTERACTIVE REPORTS

DRC proposes that the same Interactive Reports that are currently available for the existing CDT be made available for the K–2 CDT. These include: Group Maps, Individual Maps, Individual Learning Progression Maps, and Group Learning Progression Maps. For more information about the Interactive Reports, please see

Subheading 4.1.8.j., CDT Reporting Tool. Within these interactive reports, educators would have access to sample items, instructional materials and resources, and students' overall and diagnostic-category scores for the three most recent administrations.

Sample items will be included in the same process as items that will become a part of the operational forms: items will be developed, reviewed during item review, field tested, and included in the data and item alignment reviews.

VOLUNTARY MODEL CURRICULUM

In addition to the expansion of CDT to include Kindergarten through Grade 2, PDE requests the option to develop a set of Voluntary Model Curriculum (VMC) units and lesson plans for pre-kindergarten (Pre-K) along with the related expansion of the Learning Progression Map for PK. As the original developer of the VMC and the Learning Progression Maps, DRC is pleased to extend this work to include Pre-K VMC for ELA and mathematics as is appropriate for this student population.

The development of the VMC and extension of the Learning Progressions Map will be under the supervision of DRC's **Dr. Robert Poppe**, who supervised the development of the current VMC and Learning Progressions. The writing of the Pre-K units and lesson plans also will be under the supervision of **Ms. Anne Kirpes**, who has extensive experience in the development of early childhood curriculum and instructional materials and resources.

Consistent with the current VMC units and lesson plans, DRC will ensure that the PCS and the Curriculum Frameworks will drive the development of the Pre-K model curriculum units and lesson plans and ensure continuity between the grades K–2 VMC in development by DRC and the new Pre-K units and lesson plans. DRC will continue to utilize a backward curriculum design model based on Wiggins and McTighe's *Understanding by Design* model and the unit and lesson plan templates currently used for K–2, which are based on the PCS and the Curriculum Frameworks.

DRC proposes to be the primary curriculum developer for the 8 Pre-K units and 24 lesson plans, and DRC's experienced English language arts and mathematics curriculum specialists and editors will guide the development of the units and lesson plans; edit the draft lessons to ensure consistency in approach, style, and voice with the K–2 VMC; ensure alignment with the PCS and the Curriculum Framework; facilitate the review of the Pre-K VMC by a committee of Pennsylvania educators selected by PDE; and finalize the Pre-K units and lesson plans based on committee feedback. DRC English language arts and mathematics content specialists who developed the current Learning Progressions will extend them to the pre-kindergarten level. In addition, DRC will ensure that the CDT, VMC, and Learning Progression Map contain necessary and accurate content coding links to allow for the continued interconnections between the CDT Reports, the Learning Progression Maps, and the Voluntary Model Curriculum (VMC).

During Year 1, assuming that Option 4 is exercised by PDE, DRC will propose a VMC development plan identifying the content distribution of the 8 units and 24 lesson plans for PDE feedback and approval. Draft units and lessons will then be developed and internally reviewed and edited in preparation for committee review. DRC will prepare a training presentation and support materials for PDE approval prior to the committee meeting. PDE will identify six pre-kindergarten educators and a list of alternates for each content area to serve as committee panelists, who will independently review and provide feedback on the draft units and lesson plans. DRC proposes that three of the panelists should have an ELA background and review the ELA units and lesson plans, while the other three panelists should have a mathematics background and concurrently review the mathematics units and lesson plans. This concurrent review process should enable the review of all units and lesson plans during one meeting day, and panel members will receive a \$500 stipend for this activity.

All units and lesson plans will be developed as Word documents, and associated unit resources may be a combination of Word documents or Excel and PowerPoint files. Final VMC units, lesson plans, and resources will be posted on the PLS 3rd Learning (PLS) ftp site. PLS 3rd Learning is an organization dedicated to the improvement of teaching and learning in K1–2 schools. PLS is responsible for uploading the VMC to SAS. DRC will collaborate with PLS on the transfer of VMC to SAS and the necessary linking between the CDT Reporting System and the VMC units, lesson plans, and resources on SAS

No copyrighted content will be contained within the VMC; hyperlinks used in VMC will not link to commercial URLs, and PDE will retain ownership of the VMC units, lesson plans, and associated resources developed by DRC.

K–2 VMC DEVELOPMENT PROCESS OVERVIEW

The K–2 VMC units will adhere to best practices in early learning curriculum, instruction, and assessment. Best practices around development of early learning curricula recommend design and delivery of integrated, authentic learning experiences and environments that are developmentally appropriate (age-appropriate and individually-appropriate); connect with learners’ knowledge, skills, interests, and home/community experiences; and use formative assessment strategies to build upon students’ developing abilities.

Developmentally appropriate instruction for early learners involves child-centered routines, environments, and materials framed around multi-modal, multi-representational, and hands-on, active experiences. These experiences can be supplemented by carefully designed intentional teaching to enhance students’ learning experiences (California Department of Education, 2010; NAEYC, 2008). Language development is especially important during the PK years and provides a foundation for later literacy instruction (August & Shanahan, 2006; Snow, Burns, & Griffin, 1998; TESOL, 2010). Materials and activities should encourage children to communicate, and teachers should look for opportunities to build upon the linguistic and cultural resources children bring with them (Espinosa, 2002).

Because play is central to young children’s explorations and their engagement in learning experiences (Lilliard et al., 2012; NAEYC, 2008), group play and learning centers that provide opportunities for art, music/movement, science, math, block play, sand, water, and dramatic play rather than standalone decontextualized practice are essential in Pre-K curricula.

Assessment practices in the early childhood classroom should be conducted on an ongoing basis in the context of typically occurring activities and should rely on observational measures using formative assessment tools (e.g., checklists, anecdotal records, portfolios) to gather information about students, reflect on that information, and use it to inform developmentally appropriate early education instruction (Snow, 2011b). Teachers should employ culturally and linguistically sensitive tools and practices to ensure they are assessing student understanding and not the level of English language proficiency or cultural distance from mainstream schooling (Espinosa & Garcia, 2012; Snow, 2011a).

The VMC units and lessons to be developed will be based on the expanded Learning Progression Map and the Curriculum Framework. The choice of the Backwards Design framework (Wiggins & McTighe, 1998; 2005) for this work orients VMC development toward developmentally appropriate outcomes with a focus on independent performance in context. McTighe and Wiggins (2012) explain their approach:

The initial question for curriculum development must be goal focused: Having learned key content, what will students be able to do with it? . . . The key to avoiding an overly discrete and fragmented curriculum is to design backward from complex performances that require context. [Thus, the goal is not to create a curriculum which] is envisioned and enacted as a set of maps of content and skill coverage [but to] develop a student’s increasingly autonomous capacity to use learned content effectively to address complex tasks and problems. (p. 7)

The DRC Development Team will create an initial outline of the eight units in ELA and mathematics. To improve the likelihood of long-term adoption and use by PK teachers in Pennsylvania, the Development Team will also conduct a search of current Pre-K curriculum units used at the state and Intermediate Unit (IU) level and/or Pre-K curricula created by other states (e.g., California, Maryland, New Mexico, Ohio, and New York). Where possible, we will map the progressions to topics being used in current VMC units and lesson plans. By selecting eight units that may already be familiar to Pre-K teachers, Pre-K VMC implementation can focus *less* on the introduction of an entirely brand new curriculum and *more* on the specific ways in which these familiar units and lessons have been amplified and refined. In this way, the VMC design can ensure that PDE or IU training will be able to easily focus on best practice principles, resources, and techniques which teachers can apply to other non-VMC units and lessons.

Once the outlines of the eight Pre-K VMC units have been approved by PDE, the Development Team will construct outlines for the three lessons for each unit based on Cornerstone Tasks. Cornerstone Tasks are curriculum-embedded tasks that are intended to engage students in applying their knowledge and skills in an authentic and relevant context. These tasks are meant to anchor the lessons around the most important performances which learners should be able to do independently with acquired content knowledge and skills (McTighe & Wiggins, 2012). After the outline is approved, detailed drafts of the units and lessons will be created using the VMC unit and lesson plan templates. After the committee review meeting and receipt of their feedback, the Development Team will finalize the 8 VMC units and 24 lessons.

7. CONTRACT REQUIREMENTS – SMALL DIVERSE BUSINESS PARTICIPATION

DRC acknowledges that any contract resulting from this RFP must include provisions requiring the selected offeror to meet and maintain any commitments made to Small Diverse Businesses (SDB) at the time the proposal is submitted or during contract negotiations. These commitments shall be maintained throughout the term of the contract and through any renewal or extension of the contract. Any proposed change must be submitted to and approved by the BSBO. DRC further acknowledges that any contract resulting from this RFP must include a provision requiring SDB subcontractors to perform at least 50% of the subcontract work.

If the contract is assigned to another offeror, the Small Diverse Business participation commitment must be maintained by the new offeror.

After contract award, DRC will complete the Prime Contractor's Quarterly Utilization Report, or similar type document containing the same information, and submit it to the contracting officer of the Issuing Office and BSBO within 10 workdays at the end of each quarter the contract is in force. If there was no activity during the quarter then the form must be completed by stating "No activity in this quarter." DRC currently follows this reporting procedure for our active contracts with the Commonwealth.

Please see our Small Diverse Business Participation Submittal provided under separate cover.

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SECTION 4. PRIOR EXPERIENCE (REDACTED)

Data Recognition Corporation (DRC) is pleased to provide our proposal for the development, administration, scoring, analysis, and reporting of the Pennsylvania Department of Education System of Assessments (Pennsylvania assessments). This includes the Pennsylvania System of School Assessment (PSSA), Keystone Exams, and Classroom Diagnostic Tools (CDT).

Under the guidance of the Pennsylvania Department of Education (PDE), DRC will oversee and manage all aspects of the Pennsylvania assessments. We will provide project management; item/passage/prompt and test form development; printing; packaging, distribution, and collection; customer service; computer-based test administration via our online testing engine, DRC INSIGHT, along with training and support; processing and scanning; handscoring; psychometric services; and reporting.

In addition, we have partnered with two highly qualified and experienced Small Diverse Businesses to present the best program possible for PDE.

- **Victory Productions** will provide item development, Spanish translations, online tutorial production, and video sign language production.
- **eMetric, LLC**, will provide the data query and reporting tool, as well as posting of student reports, parent letters, summary reports, and the Accountability Report. eMetric will host the PSTAT website. They will also provide psychometric consultation and third-party equating verification for both the PSSA and the Keystone Exams.

Along with these partners, DRC has received the commitment of the following Small Diverse Businesses (SDBs) as vendors for this contract: Advanced Shipping Technologies for delivery and return of test materials, Brenneman Printing, Lightning Printing, and Techni-Forms for printing of test materials, Holiday Travel for meeting planning and travel services, Jemni Technologies for paper for student reports, and Language Services Consultants for translation verification. A full description of our plans for utilizing SDBs can be found in our Small Diverse Business Submittal.

Why Choose Our Team?

We believe the experience and skills of our combined organizations offer a unique and superior solution for the Pennsylvania assessments—a synthesis of talents and capabilities that cannot be found with any other testing contractor. Our program services will not only meet, but exceed the contract requirements, as we work in close collaboration with PDE to deliver a high-quality, innovative, and technically sound assessment program to the students of Pennsylvania. The partnership described throughout our proposal offers PDE the exceptional strengths and advantages of each of our organizations, ensuring the success of the Pennsylvania assessments.

A LONG-TERM, SUCCESSFUL RELATIONSHIP WITH THE COMMONWEALTH

At DRC, we believe that by providing a consistent source of leadership, we are better able to serve our clients and the students and educators of their states. **We have an excellent record of retaining high-quality program managers, which has helped us to build strong, long-term relationships with our state clients.** PDE has experienced DRC's commitment to the longevity of our staff directly, through interaction with our many long-term employees involved in the current Pennsylvania contracts. For example, Ms. Shaundra Sand, our proposed Program Director, has served in project management for Pennsylvania since 1996.

DRC's work with the Commonwealth of Pennsylvania goes back even farther, beginning in 1992, with our first contract for the Pennsylvania assessments. As Pennsylvania's testing program has grown and changed, DRC has served as a trusted and reliable partner of PDE, working cooperatively to meet all the demands brought about by changes in the assessment world, such as the No Child Left Behind Act, accountability reporting requirements, and transition to the Pennsylvania Core Standards.

Over the years, DRC has developed positive relationships with PDE and the many education stakeholders throughout the Commonwealth. Our experience in the field has allowed us to be intimately familiar with Pennsylvania's unique processes, procedures, and needs, including work plans and schedules. Gathering input from the field about products and deliverables has allowed DRC to get to know stakeholders and appreciate their many contributions to the Commonwealth's goals. These positive relationships and a collaborative work approach, built over time, have contributed to high expectations being met and a successful program delivered.

This extensive background of knowledge about the PSSA, Keystone Exams, and CDT will help us to better serve Pennsylvania, as our test developers, psychometricians, and project managers continue to work in close collaboration with PDE through this new contract.

INNOVATION AND QUALITY WORKING TOGETHER

DRC is at the forefront of helping Pennsylvania and other states across the country deliver innovative, forward-thinking assessment programs, allowing clients to meet government and industry standards and lead in improving student achievement. For example, we have a proven track record in shepherding states, including Pennsylvania, through the important progression to online testing. What's more, DRC has been a key driver in the expansion of existing online testing programs and district-level participation for our state partners, as we have done and will continue to do for the Commonwealth.

DRC takes a client-centered approach to the deployment of our innovative technology, ensuring the right technology solution for every school, student and teacher. **What separates DRC from other assessment providers is our**

steadfast commitment to both quality and innovation. DRC provides the innovations that take our clients where they want to go, without losing sight of the critical need for quality, reliability, defensibility, and 100% accuracy along the way.

Few in the industry can match DRC's record and efforts to provide error-free service. The reason for this excellent record is simple: **DRC's quality processes focus on doing things right the first time**, identifying and resolving issues before they affect students and educators in our client states. Our quality processes embedded throughout every phase of our clients' programs—from production of materials to final reporting—help ensure that these testing programs are of the highest caliber.

DRC and our Assessment Partners: The Best Solution for the Pennsylvania Assessments

We believe that our experience and qualifications uniquely position us to assist PDE in delivering innovative, high-quality, technically sound tests in Pennsylvania. Parents, educators, and students of the Commonwealth, along with PDE, have already experienced our high quality and innovative services and products and our client-oriented attitude through our long-time work on this assessment program. We look forward to continuing to contribute to the success of the program.

SECTION OVERVIEW

In this section we have included background information for DRC and our Small Diverse Business partners, including corporate capabilities, experience, and references for work on similar programs, organized under the following subheadings:

- Date Recognition Corporation
- Victory Productions
- eMetric, LLC



Data Recognition Corporation

On the following pages, DRC has provided more information on our corporate capabilities, background, and experience in large-scale assessment, including project summaries and references for our work on similar projects, changes to our company structure, and pending litigation, organized under the following subheadings:

- DRC’s Corporate Capabilities
- DRC’s Relevant Experience
 - DRC’s Recent Large-Scale Assessment Experience Overview
 - DRC’s Online Testing Experience
 - DRC’s References
 - DRC’s Project Summaries
- DRC’s Contract History
- Changes in DRC’s Company Structure
- DRC’s Lawsuits and Legal Proceedings

DRC’S CORPORATE CAPABILITIES

DRC is one of the most experienced testing contractors in the nation, with responsibility for projects involving the testing of millions of students. DRC’s current education contract base includes assessment projects for 13 states—Delaware, Florida, Idaho, Louisiana, Michigan, Missouri, Nebraska, New York, Ohio, Oregon, Pennsylvania, South Carolina, and Utah—and one multi-state consortium—the World-Class Instructional Design and Assessment (WIDA) Consortium.

Our company-wide qualifications include:

- The ability to manage multiple resources for large-scale statewide assessments.
- ISO 9001:2008 certification and formal quality control and risk management processes built into every step of our standard operating procedures.

Quick Facts about DRC

A Minnesota corporation, founded in 1978

Headquarters:
13490 Bass Lake Road
Maple Grove, Minnesota 55311

9 other locations around the country

More than 550 permanent, full-time employees

More than 4,500 seasonal/temporary employees

Phone: 763-268-2000
Toll Free: 800-826-2368
Fax: 763-268-3000

www.datarecognitioncorp.com

- A history and reputation for meeting contract deadlines with a focus on the quality and accuracy of testing materials and data.
- Past and current contracts with over 30 state departments of education and two multi-state consortia.

DRC was founded in 1978 as a privately-held, Minnesota-based service firm specializing in test and survey administration and processing. We began with 50 employees in one location—a small group of people dedicated to differentiating their company by providing superior customer service. Since that time, DRC has evolved into a **full-service information management company with a staff of more than 550 full-time employees and over 4,500 temporary employees**. Even as we have grown, we have remained committed to our “customers first” attitude. Our hallmark in the testing industry has become our unparalleled responsiveness and customized solutions for each of our state clients.

DRC comprises three business units that serve the K-12 education sector, Federal and state governments, and commercial clients worldwide.

- **Education Services** provides full-service, customized assessment solutions, including program management, test development, online test administration, psychometric services, printing and packaging, distribution and collection, scoring, and reporting.
- **Survey Services** offers support in all phases of the survey process for Federal and state government and commercial clients, from development through analysis and reporting.
- **Document Services** provides in-house typesetting, printing, and finishing/fulfillment services for contracts held by Education Services and Survey Services, as well as external projects for other education, government, and commercial clients.

DRC's Corporate Values

- Respect each other and work together to leverage skills and talents across the organization
- Interact with customers and employees with integrity
- Deliver high-quality products and services that benefit our clients and community
- Promote both personal and corporate growth through continual learning and innovation
- Balance work and family responsibilities
- Demonstrate a commitment to the health and well-being of our employees by fostering a culture of wellness

Our mission is to be the preferred provider of high-quality, differentiated services to our state department of education clients, our medium and large business clients, and our U.S. Government clients.

Upholding our mission requires dedicated people who are creative and visionary and who share DRC's corporate values.

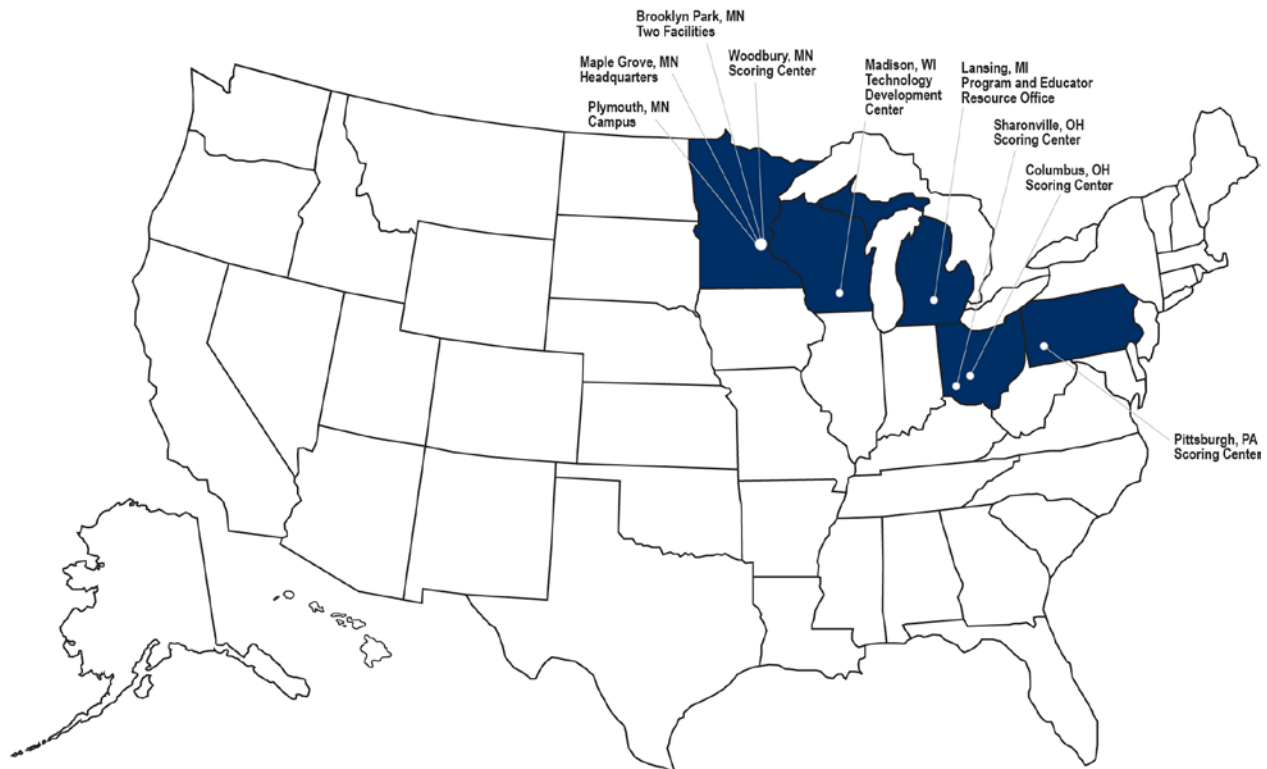
DRC is an Affirmative Action/Equal Opportunity Employer and does not discriminate in our employment practices with regard to race, color, creed, religion, age, sex, ancestry, national origin, or disability.



DRC's corporate headquarters building is located in Maple Grove, Minnesota, a northwest suburb of Minneapolis. Within the Twin Cities metropolitan area, DRC occupies over 650,000 square feet of office and warehouse space.

Headquartered in the Minneapolis suburb of Maple Grove, Minnesota, DRC has locations around the country. DRC operates five handscoreing centers across the United States, including: two in the Twin Cities metropolitan area (one in Plymouth and one in Woodbury), two in Ohio (one in Columbus and one in Sharonville), and one in Pittsburgh, Pennsylvania. DRC's two distribution and processing centers are located in Brooklyn Park, Minnesota. We also maintain offices in Lansing, Michigan, and Madison, Wisconsin.

DRC's Locations



“At DRC, we pride ourselves on our flexibility, our ability to anticipate and solve problems, and our affinity for working collaboratively with clients to develop innovative and effective programs.”

*Ms. Susan Engeleiter
CEO and President*



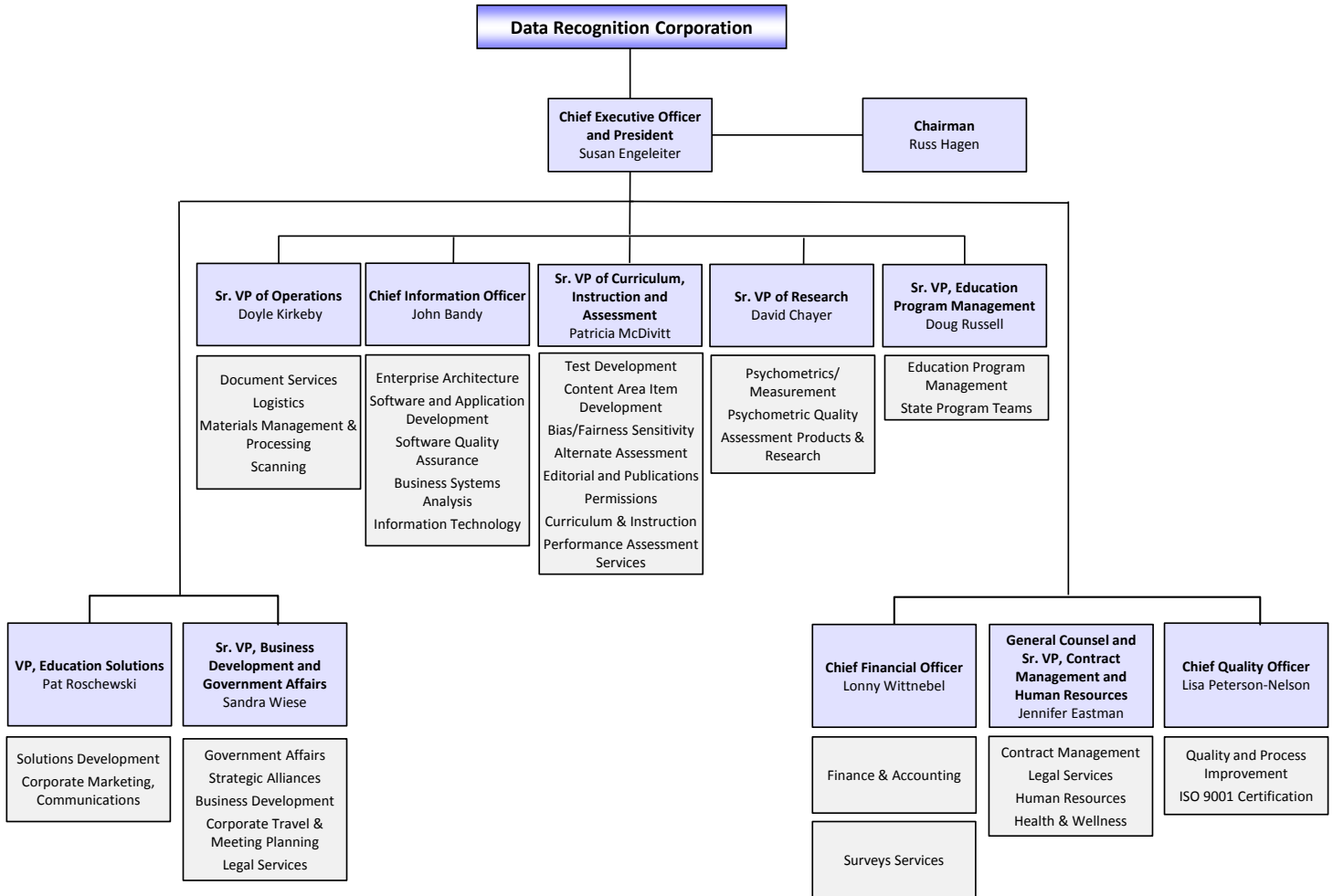
Ms. Susan Engeleiter, Chief Executive Officer and President, leads the organization and manages the day-to-day operations of DRC’s three divisions. She is responsible for business planning and development that includes strategic investments, acquisitions, and partnerships. Under her guidance for the past 16 years, DRC has become a respected service provider for large-scale assessment programs.

Supporting Ms. Engeleiter are the following DRC executives:

- Mr. Doug Russell, Senior Vice President, Education Program Management
- Ms. Patricia McDivitt, Senior Vice President of Curriculum, Instruction, and Assessment
- Mr. David Chayer, Senior Vice President of Research
- Dr. Pat Roschewski, Vice President, Education Solutions
- Mr. Doyle Kirkeby, Senior Vice President of Operations
- Ms. Lisa Peterson-Nelson, Chief Quality Officer
- Mr. John Bandy, Chief Information Officer
- Mr. Lonny Wittnebel, Chief Financial Officer
- Ms. Sandy Wiese, Senior Vice President, Government Affairs and Business Development
- Ms. Jennifer Eastman, General Counsel and Senior Vice President, Contract Management and Human Resources

DRC’s founder, Mr. Russ Hagen, currently serves as Chairman and is the minority owner of the company. Before founding DRC, Mr. Hagen developed specialty computer software for companies such as Pillsbury, Diebold, and National Computer Systems (now Pearson Educational Measurement).

DRC's Corporate Organizational Chart



HIGHLIGHTS OF CAPABILITIES AND SERVICES

Program Management

DRC's project managers ensure that no school experiences a delay in testing because of a vendor's inability to meet deadlines.

DRC's project managers use their expertise and experience to provide high-quality oversight and management of our large-scale assessment projects and ensure effective communication with our state department clients. Many of our project managers are certified Project Management Professionals (PMP®) through the Project Management Institute, bringing additional skills and advanced knowledge to their roles.

A strong focus on quality and a willing attitude enable us to find creative solutions to the challenges facing state departments of education. We manage our resources efficiently in order to meet project deadlines. Our goal is that no school should experience a delay in its testing or reporting schedule due to a vendor's inability to meet deadlines. DRC's responsiveness and flexibility are two of our trademarks in the large-scale assessment industry.

The continuity and long-term tenures of our staff are major strengths of DRC's Program Management Department. This continuity provides each state client with a team that understands the unique requirements of the state and is dedicated to the continued success of the assessment program. Our experience in successfully managing state testing programs over the course of many years demonstrates that the best solutions result from true collaboration between contractor and client. Through partnerships with our state clients, we deliver technically sound assessments that are designed to enhance the learning experience of students of all backgrounds. **In 2014, DRC's Project Management Team successfully managed 68 unique test administrations for our clients, on time and without error.**

DRC's Program Management Department also provides first-rate, "live" customer service to our clients; our corporate commitment to client satisfaction extends to our relationships with teachers, district test coordinators, and technology coordinators. We understand the stress these educators often face when administering assessments. As a result, our staff responds to telephone calls and email messages quickly and courteously. On all of our assessment projects, we consistently receive feedback from school and district staff who tell us that DRC has some of the friendliest, most helpful, and most knowledgeable customer service staff in the testing industry.

Test Development

Membership in professional associations helps our test development specialists stay current with assessment practices.

DRC has established a team of experienced content area test development specialists, curriculum experts, and content area editors in English language arts (ELA), writing, mathematics, reading, science, and social studies. All have degrees in their content areas, and most are former teachers. Team members stay knowledgeable in their fields of expertise and actively participate in professional associations.

Participating in these organizations keeps our staff informed of current assessment research and in touch with assessment stakeholders—from local teachers to nationally known education leaders. The DRC Team also has established relationships with institutions of higher education and the business community to stay current on college- and career-readiness expectations.

Our test development specialists also have extensive experience and knowledge in standards alignment, including the development and review of college- and career-readiness standards. When developing items and tests, DRC follows a series of steps uniformly recognized as industry standards, which align with the *Standards for Educational and Psychological Testing*¹. For example, our writers benefit from training that focuses not only on traditional item-writing best practices, but also focuses on best practices for the development of evidence-centered design items and assessments. This specialized training in evidence-based design item writing is crucial when developing items and tests to measure college- and career-readiness standards. The items and tests produced through our rigorous traditional and evidence-based design item-writer training, and subsequent item writing and review process, help create assessments that provide for better links between assessment and classroom teaching.

Our history of staying current in best practices for item and assessment development, along with using our focused content item and editorial processes, has yielded high-quality, content-aligned test items for numerous large-scale assessment programs. For example, DRC has developed items, test designs, and curriculum for numerous states, including Alabama, Alaska, Arkansas, Georgia, Idaho, Louisiana, Michigan, Minnesota, Nebraska, North Carolina, Ohio, Oklahoma, Pennsylvania, and South Carolina, as well as the Smarter Balanced Assessment Consortium. We have also conducted third-party independent review studies for many states, including California, Iowa, Maryland, and Oklahoma. Our services have included the following:

- Formative, diagnostic, and summative item and test development, including development of items and tests for grades 3–8 and high school, kindergarten, grades 1 and 2, and end-of-course
- Units and lesson plan development
- Item and test specifications development
- Development of paper/pencil items and online items, including technology-enhanced items, evidence-based design items, text-based analysis prompts, writing prompts, constructed-response items and auto-scored constructed-response items, traditional multiple-choice items, selected-response items, and multiple selected-response items

¹ American Educational Research Association, American Psychological Association, National Council on Measurement in Education (AERA, APA, NCME) (2014). *Standards for Educational and Psychological Testing*. Washington D.C.: American Educational Research Association.

- Item development and test design for field, pilot, and operational tests
- Standards alignment to state standards, college- and career-readiness state standards, and Common Core State Standards
- Alignment studies
- Cognitive labs and small-scale tryouts
- Grade-level expectations development
- Performance-level descriptor development
- Review and technical advisory committee facilitation
- Study guide and testing development, including development of item and scoring samplers, online tool trainings, video tutorials, and online guided practice tests
- Professional development workshops

College- and Career-Readiness State Standards and More Rigorous Assessments

DRC has had the opportunity to become one of the leaders in helping states transition to new and more rigorous college- and career-readiness state standards— including the Commonwealth’s transition to the Pennsylvania Core Standards. DRC is committed to supporting our client states in new and innovative ways as they transition and adapt to the changing assessment landscape with new and more rigorous assessments and standards. In this role, DRC has been instrumental in helping states implement a variety of transition strategies including designing new assessment systems and helping increase the rigor of existing assessment systems.

DRC’s tasks have ranged from serving as national content experts providing support for alignment of a given state’s newly developed college- and career-readiness state standards or the Common Core, and working with state educators to develop a new set of college- and career-readiness standards. We have provided these services for assessment programs in Alabama, Alaska, Idaho, Iowa, Louisiana, Michigan, New York, Pennsylvania, South Carolina, and the Smarter Balanced Assessment Consortium.

DRC is committed to supporting our client states as they transition to new and more rigorous assessments and standards.

Research and Psychometric Services

The DRC Psychometric Services (PS) Team aggressively seeks to provide our clients with results that are legally-defensible, technically-sound, and easy-to-interpret for all audiences. To achieve this, DRC’s PS Team works effectively and efficiently with Technical Advisory Committee members to ensure that our

methodologies are time-proven and able to withstand the standards of the testing industry. We are client friendly, which means that we do our best to provide technically-sound solutions that are also practical, meet the needs of our clients, and easy to understand.

In addition, we provide tools to help educators, not confuse them. For example, we do not stop at just a total score for each student. Instead, we provide tools that allow educators to drill down into fine grains of content such that they are able to quickly identify teachable content based on test results at the individual and classroom levels.

When we conduct research studies, it is for the client, not for us. Many vendors conduct research on their own behalf, to build up their own resumes and advance their agendas. DRC Psychometricians conduct research that is directly tied to what a client needs and can utilize in their assessment system. We understand that the most important clients are the students who do their best to score well on the assessments and the teachers that do their best to provide sound instruction for their students.

In order to provide a customized approach for the PDE and stakeholders throughout the commonwealth, we provide below relevant examples of our Psychometric Team at work for DRC's large-scale assessment clients.

Sampling: DRC has found that depending on the state client, and their particular issues, sampling can be a challenge. DRC's PS staff has worked through similar client issues in this area. For example, when hurricane Katrina hit, the Alabama Department of Education was faced with an inordinately large migratory student population. In partnership with ADE staff and their technical advisory committee, DRC implemented a bootstrapping design as part of their equating design that effectively mitigated this issue. In addition, in Alaska, there is a different composition of diversity, but they also have concerns about the development of representative sample. In this case, DRC designed and implemented a plan that spiraled at the form level for districts with lower populations and at the student level for districts with larger populations. We are confident that, in collaboration with the PDE, we can ensure appropriate sampling to:

- Achieve randomly equivalent groups to support any research studies that require equivalent groups,
- Match demographics between online and paper and pencil test takers using propensity matching methods, and
- Utilize our Data Manager system during the test window for tracking and adjusting form and item distributions if necessary.

Report Use and Interpretation: DRC has provided several significant tools for our clients that make interpretation of data more useful and convenient for the educator, parent, and administrator. In South Carolina and Alaska, we provide the

Residual Analysis Tool, which effectively analyzes and identifies potential gaps in instruction based on student assessment results. It does so at the state, district, and school levels, as well as for any defined student subgroups. In South Carolina, in a partnership with University of South Carolina faculty, DRC generated a method of combining classroom performance and large-scale assessment results into a standards-based classroom performance report card that could be reviewed by students, educators and teachers throughout the school year. In Pennsylvania, we provide Classroom Diagnostic Tools (CDT), which operate somewhat like the above tool, but in a computer-adaptive testing (CAT) environment. However, it is not limited to just the analyses. Instead, it goes one step further by linking the assessment results to suggested instructional materials at any desired level of aggregation. In addition, the impact of the use of the CDT on subsequent performance on the associated summative exams has been studied.

Test Security and Test Fraud: Ensuring that all test scores are obtained fairly is a critical issue in the world of high-stakes, large-scale assessment. Toward that end goal, DRC began doing Data Forensics research starting in 2009 in Pennsylvania where we have researched and evaluated no fewer than a dozen unique methodologies to identify those that are most valuable toward the accurate detection of potential test fraud. Since then, we have refined and enhanced our methods to make sure that they are both practical and legally defensible, resulting in over a dozen conference presentations by DRC staff to date. Whether it involves shoring up security before, during, or after the testing window, DRC is confident that we have the related experience and expertise to assist Pennsylvania in providing the highest level of security in the industry.

Reliability and Validity: While we believe that test security is an important issue, we also believe that students need to be able to show what they have learned to the best of their ability. Examples of how DRC PS staff has assisted clients in this area include:

- **Student Fatigue**—In Idaho and Nebraska, we analyzed the effect of test time and student performance on reading, mathematics, and writing for the general student population, as well as for special education students.
- **Mode Comparability**—In DRC clients states that have already gone online (e.g., Pennsylvania, Nebraska, South Carolina, and Washington) we have conducted studies to better understand the interaction between students and mode of administration.
- **Dimensionality**—In Alaska, we conducted a thorough evaluation of the impact of dimensionality of important subgroups in the state that was used to construct mixed-model assessments that employed both multiple-choice and rater-mediated, constructed-response items.
- **Longitudinal Effects**—In Pennsylvania, we conducted a research study to track the performance of retake students on several end-of-course exams over a four-administration period to identify improvements, if any, and potential impacts as intervening variables, such as rate of score change and

the impact of intervention (students who received remedial instruction versus those who did not).

- **Modified Assessments**—In Michigan, South Carolina, Louisiana, North Carolina, and Pennsylvania, DRC conducted research to identify and quantify the impact of the modified (2%) assessments on the student population.

Standard Setting: Since 2001, DRC PS staff has conducted more than 49 separate standard settings across 15 large-scale assessment client states. We pride ourselves in adhering to strict process and documentation, presentation of an abundance of available external referent data (if desired by the client) (e.g., SAT, ACT, NAEP, AP), and broad educator participation (online contrasting groups studies in both Nebraska and South Carolina). Our most recent work has included setting academic performance standards on the Regents Exams in New York—assessments that have been operational since 1866.

Throughout our proposal, the PDE will find that we provide sound solutions to problems, both typical and atypical. DRC believes that our Psychometric Team provides unsurpassed quality and service in large-scale assessment and is excited to provide the PDE with the same level of service that our clients have enjoyed since we were founded in 1978.

DRC strongly encourages PDE to check our references, and those of our competitors, to get an honest evaluation of our work and theirs. We are confident that PDE will find that our clients are, and have always been, impressed with our work ethic, knowledge of the industry, ability to deliver high-quality services under tight timelines, and compilation of technical documentation that meets or exceeds any and all industry standards.

Online Assessment Solutions



DRC recognizes the urgent importance of expanding large-scale student assessments from the traditional paper-and-pencil method to online testing, as well as the need to deliver robust reporting tools and instructional resources to educators as part of a comprehensive online assessment system. To meet the growing needs of our clients in this regard, DRC has developed and launched the innovative **DRC INSIGHT Online Learning System**.

Features and Capabilities

DRC INSIGHT delivers assessments and related resources online for all content areas and grade levels. A truly integrated system, DRC INSIGHT incorporates computerized testing and related resources with dynamic reporting and a popular suite of educator tools. Our secure system has been **developed and maintained in-house, offering maximum control and flexibility for our clients' programs**. Features of the system include:

- Secure, online delivery of high-stakes K–8, high school, and end-of-course assessments in all content areas
- Support for summative, formative, diagnostic, and benchmark/interim assessment types
- Assessments delivered in computer-adaptive test (CAT) or fixed-length formats
- Powerful suite of diagnostic tools and resources to support technology readiness in schools and districts
- Secure, web-based browser for high-stakes testing on multiple platforms (desktop and laptop computers, tablets, and virtual environments)
- Integrated item banking system capable of importing, authoring, and delivering numerous item types, including multiple-choice and selected-response items, items with passages, constructed-response and writing items, scenarios and performance events, and innovative technology-enhanced items
- Commitment to leading industry interoperability standards and data security standards
- Student-friendly testing interface with numerous embedded universal accessibility and accommodation tools
- Interactive reporting system featuring engaging, drill-down reports that can dynamically link to units, lesson plans, and curricular resources to help guide instruction and remediation
- Data analysis and warehousing solution capable of interfacing with client data systems for storing student and test data across years

DRC INSIGHT’s intuitive, easy-to-use interface means minimal training time for administrators and teachers, and minimal practice time for students to acclimate to the eTesting environment. Online scoring and reporting provide rapid results for quick impact on instruction. Further, DRC INSIGHT offers the convenience of a “one-stop” approach: all test setup and administration functions are accessed through a single sign-on client portal. The **DRC eDIRECT client portal** provides tiered, secure access to testing software downloads, tutorials, enrollment and precode, test session setup, scoring and reporting, and educator resources. System users will only ever need one login to access key system modules, tools, and resources.

DRC’s History with Online Testing

To date, **DRC INSIGHT has delivered millions of secure, online assessments** for programs in Washington, Idaho, Pennsylvania, South Carolina, Michigan, Nebraska, Louisiana, Alaska, Missouri, and the WIDA Consortium. DRC’s system has experienced exponential growth. In the 2013–2014 school year, DRC

delivered 2.6 million online assessments. In 2014–2015, we more than tripled our performance to 8.5 million online assessments.

DRC has included information on all of our online testing programs later in this section, under subheading *DRC's Relevant Experience; DRC's Online Testing Experience*.

Operations

Throughout our history, DRC has implemented and refined distribution, collection, and processing procedures that have proven extremely successful in reducing the burden on school and district staff while accurately accounting for secure test materials. DRC's Operations staff has managed and overseen the distribution, shipping, collection, and scoring of many statewide assessment programs.



One of DRC's Materials Distribution and Processing Centers, located in the Minneapolis suburb of Brooklyn Park, Minnesota

DRC's Materials Distribution and Processing Centers are conveniently located in the Minneapolis suburb of Brooklyn Park, less than ten miles from the Maple Grove headquarters. These facilities consist of more than 250,000 square feet of office, production, and warehouse space. They were custom designed to support DRC's high-volume packaging, shipping and receiving, secure document accounting, document processing, scanning, and editing functions, along with short- and long-term secure materials storage. Annually, **DRC packages, distributes, and tracks more than 27 million secure materials.**

DRC processes up to 250,000 received materials per day (box receipt, separating and sorting, and scanning secure barcodes). DRC's scanning capabilities include image scanning and scoring, barcode scanning, and optical character recognition scanning. **DRC is capable of image scanning and scoring approximately 40 million pages (20 million sheets) per week.**

Performance Assessment Services

DRC's Performance Assessment Services staff has scored more than 57 million student responses in a single scoring season.

DRC works diligently with clients to customize handscoring, meeting the specifications of each assessment program. They have consistently proven their ability to recruit the scorers necessary for large-scale assessment programs (more than 3,000 in 2014), and they enjoy a reader retention rate of more than 60 percent from season to season.

In 2014, DRC applied more than **43.3 million scores** to online and paper-pencil constructed-responses and open-ended test items. The following table presents the total number of scores, by state/consortium, for 2014.

Summary of DRC Handscoring in 2014

| Program | Total Number of Scores |
|------------------|------------------------|
| Alaska | 1.1 million |
| Louisiana | 4.7 million |
| Minnesota | 5,834 |
| Nebraska | 133,501 |
| Ohio | 11.8 million |
| Pennsylvania | 12.1 million |
| Smarter Balanced | 442,757 |
| South Carolina | 1.3 million |
| Utah | 1.9 million |
| Washington | 9.9 million |

DRC operates five handscoring centers across the United States, including two in the Twin Cities metropolitan area (one in Plymouth and one in Woodbury), two in Ohio (one in Columbus and one in Sharonville), and one in Pittsburgh, Pennsylvania.

DRC has consistently proven our ability to recruit the scorers necessary for large-scale assessment programs. Thanks to our positive work environment, competitive wages, and strong reputation as an intellectually stimulating place to work, we have great success in recruiting and retaining qualified staff for each project.



One of DRC's Scoring Centers, located in the St. Paul suburb of Woodbury, Minnesota

DRC employs standard security measures at all of our scoring facilities. Access to scoring centers is limited to staff and to visitors accompanied by authorized staff. Readers are required to sign legally binding confidentiality agreements before work begins and are aware that no scoring materials are to leave the centers. To prevent the unauthorized duplication of secure materials, readers are unable to print from their imaging stations.

All of our scoring centers are wired for image scoring and are divided into several large, open scoring rooms that contain flat-panel monitors and ergonomic chairs and tables. Each site also has several offices used for conferences and small-group training. We provide large break rooms equipped with coffee, vending machines, microwaves, and refrigerators. The scoring facilities are accessible to the physically challenged and are convenient to major highways.

Document Services

DRC's in-house Document Services provides our clients with accurate, error-free testing materials.

DRC's Document Services business unit, located in our Maple Grove headquarters, is a leader in scannable and digital printing solutions for large-scale educational assessment, government, and business clients. We provide complex publishing, printing, mailing, and fulfillment solutions that are highly customizable. Specializing in producing accurate, error-free, and on-time products, we deliver high-quality products and services that exceed our customers' expectations. We apply our expertise every day, in every document we produce.

Document Services has received **ISO 9001:2008 certification**, assuring our customers that formal quality control and risk management processes are incorporated into all of our standard operating procedures. **DRC has also earned Quality Level II status from the Government Printing Office (GPO), the highest quality level that can be attained for the types of printed materials we produce.**

Document Services produces scannable forms—from composition and editing to printing—to exacting specifications, guaranteeing the highest possible data

integrity for scanning and imaging machines. We print nearly 355 million scannable pages per year. With each document, our skilled press operators hold our presses to exacting tolerances, exceeding even the strictest industry standards.

DRC's highly experienced graphic designers work with multiple publishing software systems to provide complete publishing capabilities. In addition, our editing professionals ensure that documents are accurate and error-free. These in-house resources give DRC a unique ability to address large-scale development requirements within restricted parameters and timeframes, offering our state testing clients technical accuracy, design options, and scheduling flexibility.

Document Services also provides digital printing and report production services (with a production rate of more than 70 million pages per year), intelligent inserting, complete bindery and custom finishing, distribution services, and mailing fulfillment for commercial and government clients.

Whether it is a scannable testing booklet distributed to students, a custom-designed survey, or a highly-sensitive financial statement, DRC has the expertise and leading-edge technology to produce accurate, mission-critical communications each and every time.

Information Systems

Our Information Systems professionals design innovative solutions for meeting the technology requirements of state testing programs.

DRC's Information Systems professionals are accomplished providers of all technology needs required for today's assessment programs. Working with our state department of education clients, we develop customized software solutions. Our web-based development experience includes user-friendly applications that make the assessment process—from online enrollment to report interpretation—easier for educators, parents, and students. Examples of our web-based development include parent websites, online practice and operational tests, and web-based report delivery. We also offer data warehousing solutions, network and security management, and technology configuration.

DRC has the servers and networks required to support our large-scale assessment programs. Our technology staff continually evaluates the requirements of current clients, along with those of potential new contracts; we add additional server capacity and additional bandwidth when necessary so that service levels meet or exceed requirements. A summary of our server and network capacity is provided below.

- **Servers:** DRC's server infrastructure is highly virtualized, effectively managing resource utilization and scalability. Across the data center there are approximately 950 virtual servers and 300 physical servers. The combination of standalone, clustered, and virtualized servers run either Windows Server 2012 R2 or Red Hat Enterprise Linux 6 (RHEL) servers.

DRC employs redundant web, application, and database servers; if one server should fail, the load will automatically shift to other servers. The servers are load-balanced to distribute the requests and reduce the chance of one server becoming overloaded. The architecture is designed to easily scale up as the demands of the web systems increase.

- **Networks:** The DRC wide area network (WAN) utilizes point-to-point communications in our core ring, Multi-Protocol Label Switching (MPLS) network, and Virtual Private Network (VPN). Communication capacities range from 45 mbps to 2 Gbps, based on the operations carried out at each DRC facility. The data center facilities have high speed Internet links with the capacity to support up to 3 Gbps of traffic. Each local area network (LAN) in all facilities is a switched, Ethernet network with fiber backbone and gigabit connections to the desktop.

Software Quality Assurance

Software Quality Assurance analysts use industry-standard methodologies to ensure accuracy throughout an assessment project.

DRC's Software Quality Assurance (SQA) Team performs quality checks throughout every aspect of our software design, development, and quality assurance processes to ensure accuracy. The SQA team applies industry-standard software quality assurance methodologies throughout an assessment. These methodologies serve as ongoing guidelines during the development process, including design, testing, and ongoing operational support.

DRC's SQA staff have a breadth of software testing experience in large-scale statewide assessments. Our software quality professionals directly monitor all aspects of software development to ensure that processes and product deliverables conform to specified standards and requirements.

SQA analysts conduct rigorous checks, including the following:

- Test material reviews
- Answer key/test map verification processes
- Software development testing
- Data analyses
- Blue dot reviews
- Production print reviews
- Image scanning setup

Our software quality assurance processes provide our state testing clients with accurate, error-free test materials, score reports, and data.

Survey Services

DRC designs, manages, and administers several types of survey products, including surveys of educators for some of our assessment clients.

DRC prides itself on being a **full-service survey partner** with our clients, offering large-scale, multi-mode survey programs. We provide research, technology, process consulting, and complete project administration—in-house, in one seamless, integrated process. DRC has over 35 years of experience supporting all phases of the survey process: survey content development, questionnaire development and testing, printing, distribution, collection, scanning, data analysis, and report production. On an annual basis, DRC produces and mails over 6 million survey packets, sends in excess of 2 million web survey invitations, and captures more than 4.5 million paper survey pages and 600,000 web responses. Standard quality assurance procedures are executed as an integral part of the information management system.

DRC delivers survey solutions in a variety of modalities, including web, paper, interactive voice response (IVR), and computer-assisted telephone interviewing (CATI). To ensure the highest measure of data accuracy, we utilize our proprietary information management system that guarantees data integrity, secure access, and seamless survey management. We also offer qualitative research and analysis, including focus groups, site visits, ethnographic studies, and stakeholder interviews.

DRC's Survey Services provides research programs for both commercial and government organizations. Some of our clients include international corporations, such as Subaru of America and Ingersoll Rand, along with Federal government clients, such as the U.S. Department of Defense—Defense Manpower Data Center, the Department of the Army, and the Department of Veterans Affairs.

DRC's areas of expertise in the survey industry include educational surveys, Military population surveys, patient satisfaction surveys and health care research surveys, employee engagement and opinion surveys, customer satisfaction and experience surveys, and youth risk behavior studies. The services we provide to our clients include research design and analysis, qualitative research, quantitative research, data management, and reporting,

For our work with the U.S. Department of Defense (DoD), DRC's Survey Services' systems are compliant with the National Institute of Standards and Technology (NIST) Risk Management Framework (RMF), and we manage our Information Systems under the NIST RMF policies and procedures. NIST RMF compliance encompasses a stringent set of security requirements. DRC is one of only a few full-service survey research firms with this high-level of compliance.

DRC's Quality Management System

A primary factor in DRC's continued success in providing error-free services to clients is our company-wide dedication to quality.

DRC is passionate about providing quality products and services to our clients and recognizes that quality processes are critical elements of our business. DRC takes quality management to world-class levels, providing us with yet another competitive advantage.

Across decades of successful student achievement testing, we have developed and refined our quality system to ensure the highest levels of quality and customer satisfaction. **At DRC, quality is both a program and an overall approach to business.** Our Quality Management System focuses on defining and implementing critical quality control processes to ensure products and services delivered to our clients meet or exceed their requirements. This extends to our relationships with other vendors and partners.

At DRC, quality is a commitment to excellence achieved by teamwork and the process of continual improvement. Quality principles are infused into each person's role within the company. We are dedicated to being the quality leader in the industry and are confident our solutions meet or exceed our customers' expectations.

Doing it right the first time, every time is something customers challenge us with every day. Our clients have come to expect the highest level of product and service performance from DRC, and we consistently meet their expectations.

DRC's quality policy statement provides a framework for establishing and reviewing business objectives, and it is communicated and understood throughout the organization. Our quality management team reviews this statement annually to ensure it continues to meet the needs of our customers.

With the rapid pace of business today, customers' wants and needs continually evolve. Our clients are asking us to be more dynamic, flexible, and cost efficient in meeting their requirements than ever before. This places a tremendous amount of importance on the processes we use to meet these needs in repeatable and reliable ways. As a result, **DRC decided to attain ISO 9001 certification in 2007.** Our current certification—ISO 9001:2008—is an internationally recognized quality management standard that defines a set of core quality requirements with which an organization must comply.

DRC proudly holds the **most comprehensive scope of ISO certification of any**



company in the industry. We are currently ISO 9001:2008 certified in three major areas of the company:



- **Document Services** (Project Management, Document/Graphic Design, Pre-Press, Printing, Bindery, Inserting, and Purchasing)
- **Operations** (Distribution, Logistics, Materials Processing, Warehousing, and Document Scanning)
- **Performance Assessment Scoring** in all of our scoring centers

Plans are in place to expand the scope of our ISO 9001 certification to other areas of the company. Details about DRC's quality processes may be found throughout our proposal.

Security Policies

All DRC personnel are trained in security requirements, which include physical building access, employee confidentiality and behavior, data access, network and Internet access, and the safeguarding of client documents and products.

DRC has in place all of the necessary security requirements for developing, administering, and scoring large-scale assessments.

Building Security

All of DRC's secure facilities are designed to meet the stringent security requirements of large-scale testing programs. We develop, produce, process, and store all materials in an environment secure from access by the general public or unauthorized staff. DRC enforces strict security measures to prohibit unauthorized personnel from gaining access to client materials through either deliberate or unintentional action.

DRC also employs standard security measures at all of our scoring facilities. We limit access to scoring centers to staff and visitors accompanied by authorized staff. We require readers to sign legally binding confidentiality agreements before work begins, and readers are aware that no scoring materials are to leave the centers. To prevent the unauthorized duplication of secure materials, readers are unable to print from their imaging stations.

Computing Environment Security

DRC employs security controls relating to our hardware, data, and network connections. We manage more than 825 terabytes of client data; therefore, security is an inherent, inextricable, and indispensable component of our system. DRC takes very seriously our obligation to protect personally identifiable information (PII) of student data. Three specific areas of computing security are summarized here.

- **Internal Computer Security:** Network access to client data is tightly restricted. Using current security best practices, DRC denies all access to sensitive data and then grants access to only selected staff. We audit network accounts quarterly and require unique, complex passwords that change every 60 days. We immediately disable accounts whenever an employee leaves DRC. Access to DRC’s data centers is strictly controlled via employee ID badges. All server consoles are locked with tightly controlled passwords. All workstations require network authentication and password-protected screen savers. DRC’s computer source code is secured through the use of industry-leading software. We also perform code reviews regularly.
- **External Computer Security:** DRC has secured our internal network through the use of firewalls, protecting company resources from unauthorized external access. DRC’s web servers are segregated from both the Internet and our internal network through the use of a “demilitarized zone” (DMZ). We review available security updates and patches daily and implement them on all servers when applicable. Websites containing sensitive material require public-key cryptography security through Secure Sockets Layer (SSL) connections. Our intrusion detection system allows DRC to detect possible infiltration or denial of service attacks and take appropriate actions before a security breach occurs.
- **Computer Virus Protection:** DRC has an extremely aggressive virus scanning solution. Our virus scanning software packages automatically update virus definitions daily to protect email, server operating systems and network storage systems, workstations, removable media, and Internet file transfers.

In addition to the security features listed above, DRC has routine recovery procedures in place to keep all systems, files, and data secure from loss due to breakdown or disruption in the system environment (e.g., fire, tornado), as described under the next subheading.

Disaster Recovery

DRC’s servers are housed in secure data centers in two locations in Minnesota: our facility in Brooklyn Park, Minnesota, and a Level 3 co-location facility in Minnetonka, Minnesota. The data centers are constructed of concrete floors, walls, and ceilings and are fully climate-controlled environments. The data centers meet industry standards and best practices for climate control, fire suppression, power, and cooling, as well as for physical security. Access to the data centers is controlled through a card access system and is restricted to a limited number of authorized technology support staff only. A log is maintained documenting each time a data center is entered, by whom, and for what purpose. In case of a disaster at either location, the other location can take over full production operations.

DRC uses storage area network (SAN) devices for maximum speed, flexibility, and redundancy in our data storage solution. Servers are connected to the SAN to ensure minimum interruptions due to hardware failures. The SAN facilitates disk space reallocation to provide space for applications or servers as needed.

The computing environment—both servers and communications hardware—will continue to function without interruption if the utility power is disrupted. The servers use load-sharing, virtualization, and redundant power supplies and implement RAID (Redundant Array of Independent Disks) subsystems to minimize the effect of a failed disk. The data centers all have Uninterruptible Power Supply (UPS) systems and backup diesel generators. The diesel generators are tested monthly.

In addition, DRC employs industry best practices for data backup and recovery. Data is replicated between the two data centers, so in the event of a disaster in which one of the facilities is lost, the other facility has the data required to recover and restore operations. Our disaster recovery procedures enable us to have contingency plans in place in case of emergency. Our clients can feel confident about the safety of assessment data, knowing it is protected by industry best practices for data center facilities, technology infrastructure, and security practices.

DRC'S RELEVANT EXPERIENCE

DRC is one of the most experienced testing contractors in the nation, with past and current contracts with over 30 state departments of education and two multi-state consortia. On the following pages, we have included more detailed information on our experience, organized under these subheadings:

- DRC's Recent Large-Scale Assessment Experience Overview
- DRC's Online Testing Experience
- DRC's References
- DRC's Project Summaries

DRC's Recent Large-Scale Assessment Experience Overview

| | Alabama | Alaska | California | Delaware | Florida | Idaho | Iowa | Louisiana | Michigan | Minnesota | Missouri | Nebraska | New York | Ohio | Oklahoma | Oregon | Pennsylvania | Smarter Balanced | South Carolina | Utah | Washington | WIDA | West Virginia |
|-------------------------------------------------|---------|--------|------------|----------|---------|-------|------|-----------|----------|-----------|----------|----------|----------|------|----------|--------|--------------|------------------|----------------|------|------------|------|---------------|
| Project Management | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ |
| Item/Test Development | √ | √ | | | √ | √ | | √ | √ | | | √ | | | | | √ | √ | √ | | | | |
| Curriculum Development | | | | | | | | | | | | | | | | | √ | | | | | | |
| Alignment Studies | √ | √ | √ | | | √ | √ | √ | | | | √ | | | √ | | | | | | | | √ |
| Psychometric Services | √ | √ | | | | √ | | √ | √ | | | √ | √ | | | | √ | | √ | | √ | √ | √ |
| Standard Setting | √ | √ | | | | √ | √ | √ | | | | √ | √ | | | | √ | | √ | | | | |
| Pilot and Field Testing | √ | √ | | | | √ | | √ | | | | √ | | | √ | | √ | | √ | | √ | √ | |
| Materials Production, Distribution & Collection | √ | √ | | | √ | √ | | √ | | √ | | √ | √ | √ | √ | | √ | | √ | | √ | | √ |
| Online or Computerized Testing | | √ | | | | √ | | √ | √ | | √ | √ | | | | | √ | √ | √ | | √ | √ | |
| Technology Readiness Services | | √ | | | | | | | √ | | √ | √ | | | | | √ | | √ | | √ | | |
| Data Collection and Analysis | √ | √ | | | | √ | | √ | | | | √ | √ | | | | √ | | √ | | √ | | |
| Data Cleanup | √ | √ | | | | | | √ | | | | | | | | | √ | | | | √ | | |
| Performance Assessment | √ | √ | | √ | √ | | | √ | | √ | | √ | | √ | √ | √ | √ | √ | √ | √ | √ | √ | |
| Reporting | √ | √ | | | | √ | | √ | | | | √ | √ | √ | √ | | √ | | √ | | √ | | |
| Professional Development | √ | √ | | | | | | √ | √ | | | √ | | √ | √ | | √ | | | | | | |
| Multiple Administrations per Year | √ | √ | | | √ | √ | | √ | | √ | | | | √ | √ | | √ | | √ | | √ | | |

DRC's Online Testing Experience

DRC has held contracts for 20 online testing projects in the past 5 years. Our system has delivered millions of online assessments for programs in Alaska, Idaho, Louisiana, Michigan, Missouri, Nebraska, Pennsylvania, South Carolina, Washington, and the WIDA Consortium, including high-stakes assessments (grades 3–8, end-of-course, and English language learner assessments); interim and formative assessments; and classroom diagnostic assessments. The WIDA project alone involves online administration using DRC INSIGHT in 36 states.

The following table details DRC's online testing experience by program. All of these programs use the DRC INSIGHT online testing system. Full project descriptions are included later in this section under *DRC's Project Summaries*.

DRC's Online Testing Experience

| DRC INSIGHT Program | Timeline | Description |
|-------------------------------------------------------------------------|-----------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Pennsylvania Classroom Diagnostic Tools (CDT) | 2010–Present | Classroom-based, computer-adaptive tests in grades 3–12 in reading, writing, mathematics, and science. |
| Pennsylvania Keystone Exams | 2010–Present | End-of-course summative exams administered three times per year in Algebra I, Biology, and Literature. These exams are required for graduation. |
| Michigan Interim Assessment—Cognitive Labs, Pilot Test, and Field Tests | 2012–2014 | Online interim assessment system in K–2 reading and mathematics; grades 3 through high school in science and social studies; and high school reading and mathematics. Included online cognitive labs with teachers and students in grades K–2. |
| Washington Measurements of Student Progress (MSP) | 2012–2014 | Online versions of Washington's summative assessment program delivered to students each spring at grades 3–8 in reading, mathematics, and science. |
| South Carolina End-of-Course Examination Program (EOCEP) | 2012–Present | End-of-course assessments administered three times per year in Algebra, English, Biology, and U.S. History and the Constitution. |
| Louisiana Transitional Field Test | Spring 2013 | Field test of newly developed English language arts and mathematics items for use in Transitional Assessments. |
| Alaska Technology Readiness Project | Fall 2013 | Technology readiness program used to determine district preparedness for the introduction of online testing in the state. Included site-level diagnostic tools, technology readiness online survey, and live interview. |
| Idaho End-of-Course Field Test | 2013–2014 | Field test administration for new end-of-course tests in Biology and Chemistry. |

| DRC INSIGHT Program | Timeline | Description |
|----------------------------------------------------------------------------------------------------|---------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| South Carolina English Language Development Assessment (ELDA) | 2013–2014 | English language development assessment administered each spring in reading, writing, listening, and speaking in grades K–12. |
| Pennsylvania System of School Assessment (PSSA) | Spring 2013–Present | Online versions of Pennsylvania’s summative testing program administered in the spring in grades 3–8 for ELA (reading and writing prior to 2014) mathematics, and science. |
| Nebraska Check 4 Learning Formative Assessments (C4L) | Fall 2013–Present | Formative assessments administered by teachers at the point of instruction in order to monitor student learning. Delivered on demand throughout the year. |
| Nebraska State Accountability (NeSA) | Fall 2013–Present | Summative assessments in grades 3–8 and high school in reading, mathematics, science, and writing. |
| Alaska Online Item Pilot | Spring 2014 | Pilot test to help districts, schools, teachers, and students gain experience with testing online and to expose students to items aligned to the new Alaska Mathematics Standards in grades 3–8. |
| Michigan Alternate Assessment Pilot | Fall 2014 | Online pilot test and subsequent online cognitive labs for Michigan’s alternate assessment in social studies, administered to students in grades 5, 8, and 11. |
| WIDA Consortium: Assessment Services Supporting ELs through Technology Systems (ASSETS) Field Test | Spring 2014–Present | Next-generation, technology-based language assessment system for students in grades 1–12 who are learning English. The field test includes listening, speaking, reading, and writing. |
| Idaho Science End-of-Course Test | Spring 2015–Present | End-of-course test in Biology and Chemistry for high school students. |
| Idaho Standards Achievement Tests (ISAT) | Spring 2015–Present | Criterion-referenced tests in science for grades 5 and 7. |
| Michigan M-Step Online Statewide Assessments | Spring 2015–Present | Summative online assessments for grades 3–8 and 11 in ELA and mathematics (Smarter Balanced), as well as science and social studies; and Interim assessments for grades K–12 in ELA and mathematics and grades 3–high school in science and social studies. |
| Missouri Assessment Program (MAP) | Spring 2015–Present | Summative assessments in ELA and mathematics, grades 3–8 (Smarter Balanced assessments); and science, grades 5 and 8. |
| South Carolina Palmetto Assessment of State Standards | Spring 2015–Present | Online version of South Carolina’s 3–8 assessment in science and social studies. |

| DRC INSIGHT Program | Timeline | Description |
|----------------------------------------------------------------------------------|---------------------------|--------------------------------------------------------------------------------------------|
| WIDA Consortium: ACCESS 2.0 and ACCESS for ELLs Operational Assessments | Beginning in Fall 2015 | Summative ELL assessments for grades K–12 in Listening, Reading, Speaking, and Writing. |

DRC's References

DRC has included references for four of our state department of education clients. DRC invites PDE to contact our references for an assessment of our performance. Full project descriptions for the work we have done with these clients are included in the following subheading, *DRC's Project Summaries*.

DRC's References

| Client/Contact Information | Contact Information | |
|-----------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------|
| Louisiana Department of Education 1201 North Third Street G224 Baton Rouge, LA 70804 | Ms. Jessica Baghian Deputy Chief of Staff (225) 342-3625 jessica.baghian@la.gov | Ms. Jan Sibley Supervisor, Assessment Development and Support (225) 342-3421 jan.sibley@la.gov |
| Michigan Department of Education P.O. Box 30008 Lansing, MI 48909 | Mr. Andrew J. Middlestead Director (517) 335-0568 (phone) (517) 335-1186 (fax) middlesteda@michigan.gov | |
| Nebraska Department of Education 301 Centennial Mall South Lincoln, NE 68509 | Dr. Valorie Foy Director, Statewide Assessment (402) 471-2818 (phone) (402) 471-4311 (fax) valorie.foy@nebraska.gov | Dr. John Moon Project Manager (402) 471-1685 (phone) (402) 471-4311 (fax) john.moon@nebraska.gov |
| South Carolina Department of Education 1429 Senate Street, Room 607 Columbia, SC 29201 | Dr. Susan Creighton Education Associate (803) 734-8535 (phone) (803) 734-8886 (fax) screight@ed.sc.gov | Ms. Elizabeth Jones Director of Assessment (803) 734-8295 (phone) ejones@ed.sc.gov |

DRC's Project Summaries

DRC has successfully managed large-scale testing, performance, and survey projects for over 35 years. This section includes summaries of all of our recent and similar large-scale educational assessment contracts. Specific project experience for each of our proposed project personnel is included on their résumés provided in *Volume II, Appendix A, Résumés*.

DRC's Project Summaries

| Client and Contact Information | Project Information |
|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALABAMA | |
| <p>Alabama State Department of Education 50 North Ripley Street, Room 3306 Montgomery, AL 36104</p> <p>Ms. Rebecca Mims (AHSGE) Assessment Coordinator (334) 242-8038 (phone) (334) 242-7341 (fax) rmims@alsde.edu</p> <p>Ms. Kanetra Germany (ARMT⁺) Education Specialist (334) 242-8038 (phone) (334) 242-7341 (fax) kgermany@alsde.edu</p> <p>Ms. Shanthia Washington (AYP) Accountability Specialist (334) 242-8038 (phone) (334) 242-7341 (fax) swashington@alsde.edu</p> | <p>Alabama High School Graduation Exam (AHSGE): 2010–2014, 2007–2010, 2004–2007, 2001–2004, 1998–2001</p> <p>The Alabama State Department of Education (ALSDE) contracted with DRC to provide testing services for the AHSGE, which was designed to ensure that students receiving an Alabama high school diploma have a minimum comprehension of basic skills in reading, mathematics, language, social studies, and biology. Up to 200,000 students grades 9–12 in reading, mathematics, language, social studies, and biology for high school students (grades 9–12). DRC's responsibilities included project management, item development (starting in 2004), materials development and printing, packaging and shipping, scoring, psychometric services, and reporting.</p> <p>Alabama Reading and Mathematics Test⁺ (ARMT⁺): 2009–2014</p> <p>ALSDE contracted with DRC to develop, administer, and report on the ARMT⁺. These criterion-referenced assessments—for grades 3–8 in reading and mathematics and grades 5 and 7 for science—were administered to approximately 60,000 students per grade each year. DRC was responsible for project management; item and test form development; field testing; publication and printing; packaging, distribution and collection; processing and scanning; scoring, including handscoring; psychometric services; reporting; and customer service.</p> <p>Alabama Accountability Reporting System: 2005–2012</p> <p>ALSDE developed a state accountability system that incorporates and fully complies with <i>No Child Left Behind (NCLB)</i> legislation. One requirement of this system is that it must provide valid and reliable student data in all calculations related to accountability. The Department contracted with DRC for the management of the accountability system data. This management includes cleaning and matching data for each assessment with attendance files; determining adequate yearly progress (AYP) for each school, system, and the state; processing appeals for AYP; hosting a website for posting each school and system's data; and data warehousing.</p> |

| Client and Contact Information | Project Information |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| ALASKA | |
| <p>Alaska Department of Education and Early Development Division of Teaching and Learning Support 801 West Tenth Street, Suite 200 Juneau, AK 99801</p> <p>Mr. Les Morse, Deputy Commissioner (907) 465-8691 (phone) les.morse@alaska.gov</p> | <p><i>Alaska Comprehensive System of Student Assessment: Standards-based Assessments (SBAs) Science: 2014–2015</i></p> <p>These are criterion-referenced tests based on Alaska standards in science for students in grades 4, 8, and 10. Assessments include a balance of constructed-response and multiple-choice items. The science assessment was given to approximately 10,000 students per grade in the spring across 54 districts and 514 schools. DRC’s responsibilities included project management; item development and test construction; conducting review committee meetings; materials development and printing; packaging, distributing, and collecting test materials; scanning, editing, and scoring answer documents, including handscoring; standard setting; psychometric services; reporting; and data warehousing.</p> <p><i>Alaska Comprehensive System of Student Assessment: Standards-based Assessments (SBAs) and High School Graduation Qualifying Examination (HSGQE): 2009–2014, 2004–2009 (Science Assessments: 2005–2009)</i></p> <p>The Alaska Standards-based Assessments measure the extent to which Alaskan students in grades 3–10 (reading, writing, and mathematics) are attaining statewide student performance standards. The Alaska Science Assessments (grades 4, 8, and 10) were implemented to measure student performance in science and to meet the requirements of the NCLB legislation. The HSGQE is a high-stakes assessment that students must pass to receive high school diplomas. DRC was contracted to develop and administer these tests, which were given to approximately 10,000 students in the spring and 6,000 students in the fall, per grade, across 54 districts and 514 schools. DRC’s responsibilities included project management; item development and test construction; pilot and field testing; conducting review committee meetings; materials development and printing; packaging, distributing, and collecting test materials; scanning, editing, and scoring answer documents, including handscoring; standard setting; psychometric services; reporting; and data warehousing.</p> |

| Client and Contact Information | Project Information |
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| <p><i>(Alaska continued)</i></p> | <p><i>Alaska Technology Readiness and Online Item Pilot: 2013–2014</i></p> <p>As part of the CSSA contract, DRC provided Alaska with a comprehensive technology readiness suite used to determine district preparedness for online testing in the state. The suite included a technology toolbox (bandwidth estimator, load simulation tool, system readiness check); technology readiness online surveys and live interviews; and on-site technical evaluations as needed. Following the technology readiness evaluation, DRC conducted an online mathematics pilot (for grades 3–8) in seven districts to help districts, schools, teachers, and students gain experience with testing online and to expose students to items aligned to the new Alaska Mathematics Standards. DRC’s responsibilities included: production of user guides and a test administration manual, training workshops for districts/schools, online testing via the DRC INSIGHT™ Online Learning System, and customer service and technical support.</p> |
| CALIFORNIA | |
| <p>California Department of Education Assessment and Accountability Division 1430 N Street, Suite 4202 Sacramento, CA 95814</p> <p>Mr. Don Killmer Education Research and Evaluation Consultant Standardized Testing and Reporting (STAR) Program Assessment Development and Administration Division (916) 319-0350 (phone) (916) 319-0969 (fax) dkillmer@cde.ca.gov</p> | <p><i>California Modified Assessment (CMA) Studies: 2012</i></p> <p>The State of California contracted with DRC to conduct independent alignment and validation studies of the CMA to the California content standards for ELA grades 3–11; mathematics grades 3–7, Algebra I, and Geometry; and science grades 5, 8 and 10. DRC’s responsibilities included recruiting and selecting individuals to review alignment of California content standards and assessments using the Webb alignment criteria; preparing documents and training materials for the alignment study; training and facilitating the alignment process; providing reports and documentation summarizing the alignment studies including evaluations from reviewers on the alignment process; and coordinating all meeting logistics.</p> |

| Client and Contact Information | Project Information |
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| DELAWARE | |
| <p>Delaware Department of Education The Townsend Building 401 Federal Street, Suite 2 Dover, DE 19901</p> <p>Mr. Brian Touchette Director, Office of Assessment (302) 735-4090 (phone) (302) 739-3092 (fax) brian.touchette@doe.k12.de.us</p> | <p>Handscoring of Delaware’s Smarter Balanced Assessments: 2014–2015</p> <p>As a subcontractor to American Institutes for Research (AIR), DRC is providing handscoring of Delaware’s Smarter Balanced Assessments for grades 3–8 and high school English Language Arts and Mathematics, which are administered to approximately 70,000 students.</p> |
| FLORIDA | |
| <p>Florida Department of Education Assessment and School Performance Turlington Building 325 W. Gaines Street, Suites 401 & 414 Tallahassee, FL 32399</p> <p>Mr. Vince Verges Assistant Deputy Commissioner Division of Accountability, Research, and Measurement (850) 245-0513 vince.verges@fldoe.org</p> | <p>Florida Standards Assessments: 2014–2017 (with three one-year renewal options available)</p> <p>DRC is working in partnership with AIR to administer the Florida Standards Assessments, computer-based and paper-based statewide summative assessments aligned to the Florida Standards. Subject areas and grade levels include: grades 3–8 ELA/Literacy (ELA/L); grades 3–8 Mathematics; grades 9–11 ELA/L; and end-of-course (EOC) assessments in Algebra I, Geometry, and Algebra II. As a subcontractor to AIR, DRC is providing project management; item development; printing, packing, shipping, and collection of test materials; customer service; scanning; rangefinding; handscoring; and research studies.</p> |
| IDAHO | |
| <p>Idaho State Department of Education 650 West State Street Boise, ID 83720</p> <p>Ms. Angela Hemingway Director of Assessment and Accountability (208) 332-6976 (phone) (208) 334-2228 (fax) ahemingway@sde.idaho.gov</p> <p>Ms. Catherine Salas Program Specialist (208) 332-6909 (phone) (208) 334-2228 (fax) csalas@sde.idaho.gov</p> | <p>Idaho Standards Achievement Tests (ISAT): 2006–2015</p> <p>The Idaho State Department of Education (SDE) contracted with DRC to develop, administer, and report on the ISAT, which are criterion-referenced, multiple-choice tests in science for students in grades 5 and 7, with retests offered in grade 12. Tests are primarily administered online (with a small number of tests administered via paper/pencil) to approximately 30,000 students. DRC’s duties include project management; item development and test construction; field testing; online test administration via DRC INSIGHT; conducting review committee meetings; materials development and production; electronic administration and scoring of tests; printing and distributing a small number of testing materials; preparation of training materials; customer support; scanning, editing and scoring; psychometric services; and production and distribution of reports and parent brochures.</p> |

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| <p><i>(Idaho continued)</i></p> | <p>Idaho Science End-of-Course Test: 2014–2015</p> <p>SDE contracted with DRC to develop and administer the Idaho Science EOCs in Biology and Chemistry. Tests are criterion-referenced and multiple-choice, and are administered via computer. Up to 80,000 students could take the test. DRC’s duties include project management; item development and test construction; conducting review committee meetings; electronic administration and scoring of tests via DRC INSIGHT; preparation of training materials; customer support; and psychometric services.</p> <p>Idaho Science End-of-Course Field Test: 2013–2014</p> <p>SDE contracted with DRC to develop and administer the Idaho Science EOCs in Biology and Chemistry. The field test administration included only multiple-choice items and was administered via computer. Approximately 10,000 students participated in the field test. DRC’s duties included project management; item development and test construction; field testing; conducting review committee meetings; electronic administration and scoring of tests via DRC INSIGHT; preparation of training materials; customer support; and psychometric services</p> |
| IOWA | |
| <p>Iowa Department of Education Grimes State Office Building 400 East 14th Street Des Moines, IA 50319-0146</p> <p>Mr. Jay Pennington Chief of Bureau of Information and Analysis Services (515) 281-3757 (phone) (515) 242-5988 (fax) jay.pennington@iowa.gov</p> | <p>Alignment Study and Standard Setting for the Iowa Assessments: 2013</p> <p>The Iowa Department of Education contracted with DRC to conduct alignment studies and standard setting services for the Iowa Assessments in reading and mathematics in grades 3–8, 10, and 11, and science in grades 5, 8, and 11. DRC’s responsibilities included: project management, meeting planning and coordination, selection and training of panelists, session leadership and facilitation, determining alignment (content and cognitive level) of the Iowa Assessments with the Iowa Core content standards, establishing achievement levels (cut points) and associated achievement-level descriptors, and preparing final reports. The achievement levels and descriptors will be used in Iowa’s accountability model.</p> |

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| LOUISIANA | |
| <p>Louisiana Department of Education Division of Standards, Assessments, and Accountability 1201 North Third Street G224 Baton Rouge, LA 70804</p> <p>Ms. Jessica Baghian Deputy Chief of Staff (225) 342-3625 jessica.baghian@la.gov</p> <p>Ms. Jan Sibley Supervisor, Assessment Development and Support (225) 342-3421 jan.sibley@la.gov</p> | <p>Louisiana Educational Assessment Program (LEAP), Graduation Exit Examination (GEE), Louisiana Alternate Assessments (LAA 1 and LAA 2), and English Language Development Assessment (ELDA): 1998–2015 (multiple contracts)</p> <p>This program consists of standards-based tests for grades 4 and 8, along with a graduation exam, with approximately 60,000 students per grade taking the tests. These criterion-referenced tests include multiple-choice and constructed-response items in ELA, mathematics, science, and social studies. The program also includes the Louisiana Alternate Assessments for grades 3–11 and the English Language Development Assessment for K–12 students. DRC’s responsibilities include project management; item development (for Transitional Assessments and assessment guides) test construction; printing of all materials; writing and editing manuals, interpretive guides, and released items documents; conducting workshops for test coordinators; packing, distributing, and collecting materials; scanning, editing, and scoring answer documents, including handscoring and rangefinding; psychometric services; and reporting.</p> <p>Integrated Louisiana Educational Assessment Program (iLEAP): Augmented Norm-Referenced Tests and Criterion-Referenced Tests: 2003–2015</p> <p>The iLEAP consists of both augmented norm-referenced tests and criterion-referenced tests for grades 3, 5, 6, and 7 in ELA, mathematics, science, and social studies, and grade 9 in ELA and mathematics. The assessments include both multiple-choice and constructed-response items. Approximately 55,000 students per grade take the tests. DRC and our subcontracting partner, Riverside Publishing, are working together to develop and implement the iLEAP program. DRC’s project activities include project management; item development (of science and social studies items) and forms construction; conducting review committee meetings; designing and printing scannable documents; packing, distributing, and collecting test materials; scanning, editing, and scoring answer documents, including handscoring and rangefinding; psychometric services; and reporting.</p> |

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| <p><i>(Louisiana continued)</i></p> | <p>Louisiana Transitional Field Test: 2013</p> <p>As part of the LEAP/GEE programs, DRC is assisting Louisiana in developing Transitional Assessments that will help the State shift to Common Core assessments and new science and social studies standards over the next three years. The Transitional Assessments replaced the State’s 3–8 summative assessments in the 2013 and 2014 administration years. DRC INSIGHT was used to administer an online field test of the newly developed English language arts and mathematics items for the Transitional Assessments. Approximately 115,000 testers participated in the online field test administration in May 2013.</p> |
| MICHIGAN | |
| <p>Michigan Department of Education Office of Standards & Assessment Bureau of Assessment & Accountability P.O. Box 30008 Lansing, MI 48909</p> <p>Mr. Andrew J. Middlestead Director (517) 335-0568 (phone) (517) 335-1186 (fax) middlesteada@michigan.gov</p> | <p>Michigan Online Statewide Assessments: 2014–2016</p> <p>DRC was selected by the Michigan Department of Education (MDE) for the administration, scoring, and reporting of Michigan’s Online Statewide assessment programs and related projects. Tests include summative and alternate assessments for grades 3–8 and 11 in ELA, mathematics, science, and social studies; and Interim assessments for grades K–12 in ELA and mathematics and grades 3–high school in science and social studies. DRC’s responsibilities include: project management, customer service, online administration via DRC INSIGHT, scoring, and reporting.</p> <p>MDE recently awarded DRC a new three- year contract to provide online administration, via DRC INSIGHT, of the new M-STEP assessments beginning later in 2015</p> |

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| <p>(Michigan continued)</p> | <p>Michigan K–12 Item Development: 2011–2016</p> <p>MDE contracted with DRC for the development, quality assurance, revision, and stakeholder review of assessment items and contexts for all subjects and tests included in the State of Michigan’s K–12 statewide assessments. This includes Summative Assessments for ELA, math, science and social studies Grades 3–8 and High school; Alternate Assessments for ELA, math, science and social studies for grades 3–8 and high school; and Interim Assessments for K–8 and high school in ELA, math, science and social studies. DRC’s responsibilities include project management; customer service and technical support; developing training methods and materials; forms construction and development and review of social studies items for Michigan’s alternate assessment, as well as conducting a pilot test and subsequent cognitive labs (spring 2014); item development training for Michigan teachers to develop Math and ELA items for the Smarter Balanced Assessment Consortium; recruiting, training, and performance evaluation of item/context writers and reviewers; planning, coordinating, and conducting all item/context development and review meetings; translation services; research/psychometric services; and reporting of procedures and results.</p> <p>Michigan Administration, Scoring, and Reporting of Statewide Assessments: 2013–2016</p> <p>DRC, AIR, MI, and Measured Progress were selected for the administration, scoring, and reporting of Michigan’s statewide assessments (given to 1.5 million students, across 3,500 schools, in grades 3–11 in ELA, reading, writing, math, science, and social studies). DRC’s responsibilities include: printing, packaging, and shipping of all test materials for Michigan’s fall and spring assessments. Materials include: test booklets, answer documents, manuals, and accommodated materials (braille, enlarged print, audio, video, and translations).</p> |

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| MINNESOTA | |
| <p>Minnesota Department of Education 1500 Highway 36 West Roseville, MN 55113</p> <p>Ms. Jennifer Dugan Test Development Supervisor (651) 582-8654 (phone) (651) 582-8874 (fax) jennifer.dugan@state.mn.us</p> | <p>Minnesota Assessments: 2011–2014</p> <p>DRC worked in partnership with AIR to administer the Minnesota Assessments—standards-based assessments in grades 3–8 and 11 in mathematics, grades 3–8 and 10 in reading, and grades 5, 8 and one grade in high school in science; graduation assessments in mathematics, reading, and writing; alternate assessments in mathematics, reading, and science; and modified assessments in mathematics and reading. Assessments were administered in both paper/pencil and online format. DRC was responsible for managing the paper/pencil administration process, including project management; printing, packaging, distribution, and collection of test materials; customer service; scanning and scoring, including handscoring; and creation of data files.</p> |
| MISSOURI | |
| <p>Missouri Department of Elementary & Secondary Education 205 Jefferson Street Jefferson City, MO 65102</p> <p>Mr. Michael Muenks, Coordinator of Curriculum and Assessment (573) 751-8465 (phone) michael.muenks@dese.mo.gov</p> | <p>Missouri Assessment Program (MAP): 2014–2018</p> <p>DRC is working in partnership with CTB/McGraw-Hill (CTB) for the administration, scoring, and reporting of the MAP, for grades 3–8 in ELA and mathematics, and grades 5 and 8 for science. As a subcontractor to CTB, DRC is providing project management and online test administration services, via DRC INSIGHT, for the following: the computer-adaptive survey assessment of English language arts and mathematics content at grades 3, 4, 6, and 7; the computer-adaptive Smarter Balanced assessments of mathematics and ELA at grades 5 and 8; and the fixed-form Grade-Level Assessments for grades 5 and 8 in science.</p> |

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| NEBRASKA | |
| <p>Nebraska Department of Education 301 Centennial Mall South Lincoln, NE 68509</p> <p>Dr. Valorie Foy Director of Statewide Assessment (402) 471-2818 (phone) (402) 471-4311 (fax) valorie.foy@nebraska.gov</p> <p>Dr. John Moon Project Manager (402) 471-1685 (phone) (402) 471-4311 (fax) john.moon@nebraska.gov</p> | <p><i>Nebraska State Accountability (NeSA) and Check 4 Learning (C4L): 2013–2018, 2009–2013 (NeSA-Writing, 2010–2013)</i></p> <p>The Nebraska Department of Education (NDE) contracted with DRC for the development and administration of the NeSA and C4L formative assessments. NeSA consist of multiple-choice items for reading, mathematics, and science, and writing. Items are based on Nebraska academic content standards, with approximately 22,000 students tested per grade in the spring of each year. Operational tests with embedded field testing are primarily administered online via DRC INSIGHT, with a small number of tests being administered in a paper-and-pencil format. Practice tests are delivered in online format only. The C4L system, for grades 3–8 and 11 in reading, mathematics, and science, is used by teachers and administrators to deliver on-demand, classroom-based assessments at the point of instruction in order to monitor student learning throughout the year. DRC’s responsibilities include project management; test development services; materials production, printing, distribution, and collection; computer-based test administration via our online testing engine, DRC INSIGHT; training; customer service; processing and scanning; scoring, including handscoring and rangefinding for NeSA-Writing; psychometric services; and reporting.</p> |
| NEW YORK | |
| <p>New York State Education Department 89 Washington Avenue Albany, NY 12234</p> <p>Mr. Zachary B. Warner Office of Assessment, Standards & Curriculum (518) 402-5390 zachary.warner@nysed.gov</p> | <p><i>Standard Setting, Data Analysis, and Technical Reports for the Regents Exams: 2013–2016</i></p> <p>New York State Education Department contracted with DRC to provide standard setting services and technical reports for statewide Regents (end-of-course) exams. DRC’s responsibilities include project management; contacting sample schools; printing of answer documents; distribution, collection, and scanning answer documents; arranging meetings including recruitment and payment of committee participants; session leadership, training, and facilitating for performance-level descriptor development and standard setting meetings; analysis of external benchmark data; and providing technical reporting and data. DRC will also develop annual technical reports (a total of 25) for all operational Regent Exams.</p> |

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| OHIO | |
| <p>Ohio Department of Education 25 South Front Street Mail Stop 507 Columbus, OH 43215</p> <p>Mr. Jim Wright Director of Assessment (614) 387-2218 (phone) (614) 995-5568 (fax) james.wright@ode.state.oh.us</p> | <p>Ohio Computer-Based Assessments: 2013–2018</p> <p>DRC is working in partnership with AIR to provide test development, administration, and analysis of subject tests for science and social studies to compliment the ELA and mathematics assessments available from the Partnership for Assessments of Readiness for College and Career (PARCC). These are performance-based assessments in science (grades 4, 6, and high school) and social Studies (grades 5, 8, and high school) consisting of multiple-choice and constructed-response items, and graduation tests in reading, mathematics, science, social studies, and writing administered to all students in grade 10, with re-tests for students in grades 11 and 12, consisting of multiple-choice and constructed-response items, along with a writing prompt. This contract also includes the administration of the Ohio Graduation Tests, which are aligned to Ohio’s Academic Content Standards. Students in high school must take and pass these tests to demonstrate proficiency before graduation from high school. Between 15,000 and 200,000 students are assessed per administration, with three administrations provided per year. As a subcontractor to AIR, DRC’s duties include project management; printing (test booklets, answer documents, and administrative manuals); packaging, distribution, and collection of test materials; receipt control and materials tracking; scanning and scoring, including handscoring; and creation of data files.</p> <p>Ohio Alternate Assessment for Students with Significant Cognitive Disabilities (AASCD): 2013–2018</p> <p>DRC is working in partnership with AIR to provide test development, administration, and analysis of performance-based adaptive alternate assessment subject tests for English language arts, mathematics, science, and social studies, for grades 3–12, aligned to Ohio’s Academic Content Standards – Extended. As a subcontractor to AIR, DRC is providing project management and production, packaging, and shipment of test materials.</p> |

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| <p>(Ohio continued)</p> | <p>Ohio Graduation Tests (OGTs): 2006–2014</p> <p>DRC worked in partnership with AIR to administer the OGTs— criterion-referenced tests in reading, mathematics, science, social studies, and writing administered to all students in grade 10, with re-tests for students in grades 11 and 12. Tests included multiple-choice and constructed-response items, along with a writing prompt. In fulfillment of this contract, DRC also provided services for the 1% population with the most severe cognitive disabilities through the Ohio Alternate Assessment for Students Disabilities. DRC’s duties included project management; printing (test booklets, answer documents, administrative manuals); packaging, distribution, and collection of test materials; receipt control and materials tracking; scanning and scoring, including handscoring and rangefinding; and creation of data files.</p> |
| OKLAHOMA | |
| <p>Oklahoma State Department of Education 2500 North Lincoln Boulevard Oklahoma City, OK 73105-4599</p> <p>Joyce DeFehr Executive Director, Office of Accountability and Assessments (405) 521-3341 (phone) joyce_defehr@sde.state.ok.us</p> | <p>Oklahoma School Testing Program: Oklahoma Core Curriculum Tests (OCCT): 2005–2010</p> <p>The OCCT were criterion-referenced assessments in reading, writing, mathematics, science, social studies, geography, and U.S. History/ Constitution/Government administered to approximately 45,000 students per grade, for grades 3–8. DRC provided ongoing development, implementation, and management of the program. DRC’s project responsibilities included overall project management; item and test development; field testing; psychometric services; standard setting; printing of all test materials; packaging, distribution, and collection; scanning, scoring, rangefinding and handscoring; reporting; in-state training; and customer service.</p> <p>Oklahoma Core Curriculum Test Alignment Study: 2011–2012</p> <p>The State of Oklahoma contracted with DRC for the completion of alignment studies for the general OCCT assessments in grades 3–8 mathematics and reading, and grades 5 and 8 science. DRC’s responsibilities included recruiting and selecting individuals to review alignment of Oklahoma’s Priority Academic Student Skills (PASS) standards and assessments using the Webb alignment criteria; training and facilitating the alignment process using the Web Alignment Tool; preparing documents and training materials for the alignment study; providing reports and documentation summarizing the alignment studies including evaluations from reviewers on the alignment process; and coordinating all meeting logistics.</p> |

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| OREGON | |
| <p>Oregon Department of Education 255 Capitol Street NE Salem, OR 97310</p> <p>Mr. Derek Brown Director, Assessment (503) 947-5841 (phone) derek.brown@state.or.us</p> | <p>Handscoring of Oregon’s Smarter Balanced Assessments: 2014–2015</p> <p>As a subcontractor to AIR, DRC is providing handscoring of Oregon’s Smarter Balanced Assessments for grades 3–8 and high school English language arts and mathematics, which are administered to 280,000 students.</p> |
| PENNSYLVANIA | |
| <p>Pennsylvania Department of Education Bureau of Curriculum, Assessment and Instruction 333 Market Street Harrisburg, PA 17126-0333</p> <p>Mr. John Weiss (all programs) Assistant Director, Bureau of Curriculum, Assessment and Instruction (717) 214-4394 (phone) (717) 783-6642 (fax) jweiss@pa.gov</p> <p>Dr. Rich Maraschiello (CDT) PDE Consultant (717) 525-5746 (office) (215) 771-9805 (mobile) c-rmarasch@state.pa.gov</p> | <p>Pennsylvania System of School Assessment (PSSA): 2008–2016, 2003–2008, 1999–2003, 1992–1999</p> <p>The Pennsylvania Department of Education (PDE) contracted with DRC to provide development, implementation, and management of the PSSA. These are standards-based, criterion-referenced assessments, consisting of open-ended, multiple-choice, and evidence-based selected-response items for grades 3–8 in English language arts, mathematics, and science. Each year, approximately 140,000 students are tested per grade, and more than 1.9 million tests are administered. DRC’s responsibilities include project management; customer service; item development and test construction; conducting review meetings; designing and printing materials; packaging, distribution, and collection; scanning and scoring all answer booklets, including handscoring; psychometric services; standard setting; rangefinding; and reporting. In Spring 2013, DRC began embedded and standalone field testing to support the transition of the PSSA program to align to the Pennsylvania Core Standards (PCS). In Spring 2015, DRC delivered PCS-aligned assessments, including the new English Language Arts assessment.</p> <p>Pennsylvania Voluntary Model Curriculum, Classroom Diagnostic Tools (CDT), and Keystone Exams: 2009–2016</p> <p>PDE contracted with DRC for the development of the Voluntary Model Curriculum, CDT, and Keystone Exams. All three components are aligned to the Pennsylvania curriculum framework, the Pennsylvania Core Standards (PCS), and assessment anchors in the areas of reading, writing, mathematics, and science. Diagnostic tests are administered multiple times throughout the year. End-of-course tests are administered three times per year.</p> |

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| <p>(Pennsylvania continued)</p> | <p>The Voluntary Model Curriculum consists of K-12 curricular resources and materials developed in collaboration with Pennsylvania teachers, administrators, and higher education faculty. Curricular resources include units and lesson plans as well as a variety of support materials. DRC’s responsibilities include project management, curriculum development (learning progressions/ units/lesson plans) aligned to PCS, development of enriched performance tasks, committee facilitation, meeting planning and coordination, designing an online committee feedback system, and curriculum field testing.</p> <p>The Classroom Diagnostic Tool is an online test system that supports the Keystone Exams and PSSA by providing instructional feedback to students and teachers through criterion-referenced, multiple-choice, online computer-adaptive assessments of the prerequisite skills of students grade six through high school (with content down to grade three for students who perform below grade six). Beginning in spring 2014, the CDT became available to students in grades 3–5 (with content down to kindergarten for students who perform below grade three). The assessments are based on the same academic content as the PSSA and the Keystone Exams. The CDT consists of multiple-choice items with real-time scoring. The system is available for use in schools and classrooms throughout the school year, and teachers can easily access online curricular resources directly from student and class reports. DRC is responsible for providing the following: project management, item development and item bank aligned to PCS, online administration with computer-adaptive testing algorithm, field testing, materials production (online), customer service, scoring, psychometric services, data management, reporting, and professional development resources.</p> |

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| <p><i>(Pennsylvania continued)</i></p> | <p>The Keystone Exams are a series of end-of-course assessments in Algebra I, Biology, and Literature that are required for graduation beginning with the graduating class of 2017. Testing began for these three courses in 2011. Additional Keystone Exams, like English Composition and Civics & Government, may be added in the future if funding is available. The exams are offered in both online and paper-and-pencil format. Each test is comprised of two modules containing specific course-related content topics, permitting students who don't achieve proficiency to retake only the module(s) in which they were not successful. A student takes a Keystone Exam after completion of the appropriate course. DRC's responsibilities include: project management; item development aligned to PCS; forms construction; coordinating committee reviews; field testing; materials production and printing; packaging, distribution, collection, and processing; customer service; online test administration; scanning and scoring, including handscoring, rangefinding, and automated scoring; psychometric services; standard setting; comparability study; data management; conducting report focus groups; and reporting.</p> |
| <p>SMARTER BALANCED ASSESSMENT CONSORTIUM</p> | |
| <p>Smarter Balanced Assessment Consortium Office of Superintendent of Public Instruction State of Washington P.O. Box 47200 Old Capital Building 600 South Washington Olympia, WA 98504-7200</p> <p>Mr. Mike Middleton Director, Assessment Business & Special Populations (360) 725-6434 (phone) (360) 725-0424 (fax) michael.middleton@k12.wa.us</p> | <p><i>Pilot Item Development for the Common Core Assessments: 2012–2013</i></p> <p>DRC was selected as part of a team to develop the first set of nearly 10,000 student test questions for the new Common Core Assessments. DRC worked collaboratively with five partners to develop the test items for Smarter Balanced. The partners include the prime contractor, CTB, AIR, The Council for Aid to Education, HumRRO, and The College Board. DRC developed a variety of CCSS-aligned ELA and mathematics stimuli and items including selected-response, technology-enhanced, and constructed-response items. The ELA stimuli include audio/video stimuli as well as traditional passages. In support of the item development process, DRC conducted more than 315 individual cognitive labs (summer of 2012) in four states to provide a research base for developing test questions. Following the cognitive labs, DRC began efforts to recruit and enroll participants in small-scale trials (held in November 2012) in more than 900 schools across 25 states. The results further inform the development of the Smarter Balanced assessments.</p> <p><i>Test Delivery System: 2012–2014</i></p> <p>AIR and DRC were selected to develop and deliver Smarter Balanced's Test Delivery System. The goals for the test delivery system. As a subcontractor to AIR, DRC developed several components of the open-source technology in conjunction with AIR.</p> |

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| <p><i>(Smarter Balanced continued)</i></p> | <p><i>Pilot Test Administration: 2012–2013</i></p> <p>As an addition to the Test Delivery System contract, AIR and DRC were also awarded test administration services for the Smarter Balanced Pilot Test. As a subcontractor to AIR, DRC’s role was to recruit schools to participate in the large-scale Pilot Test in 2013. The Pilot Test was administered online to students in grades 3–11 in the content areas of English language arts/literacy (ELA) and mathematics. DRC was responsible for contacting over 6,000 schools to register them to participate in one of five testing windows. As participation was secured, we ensured that the contact information for the districts was up-to-date and sent follow-up communication to districts describing the details they would need in order to take the next step in participation. DRC also provided bi-weekly reports that outlined the progress and status of schools that had been contacted.</p> <p><i>Item Development Management for the Field Test and Scoring Management for the Pilot Test and Field Test: 2013</i></p> <p>CTB, DRC, AIR, MI, Human Resources Research Organization (HumRRO), and Stanford Center for Assessment, Learning and Equity (SCALE) were selected to develop items for the Smarter Balanced Field Test and score items for the Pilot and Field Test. As a subcontractor to CTB, DRC developed more than 4,900 ELA items, 4,400 mathematics items, and 104 Performance Tasks. Items types included: constructed-response, selected-response, technology-enhanced, and performance tasks. DRC contributed to the item/task/stimulus writing and revisions for the field test; the bias/sensitivity, accessibility, and content reviews; and cognitive labs; and contributed to rangefinding, scoring, and handscoring of the pilot test and field test.</p> |

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| SOUTH CAROLINA | |
| <p>South Carolina Department of Education Office of Assessment 1429 Senate Street, Room 607 Columbia, SC 29201</p> <p>Dr. Susan Creighton Education Associate (803) 734-8535 (phone) (803) 734-8886 (fax) screight@ed.sc.gov</p> <p>Ms. Elizabeth Jones Director of Assessment (803) 734-8295 (phone) ejones@ed.sc.gov</p> | <p>South Carolina Palmetto Assessment of State Standards (SCPASS): 2013–2018 (SCPASS), 2008–2013 (SCPASS), 1998–2008 (PACT), and 1997–1998 (PACT Field Test)</p> <p>The South Carolina Department of Education (SCDE) contracted with DRC to provide overall management and administration of the SCPASS, which is a statewide, criterion-referenced assessment for grades 4–8 in science and social studies, with multiple-choice items only. 50,000 students per grade/subject taking it annually. DRC’s responsibilities include project management; item development; materials production; packaging, distribution, and collection of test materials; customer service; coordinating and presenting workshops (in-state and via WebEx); scanning and scoring; psychometric services; and reporting. DRC will begin administering the tests online, via DRC INSIGHT, in spring of 2015.</p> <p>High School Assessment Program (HSAP): 2013–2014 (HSAP), 2008–2013 (HSAP), 2003–2005 (BSAP) 1998–2003 (BSAP), and 1989–1998 (BSAP)</p> <p>The SCDE selected DRC for the overall administration and management of the HSAP, which were statewide, criterion-referenced assessments (multiple-choice and constructed-response) for high school students in ELA and mathematics. 90,000 students were tested per subject annually. DRC’s responsibilities included project management; materials production; packaging, distribution and collection; customer service; coordinating and presenting workshops (in-state and via WebEx); scanning and scoring, including handscoring and rangefinding; psychometric services; and reporting.</p> <p>South Carolina End-of-Course Examination Program (EOCEP): 2012–2017 and 2008–2012</p> <p>The SCDE contracted with DRC to provide overall management and administration of the EOCEP, which is a high-stakes assessment administered to high school students in English 1, Algebra 1/Mathematics for the Technologies 2, Biology, and U.S. History and the Constitution. Over 55,000 students per course are tested annually. Tests are administered three times per year using online or paper-and-pencil modes. Online test administration is done using our online testing system, DRC INSIGHT. DRC’s responsibilities include project management; producing test materials; coordinating and presenting workshops (in-state and via WebEx); items and forms development for all subjects; printing, packaging, distributing, and collecting materials; online test delivery; customer service; scanning and scoring; psychometric services; and reporting.</p> |

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| <p><i>(South Carolina continued)</i></p> | <p><i>South Carolina English Language Development Assessment (ELDA): 2012–2014, 2008–2012, 2007–2008, and 2006–2007</i></p> <p>The SCDE contracted with DRC to provide overall management and administration of the ELDA, which was administered annually to all students in grades K–12 (approximately 45,000 students.) Tests were administered via paper/pencil or online, via DRC INSIGHT and consisted of multiple-choice and constructed-response items. DRC’s responsibilities included project management; producing test materials; online testing via the DRC INSIGHT; customer service; coordinating and presenting workshops (in-state and via WebEx); printing, packaging, distributing, and collecting materials; image scanning and scoring, including handscoring; psychometric services; and reporting.</p> |
| UTAH | |
| <p>Utah State Office of Education 250 East 500 South PO Box 144200 Salt Lake City, Utah 84114-4200</p> <p>Mr. Kurt Farnsworth Educational Development Coordinator (801) 538-7673 kurt.farnsworth@schools.utah.gov</p> <p>Mr. Darron Kennett Education Specialist, ELA, WIDA (801) 538-7819 daron.kennett@schools.utah.gov</p> <p>Ms. Julie Benson Education Specialist, ELA (801) 538-7542 julie.benson@schools.utah.gov</p> | <p><i>Utah Statewide Computer Adaptive Assessment System: 2013–2016</i></p> <p>AIR and DRC were selected to work in conjunction with the Utah State Office of Education for the development, delivery, administration, and data exchanges of a computer-adaptive testing system aligned with the Utah Core Standards. Subject areas and grade levels include: English language arts, mathematics, and science for students in grades 3–12. As a subcontractor to AIR, DRC’s responsibilities include project management and handscoring services for the program, including planning and conducting rangefinding meetings.</p> |

| Client and Contact Information | Project Information |
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| WASHINGTON | |
| <p>Office of Superintendent of Public Instruction State of Washington P.O. Box 47200 Old Capitol Building 600 South Washington Olympia, WA 98504-7200</p> <p>Ms. Robin Munson Assistant Superintendent, Division of Assessment and Student Information (360) 725-6356 (phone) (360) 725-6509 (fax) robin.munson@k12.wa.us</p> <p>Mr. Mike Middleton Director, Assessment Business & Special Populations (360) 725-6434 (phone) (360) 725-0424 (fax) michael.middleton@k12.wa.us</p> | <p>Washington Comprehensive Assessment Program (WCAP): Measurements of Student Progress (MSP), High School Proficiency Exam (HSPE), and End-of-Course (EOC) Tests: 2008–2015</p> <p>The MSP consisted of standards-based tests for grades 3–8 reading, mathematics, science, and writing. The HSPE measured the proficiency of high school students (reading and writing) and served as the state’s exit exam. Approximately 80,000 students per grade took the MSP and HSPE tests. DRC’s contract also included mandated EOC tests in mathematics and biology. DRC’s responsibilities included project management; modifying items to include technology-enhanced features (MSP); typesetting and printing of all materials; writing and editing manuals; packing, distributing, and collecting materials; conducting workshops for test coordinators; online test administration via DRC INSIGHT of the reading and mathematics tests for grades 3–8 and science tests for grades 5 and 8 of the MSP; scanning, editing, and scoring, including handscoring, rangefinding, and teacher scoring; and reporting.</p> |
| WEST VIRGINIA | |
| <p>West Virginia Department of Education Capitol Complex Building 6, Room 722 1900 Kanawha Blvd., East Charleston, WV 25305</p> <p>Mr. Timothy Butcher Science Assessment Coordinator (304) 558-2546 (phone) (304) 558-1613 (fax) tbutcher@accesss.k12.wv.us</p> | <p>West Virginia Science Alignment Study: 2009–2011</p> <p>The State of West Virginia contracted with DRC to perform pre- and post-field test alignment studies of the State’s content standards and objectives and the statewide assessments in Science for grades 10 and 11. Prior to the alignment studies, DRC conducted a comprehensive review of items from the field test item bank for item alignment to the State’s content standards and objectives for Science, grades 10 and 11. DRC’s responsibilities included: coordinating meeting logistics; developing materials for meetings; training, facilitating, and participating in the item review and alignment study meetings; engaging national content experts as participants; preparing written reports and data files for all studies conducted; and making recommendations for actions as needed based on study results.</p> |

| Client and Contact Information | Project Information |
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| WIDA CONSORTIUM | |
| <p>World-Class Instructional Design and Assessment (WIDA) Consortium Wisconsin Center for Education Research University of Wisconsin-Madison 1025 West Johnson St., MD #23 Madison, WI 53706</p> <p>Dr. Carsten Wilmes Assistant Director, Assessment (608) 263-5547 (phone) (608) 263-3733 (fax) (312) 718-2444 (cell) wilmes@wisc.edu</p> | <p><i>Assessment Services Supporting ELs through Technology Systems (ASSETS): 2011–2015</i></p> <p>The Wisconsin Department of Public Instruction and WIDA were awarded a four-year Enhanced Assessment Grant by the U.S. Department of Education to develop a next-generation assessment system for English learners (ELs). DRC was selected as WIDA’s technology partner to provide online versions of their ACCESS 2.0 Field tests using the DRC INSIGHT online testing system. This includes field testing in Reading (grades 1–3), Speaking (grades 1–12), and Writing (grades 4–12) in 2014, and Reading (grades 1–12), Listening (grades 1–12), Speaking (grades 1-12) and Writing (grades 4-12) in 2015. DRC provides overall management of the test delivery system and customer support for schools and districts administering these assessments. The DRC eDIRECT portal is used for student registration, online test tracking and statistics, and reporting.</p> <hr/> <p><i>Administration, Scoring, and Reporting of the ACCESS 2.0 and ACCESS for ELLs Operational Assessments: 2014–2019 (with an additional 3-year option)</i></p> <p>DRC was selected to administer, score, and report the ACCESS for ELLs and ACCESS for ELLs 2.0 assessments, which include summative assessments (both online and paper/pencil) for grades K–12 in Listening, Reading, Speaking, and Writing; screener assessments for grades K–12 in Listening, Reading, Speaking, and Writing; and alternate assessments for grades 1–12 in Listening, Reading, Speaking, and Writing. DRC’s responsibilities include: program management; materials production and printing; shipping; test administration; scoring, including handscoring; psychometric consulting services; and reporting.</p> |

DRC'S CONTRACT HISTORY

DRC has never had a contract terminated due to our performance. Per the RFP requirements, we have provided information below regarding contracts that have ended early.

In 2014, DRC was awarded a two-year contract with the Michigan Department of Education (MDE) for the Administration, Scoring, and Reporting of Michigan's Online Statewide Assessment programs and related projects. We performed well under the contract, including a successful spring 2015 online test administration. Due to legislation in the State of Michigan, MDE was required to reissue the RFP in 2015; DRC was again awarded the contract and will begin administering the assessments under the new contract beginning later in 2015.

CHANGES IN DRC'S COMPANY STRUCTURE

On December 15, 2011, DRC acquired REDA International, Inc. (REDA), a research company based in the Washington D.C. area and founded in 1992.

DRC'S LAWSUITS AND LEGAL PROCEEDINGS

Within the last five years, there have not been any lawsuits or legal proceedings against DRC related to the services for which we are submitting our proposal to PDE.



Victory Productions

On the following pages, DRC has provided more information on Victory Production's corporate capabilities, background, and experience organized under the following subheadings:

- Victory Production's Corporate Capabilities
- Victory Production's References
- Victory Production's Experience

VICTORY PRODUCTION'S CORPORATE CAPABILITIES

Victory Productions (Victory) is a state-of-the-art development organization, with innovative solutions, deep content knowledge, focused communications, effective project management, and the pedagogical and technological expertise to fulfill the changing requirements of the world of education. Victory develops engaging, content-rich, individualized learning experiences that are available on multiple platforms. Their successful projects include assessments (high-stakes, formative, technology-enhanced, performance-based); basal and supplemental programs for all areas of the curriculum; multi-lingual products and translation services; professional development services; games, simulations, iPad/mobile apps, digital learning objects, delivery platforms; and eBooks textbooks and other ePub platforms.

Founded in 1995, Victory's headquarters are in Worcester, Massachusetts, with a wholly owned facility in Medellin, Colombia. Their relationships with global universities and industry organizations keep the company on the cutting edge.

Publishing: from Paper to iPad

In addition to a broad history of development in educational publishing with clients including Pearson, Oxford University Press, Macmillan Publishers, SRA/McGraw-Hill, Houghton Mifflin, Harcourt, Saxon Publishers, Zaner-Bloser, Holt, Rinehart and Winston, Benchmark Education, Abrams, Glencoe, Key Curriculum Press, Scholastic, and many others, Victory developed the economics and personal finance course for the Virginia Department of Education, deploying it online through their statewide LMS. When Apple launched its eBooks Textbooks initiative, Victory leapt to convert the course for use on the iPad, taking full advantage of the format's interactive capabilities. The resulting pair of eBooks textbooks were the first available on economics and personal finance in the iTunes store. Victory's production department is second to none in the creation of quality products in all media.

Custom Technology and Consulting

Victory has supported clients through some of the most challenging transitions organizations in our area undertake, such as print-to-digital transitions, including selecting or developing technology to achieve product goals; transitions in instructional approaches and technologies, such as migrating from whole-class instruction to individual, adaptive learning; business model transitions, such as shifting from per-copy to subscription revenue models, shifting from top-down to bottom-up, socially-networked, multiple price-point and feature models; and architectural and process transitions, such as moving into cloud-based platforms and designing digital workflows.

Translation

Victory Productions has extensive experience developing educational materials in multiple languages. Their translation—or non-English composition—experience is significant and scalable. Victory has four partner organizations that can satisfy virtually any translation, trans-adaptation, or translation-review requirements, as well as composition of authentic materials in non-English languages. This capability is particularly powerful in conjunction with Victory’s industry-leading capability in assessment.

Professional Learning and Leadership

Victory custom-designs professional learning and leadership that transforms research into practice, empowers educators to expand outcomes for students, and integrates innovations in educational technology. Victory’s expertise includes professional development, standards alignment, instructional coaching, curriculum design and audit, performance assessments and training teachers how to use them, project-based learning, STEM implementation, and data-driven decision-making training. Victory’s solutions include professional development models, professional development courses in all formats: training-the-trainer, multi-media support materials, and remote as well as on-site training.

metacog™ Proprietary Software And Services

metacog, Inc. is a subsidiary of Victory Productions that enables learning and assessment objects to generate data about student behavior from which educators, product developers, and researchers can glean data-supported insights about student cognition and metacognition.

Overall

Victory helps clients and partners succeed in their objectives by providing all of these capabilities, using its rigorous systems and vast network of creative contributors, at scale, quickly, and with an extremely high degree of quality and reliability.

VICTORY PRODUCTION'S REFERENCES

References for Victory Production's work on similar projects are included in the table below. Victory Productions invites PDE to contact their references for an assessment of their performance.

Victory Production's References

| Client/Contact Information | Project Description |
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| <p>Renaissance Learning PO Box 8036, Wisconsin Rapids, WI 54495</p> <p>Ms. Julianne Robar Content Program Manager (715) 424-3636 julianne.robar@renaissance.com</p> | <p>CCSS Formative Assessment Item Bank: 2014–2015</p> <p>Victory is handling item development in ELA, science, and Spanish language arts for grades K–12. Recently, in a two-month period, Victory developed a total of 16 passages and 100 items in grades 3–12. Victory remotely attended several collaborative client meetings to set project parameters and establish guidelines. Victory also produced more than 4,400 Spanish assessment items for Renaissance Learning's STAR360° computer-adaptive assessments.</p> |
| <p>Pacific Metrics 1 Lower Ragsdale Drive, Building 1, Suite 150, Monterey, CA 93940</p> <p>Mr. Scott Harter Director of Test Development (541) 636-3423 sharter@pacificmetrics.com</p> | <p>Louisiana State Assessment: 2014</p> <p>Victory handled the revision and development of ELA and mathematics items for grades 1–12 for Louisiana's high-stakes assessment. Victory was initially hired to review approximately 3,600 high-stakes career and college ready ELA and mathematics items that had been developed by another vendor. After evaluating the quality of the items, Victory advised on the best methods for implementing revisions. Based on the thoroughness of the review, Victory was awarded the opportunity to carry out the revisions of 30% of the items. The item types included multiple choice, evidence-based standard-response, short answer, and extended response. The duration of the project was approximately three months.</p> |

| Client/Contact Information | Project Description |
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| <p>Puro Cotto Lopez Calle 4 AF-2 URB. Almira Toa Baja, Puerto Rico</p> <p>Pura Cotto Lopez Independent Educational Consultant (787) 240-5505 puracotto@yahoo.com</p> | <p><i>Puerto Rico State Assessment: 2010–2014</i></p> <p>Victory worked in close collaboration with Pearson and the Puerto Rico Department of Education (PRDE) to develop high-stakes assessments, including items, passages, and art. The Victory team also worked closely with Pearson and PRDE consultants to conceptualize, develop, organize, and facilitate item writer workshops and in addition to supporting content and bias-review committee meetings in Puerto Rico for each development cycle. Victory was responsible for locating, training, and monitoring the island-based item writers. Assessment passages and items were developed in English for ESL and in Spanish for mathematics, Spanish language arts, and science assessments. ESL, Spanish, and mathematics assessments were developed for grades 3 -8 and 11. Science was developed for grades 4, 8, and 11. The total number of items and passages developed for all content areas and all four cycles was approximately 11,000 with the following breakdown: 2,900 for ESL, 3,300 for mathematics, 1,800 for science, and 3,000 for Spanish language arts.</p> |

VICTORY PRODUCTION’S EXPERIENCE

Victory Productions is one of the most respected development houses in the educational media industry. Their clients include some of the largest educational publishers in the world, and **all the major assessment providers rely on Victory to deliver content and services** that meet the extremely rigorous quality standards of assessment programs. Victory’s experience covers almost all forms of assessment, including tests involving the development of multiple choice, constructed response, evidence-based, technology-enhanced items (TEIs), performance tasks, and other item types. Their experience with College and Career Ready Standards is extensive and current as is their experience with the various state standards and frameworks.

Victory’s extensive experience in the development of formative and other summative assessments, including simulations and curriculum-embedded performance assessments, makes Victory the perfect partner to develop state assessments in ELA, math, and science. Victory does high-volume, high-speed, high-quality work in researching and permission-processing authentic passages and in developing original passages. In addition, Victory conducts major tagging and glossing projects for all the major assessment organizations. Their efficiency, their focus on quality, and the commitment and creativity of their people has resulted in a stellar track record of supporting client and student success.

New York State: As a subcontractor to Pearson from 2011–2015, Victory developed more than 8,000 high-stakes career- and college-ready ELA and mathematics items for the New York State assessment program. Both content areas spanned grades 3–8, and the ELA items were associated with passages provided by the client. In addition to developing items, Victory attended teacher-training sessions and participated in item review sessions with representatives from the New York State Education Department, as well as educators from the New York public school system.

Puerto Rico: As a subcontractor to Pearson from 2010–2014, Victory worked in close collaboration with Pearson and the Puerto Rico Department of Education (PRDE) to develop high-stakes assessments, including items, passages, and art. The Victory team also worked closely with Pearson’s and PRDE’s consultants to conceptualize, develop, organize, and facilitate item writer workshops and support content and bias-review committee meetings in Puerto Rico for each development cycle. Victory was responsible for locating, training, and monitoring item writers based in Puerto Rico. Assessment passages and items were developed in English for ESL and in Spanish for mathematics, Spanish language arts, and science assessments. ESL, Spanish, and mathematics assessments were developed for grades 3–8 and 11. Science was developed for grades 4, 8, and 11. The total number of items and passages developed for all content areas and all four cycles was approximately 11,000 with the following breakdown: 2,900 for ESL, 3,300 for mathematics, 1,800 for science, and 3,000 for Spanish language arts.

Partnership for Assessment of Readiness for College and Careers (PARCC): As a subcontractor to Pearson from 2013–2014, Victory handled item development, with a heavy emphasis on TEIs, in mathematics and ELA for grades 3–8.

Florida: As a subcontractor to Pearson in 2013, Victory reviewed and revised items in ELA, Spanish language arts, and social studies for grades K–12 for Florida’s high-stakes assessment. Much of the revision work was based on the recommendations provided by Victory’s review.

CCSS Formative Assessment Item Bank: As a subcontractor to Measured Progress from 2013–2014, Victory created approximately 1,500 formative assessment items in ELA and mathematics at grades 3–11 for an item bank for the state of New Hampshire. Victory created writer packets and editing checklists to more clearly describe the client specifications and guidelines in order to streamline the development process. This was especially important when it came to entering the items into the client’s management system. All items were carefully crafted to maintain high standards of quality, fairness, and rigor. Victory also researched and selected the appropriate permissioned passages to which the ELA items were written, concentrating on ensuring a wide range of text complexities for the passages and DOK levels in the items. Victory editorial staff attended several collaborative client meetings held in Worcester, Massachusetts,

and Dover, New Hampshire, and worked closely with Measured Progress assessment experts over the course of the project.

Massachusetts: As a subcontractor to Measured Progress from 2013–2014, Victory handled passage and item development in ELA and mathematics for grades 3–10 for Massachusetts’ high-stakes assessment. Victory developed approximately 470 ELA items associated with permissioned passages in grades 7, 8, and 10 in a two and a half month period. In mathematics, Victory developed more than 760 items for grades 3–8 and 10 in a little over five months. Grade level submissions were divided into two batches to facilitate development and client review. These items included multiple choice, open response, and short answer with Victory authoring distractor rationales. In both ELA and mathematics, Victory crafted items in accordance with Massachusetts Comprehensive Assessment System (MCAS) guidelines to maintain high standards of quality, fairness, and rigor.

Rhode Island: As a subcontractor to Measured Progress from 2013–2014, Victory handled item and passage development in mathematics, science, ELA, and social studies for grades 3–11 for Rhode Island’s high-stakes assessment. In mathematics and science, the items included multiple choice, short answer, and 4–point constructed response types. In mathematics there were more than 1,000 items spanning grades 3–11. In science the items included grades 4, 8, and 11 and were based upon the implementation of the Next Generation Science Standards (NGSS). The science items had to meet all three dimensions as described in the NGSS performance expectations. In ELA Victory was initially hired to revise multiple-choice and constructed-response items developed by another vendor. After successfully raising the rigor and quality of the items, Victory was awarded a contract to develop additional assessment items.

CCSS Formative Assessment Item Bank: As a subcontractor to NWEA in 2013, Victory handled passage and item development in ELA and mathematics for grades 3–11. Working in the QTI format, Victory also rewrote or replaced several ELA passages and created new original passages as necessary.

Louisiana: As a subcontractor to Pacific Metrics in 2014, Victory handled the revision and development of ELA and mathematics items for grades 1–12 for Louisiana’s high-stakes assessment. Victory was initially hired to review approximately 3,600 high-stakes career and college ready ELA and mathematics items that had been developed by another vendor. After evaluating the quality of the items, Victory advised on the best methods for implementing revisions. Based on the thoroughness of the review, Victory was awarded the opportunity to carry out the revisions of 30% of the items. The item types included multiple choice, evidence-based standard-response, short answer, and extended response. The duration of the project was approximately three months.

CCSS Formative Assessment Item Bank: As a subcontractor to Renaissance Learning from 2014–2015, Victory is handling item development in ELA,

science, and Spanish language arts for grades K–12. Recently, in a two-month period, Victory developed a total of 16 passages and 100 items in grades 3–12. Victory attended several collaborative client meetings remotely that set project parameters and established guidelines.

eMetric

eMetric, LLC

On the following pages, DRC has provided more information on eMetric’s corporate capabilities, background, and experience organized under the following subheadings:

- eMetric’s Corporate Capabilities
- eMetric’s References
- eMetric’s Experience

EMETRIC’S CORPORATE CAPABILITIES

Background

As a leading provider of technology solutions for the K–12 assessment industry, eMetric has a strong track record of providing powerful, reliable solutions that empower educators and decision-makers at all levels—states, districts, schools, and classrooms—with rich insight into assessment data. Based in San Antonio, Texas, eMetric was founded in 2000 by Dr. Huixing Tang. With strong expertise in psychometrics and software application development, Dr. Tang held the belief that data analytics is a powerful tool that should not be reserved for use by only data scientists and data gurus. His vision to enable educators to interact with assessment data in a meaningful way inspired the creation of Data Interaction™, a robust, dynamic reporting, and data warehousing environment way ahead of its time. This reporting and data analytics system has since been adopted by multiple states, most notably Alaska, Connecticut, Nevada, Pennsylvania, and South Dakota, for their statewide assessments and by leading test publishers for their norm referenced assessments. The latest version of Data Interaction has been redesigned and engineered to provide enhanced data visualization and support multiple devices including tablets and smartphones.

As eMetric grew, so did the field’s need to transition from paper/pencil testing to online testing. After substantial research and design efforts, the iTester™ platform was born. iTester has been used for summative, interim/benchmark, and formative assessments in multiple states and districts, most notably in South Dakota (end-of-course, formative, and benchmark), Nevada (writing assessment), Indiana (end-of-course), Missouri (end-of-course) and Oklahoma (Math, ELA, end-of-instruction). eMetric’s newest version, iTester 3, is designed to run smoothly on PC, Mac and touch-based tablets, and supports both traditional and technology-enhanced item types through a standards-based layout engine.

eMetric also offers a comprehensive range of services to support the statistical and psychometric aspects of large-scale testing programs. These services include planning, test construction, sampling, equating and scaling, norms development, and/or independent verification of equating/scaling results for high stakes testing programs. eMetric has provided psychometric services to a number of states for

their statewide high-stakes testing programs, including Connecticut, Florida, Nevada, Texas, Hawaii, Georgia and Mississippi.

Executive Leadership

eMetric is led by a close-knit, experienced, professional leadership team which has been crucial to the growth of eMetric, and will be essential to the successful execution of this project. Over time, each member of the management team has worked collaboratively to design and implement solutions for existing and new customers. Together, they comprise a coherent leadership group with mutually complementary expertise in the area of technology, education, psychometrics, operations, and project management.

Dr. Huixing Tang, President and Founder: As the head of eMetric, Dr. Tang provides innovative leadership and constant involvement with every project undertaken by eMetric. Over the course of this project, Dr. Tang will be involved daily in an oversight capacity. He will also be available to PDE for the escalation of any potential issues.

Mr. Vamsi Mukkamala, Vice President, Technology: As the head of Technology Solutions for eMetric, Mr. Mukkamala has been instrumental in providing focus for the development staff and he constantly researches the latest technologies and employs those new technologies in eMetric's solutions. For this project he will provide overall leadership and direction for the development and implementation of the proposed solution.

Ms. Dixie Knight, Vice President, Operations: Ms. Knight provides eMetric with operational vision, guidance, and leadership. Formerly a senior project director at Edvance Research and director of Educational Technology at Education Service Center, Region 20, she has led multiple highly visible, large-scale projects funded by the Texas Education Agency, the Michael & Susan Dell Foundation, and the George W. Bush Institute. For this project, she will provide leadership and direction for project management, quality assurance, technical support, and training.

Capacity to Perform this Scope of Work

eMetric has thoughtfully constructed a team with an impressive and extensive blend of skills and experience in technology, education, student assessment, program management, data management, and psychometrics; this team has enabled eMetric to advance beyond other technology providers in the educational assessment field and has positioned eMetric to lead the way in next generation online assessment and reporting systems. The eMetric technical team is comprised of experienced software developers, database analysts, system architects, and UI designers, all well-versed in current development languages and methodologies. eMetric's capabilities are further strengthened by a strong operational team of quality assurance engineers, project managers, business analysts, and client support specialists. These teams work collaboratively to

ensure the highest levels of reliability, usability, and client satisfaction for every contract.

Committed to continuous improvement, eMetric continues to enrich its core products and seek innovative ways to meet the online assessment and reporting needs of clients. eMetric’s portfolio of online assessment and reporting solutions revolve, and evolve, around the company’s goal to empower educators and decision-makers with timely insight into student performance.

Experience/Similar Work Performed

eMetric has a solid track record of successfully delivering Data Interaction for both test publishers and state education agencies. This track record speaks volumes to eMetric’s dependability and commitment to excellence. eMetric has earned a reputation for being easy to work with, technically advanced, and highly knowledgeable. For over a decade, eMetric has successfully delivered on many programs similar in size and complexity as the Pennsylvania program.

Data Interaction has been adopted by several of the leading test publishers in the U.S. to report assessment results for statewide programs or norm-referenced assessments with nationwide sales. In several states, most notably in Alaska, Connecticut, Nevada, Pennsylvania, and South Dakota, Data Interaction has been used as a single access point for each state to access reporting results of all major state assessments.

EMETRIC’S REFERENCES

References for eMetric’s work on similar projects are provided in the table below. eMetric invites PDE to contact any of these references for an assessment of their performance.

eMetric’s References

| Contact Information | Project Description |
|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <p>Connecticut Department of Education 165 Capitol Avenue Hartford, CT 06106</p> <p>Mr. Abe Krisst Bureau of Student Assessment (860) 713-6852 abe.krisst@ct.gov</p> | <p><i>Data Interaction™ for Connecticut Student Assessment</i></p> <ul style="list-style-type: none"> ■ Connecticut Master Test (2004–Present) ■ Connecticut Academic Performance Test (2004–Present) |

| Contact Information | Project Description |
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| <p>Nevada Department of Education 700 E. Fifth Street Carson City, NV 89701</p> <p>Mr. Julian M. Montoya, CPM Assessment, Program Accountability & Curriculum (775) 687-9255 jmontoya@doe.nv.gov</p> | <p><i>Data Interaction™ 2012–Present</i></p> <ul style="list-style-type: none"> ■ Nevada Longitudinal Data System <ul style="list-style-type: none"> — Report card — Nevada School Performance Framework <p><i>Data Interaction™ and iTester™</i></p> <ul style="list-style-type: none"> ■ Nevada Writing Assessment Program <ul style="list-style-type: none"> — Data management and reporting (2008– Present) — Online Assessment (2011–2012) |
| <p>Oklahoma State Department of Education 2500 North Lincoln Boulevard Oklahoma City, Oklahoma 73105-4599</p> <p>Ms. Sonya Fitzgerald Executive Director of State Testing (405) 521-3341 sonya.fitzgerald@sde.ok.gov</p> | <p><i>Data Interaction™ and iTester™</i></p> <ul style="list-style-type: none"> ■ Oklahoma Core Curriculum Test, Grades 6–8 Math and ELA (2014–Present) ■ Oklahoma End of Instruction (2014–Present) |
| <p>Pennsylvania Department of Education 333 Market Street Harrisburg, PA 17126</p> <p>Mr. John Weiss Bureau of Assessment and Accountability (717) 214-4394 jweiss@state.pa.us</p> | <p><i>Data Interaction™ for Pennsylvania Student Assessments</i></p> <ul style="list-style-type: none"> ■ Keystone Exams (2012–Present) ■ Pennsylvania System of School Assessment (2004–Present) ■ Pennsylvania System of School Assessment Modified (2010–2012) ■ Pennsylvania Alternate System of Assessment (2004–Present) ■ Access for ELLs™ (WIDA) (2009–Present) |

| Contact Information | Project Description |
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| <p>South Dakota Department of Education 800 Governors Drive Pierre, SD 57501</p> <p>Mr. Matt Gill Department of Education (605) 773-8193 matthew.gill@state.sd.us</p> | <p>Data Interaction™ for South Dakota Student Assessment: 2007–Present</p> <ul style="list-style-type: none"> ■ South Dakota State Test of Educational Progress <p>iTester™ – South Dakota Assessment Portal: 2011–Present</p> <ul style="list-style-type: none"> ■ End of course ■ Benchmark assessment ■ Formative assessment ■ District secure |

EMETRIC’S EXPERIENCE

eMetric has a solid track record of successfully delivering Data Interaction™ for test publishers and states. This track record speaks volumes to eMetric’s dependability and commitment to excellence. eMetric has earned a reputation for being easy to work with, highly knowledgeable, and technically advanced.

Data Interaction has been adopted by many of the leading test publishers in the United States to manage and report assessment results for statewide programs or norm-referenced assessments with nationwide sales. In several states, most notably in Pennsylvania, Oklahoma, Connecticut, South Dakota and Alaska, Data Interaction has been used as a state portal for reporting all major state assessment programs.

Below please find a list of current and prior projects that are similar in scope to the work that is to be performed for this contract.

Alaska

eMetric’s Data Interaction platform has been utilized in Alaska since 2010. The following assessment programs have been reported within Data Interaction:

- Standards Based Assessment (2010–2014)
- High School Graduation Qualifying Exam (2010–2014)
- Alternate Assessment (2011–2014)
- TerraNova Assessment (2011–2012)
- English Language Proficiency Assessment (2011–2012)

- Access for ELLs Assessment (WIDA) (2012–2014)

Connecticut

eMetric’s Data Interaction platform has been utilized in Connecticut since 2001. The following assessment programs have been reported within Data Interaction:

- Connecticut Mastery Test, generations 3–4 (2001–Present)
- Connecticut Academic Performance Test, Generations 2–3 (2001–Present)

Additionally eMetric has provided a publically accessible website for federal accountability reports in Connecticut.

Indiana

eMetric’s iTester portal has been utilized in Indiana to administer the End-of-Course Assessments (2008–2013). The integrated solution included authoring, administration, and reporting.

Nevada

eMetric’s Data Interaction platform has been utilized in Nevada for reporting the Nevada Writing Assessment (2006–2012). Customizations were added to assist the Nevada Department of Education in validating and applying writing scores to student records. In 2011 Nevada adopted eMetric’s iTester Portal which provided integrated online assessment and scoring platform to administer the Nevada Writing Assessment to grades 5, 8, and 11.

Additionally, eMetric Data Interaction platform powers the publically accessible federal accountability reporting website (The Nevada School Performance Framework) (2012–Present).

Pennsylvania

eMetric’s Data Interaction platform has been utilized in Pennsylvania since 2004. The following assessment programs have been reported within Data Interaction:

- Keystone Exams (2012–Present)
- Pennsylvania System of School Assessment (2004–Present)
- Pennsylvania System of School Assessment Modified (2010–2012)
- Pennsylvania Alternate System of Assessment (2004–Present)
- Access for ELLs Assessments (WIDA) (2009–Present)

Additionally, eMetric has hosted the PSSA Summary Reports and a publically accessible website for federal accountability reports in Pennsylvania (2009–Present).

Oklahoma

eMetric's iTester portal has been utilized in Oklahoma to administer the End-of-Course Assessments and Core Curriculum Assessments, grades 6–8. The integrated solution included authoring, administration, and reporting via the Data Interaction platform.

- Oklahoma Core Curriculum Test, Grades 6-8 Math and ELA (2014–Present)
- Oklahoma End of Instruction (2014–Present)

South Dakota

eMetric's Data Interaction platform has been utilized in South Dakota since 2007 to report the South Dakota State Test of Educational Progress assessment. In 2011, South Dakota adopted eMetric's iTester Portal which provides an integrated online assessment, scoring, and reporting platform. The following assessment programs are currently reported using Data Interaction within the iTester Portal:

- South Dakota State Test of Educational Progress (2007–Present)
- End-of-course Assessments (2011–Present)
- Classroom Assessments (2011–Present)
- South Dakota Benchmark Assessments (2012–Present)

Texas

eMetric has served as a provider of independent review of the equating and scaling procedures and independent verification of the equating results for the state's major assessment programs including STAAR, TAKS, and TAAS since 2003.





SECTION 5. PERSONNEL (REDACTED)

DRC’s employees are a key advantage for our state testing clients. Our valued professionals combine high levels of specialized academic knowledge with practical, real-world testing experience, offering high-quality development, management, and administration of assessment programs. In addition, many of our employees throughout numerous areas of the company (such as Program Management, Test Development, Research and Psychometric Services, and Performance Assessment) are former teachers. **They share a genuine concern for and commitment to the education and advancement of students across the country.**

What separates us from our competitors—the true “**DRC Difference**”—is our **unsurpassed commitment to our clients**. DRC was founded with the belief that service to our clients is always the top priority. Today, 35 years later, our employees continue to embody that belief through their everyday interactions with our customers, from school test coordinators to state commissioners of education.

DRC is pleased to propose **Ms. Shaundra Sand** to serve as the **Project Director** for the Pennsylvania System of Assessments. As Project Director, Ms. Sand will continue to provide senior-level expertise, oversight, and leadership to DRC’s Pennsylvania Program Management Team, as well as all DRC resource areas and vendors that support the program.

Ms. Sand has more than **19 years of experience working with the Pennsylvania Department of Education (PDE) and Pennsylvania assessments**, including the Pennsylvania System of School Assessment (PSSA) since 1996, PSSA-Modified Assessment from 2009–2012, and the Pennsylvania Voluntary Model Curriculum, Classroom Diagnostic Tools, and Keystone Exams since 2010.

Ms. Sand will be supported by a team of experts in Program Management, Test Development, Research and Psychometric Services, Performance Assessment, Information Systems and Software Quality Assurance, Operations, and Quality Management. Our proposed Pennsylvania Team is fully capable of applying and managing the resources necessary to carry out the statement of work for this contract.

DRC is also pleased to be partnering with the following Small Diverse Businesses that are highly regarded in the testing industry:

- **Victory Productions** will provide item development, Spanish translations, online tutorial production, and video sign language production.

- **eMetric, LLC**, will provide the data query and reporting tool, as well as posting of student reports, parent letters, summary reports, and the Accountability Report. eMetric will host the PSTAT website. They will also provide psychometric consultation and third party equating verification for both the PSSA and the Keystone Exams.

Adding the experience, expertise, and education of individuals from our assessment partners to our proposed Pennsylvania Team enriches our capabilities for the Commonwealth and the Pennsylvania assessments. The employees of Victory Productions and eMetric share the same commitment to excellence as DRC. Their teams have a deep understanding of the intricacies of large-scale testing programs. Together, we will work in close collaboration with PDE to ensure the success of the program.

DRC will remain responsible for the performance and work of our subcontracting partners for the duration of the contract. If DRC discovers a fault with any of our subcontracting partners, we will immediately notify PDE, and take the appropriate steps to correct the problem.

SECTION OUTLINE

The remainder of this section provides information on our proposed staffing plan for the Pennsylvania assessments and information on the office locations of our proposed team, organized under the following subheadings:

- Staffing Plan for the Pennsylvania Assessments
- Office Locations of Proposed Personnel
- Personnel Experience by Key Position (as required by RFP, Appendix C)

Staffing Plan for the Pennsylvania Assessments

DRC is proposing highly qualified individuals with a wealth of knowledge specific to Pennsylvania testing for the Pennsylvania assessments. These experts have the required training and education, along with the practical, hands-on experience, to ensure the success of these assessment programs. Their past performance, working closely with the Commonwealth of Pennsylvania, has helped accomplish the goals of dynamic, well-managed, and highly functional assessment programs. We look forward to continuing and expanding our service to Pennsylvania through the Pennsylvania assessments.

DRC staff are keenly aware of the federal requirements of the Elementary and Secondary Education Act (ESEA), including the latest requirements and assurances associated with the flexibility waivers. We will continue to work with PDE to implement the Commonwealth's accountability plan, and will stay abreast of the status of ESEA reauthorization, and how it may impact Pennsylvania's testing programs.

On the following pages, DRC has provided information on our proposed personnel, including staffing tables highlighting project roles and responsibilities, time dedicated to the Pennsylvania assessments, and years of relevant experience.

Behind a colored tab at the end of this section, DRC has included an organizational chart and more detailed staffing tables for DRC and our Small Diverse Business partners—Victory Productions and eMetric, LLC—based on the information requested in the RFP and in Appendix C, Personnel Experience by Key Position. Résumés for all proposed personnel are included in *Volume II; Appendix A, Résumés*.

If DRC is awarded this contract, we will seek PDE's approval for all key personnel appointments and replacements, throughout the term of the contract. In the event that PDE requests a staff replacement, DRC will provide a replacement with qualifications that meet, or exceed, those of the removed individual. DRC understands that staff working on-site at PDE or at school sites, may be required to be pre-approved for site access, via a criminal background check paid for by DRC.

PROGRAM MANAGEMENT

The high quality of the people who manage our projects allows DRC to confidently guarantee every project's success. Our project managers are experienced and dedicated individuals who value and promote true collaboration with our state department of education clients. They are not focused on short-term objectives, but rather on **creating enduring professional relationships** that will help to improve assessment programs, make the state departments' work easier, and enhance learning for students. This is evidenced by the long-term tenure of many of our managers.

Led by our project managers, DRC’s assessment teams design and deliver solutions that meet each of our state client’s program needs. In addition, our project managers have easy access to senior-level managers and the Chief Executive Officer/President, so that the project team may quickly respond to any customer concerns or requirements. The primary goal of our project managers is to deliver a successful assessment program on time and within budget—in other words, **to achieve complete client satisfaction**. We accomplish this goal time and time again because our program leaders know that **they have the full force of DRC’s resources at their disposal**.

Proposed Program Management Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Doug Russell , Senior Vice President, Education Program Management | As the Senior Vice President, Education Program Management , Mr. Russell will provide executive-level guidance and support for the Pennsylvania assessments. | As needed | 37 yrs. |
| Ms. Shaundra Sand , Vice President, Education Program Management | As the Project Director , Ms. Sand will continue to provide senior-level expertise, oversight, and leadership to DRC’s Pennsylvania Assessments Program Management Team, as well as all DRC resource areas and vendors that support the program. | 100% | 20 yrs. |
| Mr. Christian Schiller , Director of State Assessment Programs | As the Assessment Administration Manager , Mr. Schiller will collaborate with PDE for all program deliverables, guide development of the assessments across DRC resources and external resources, and provide guidance to all staff supporting the Pennsylvania assessments. | 100% | 11 yrs. |
| Mr. Kevin Trenholm , Program Lead | As a Program Lead , Mr. Trenholm will be responsible for the successful management of the Spring Keystone Exams, while providing leadership, guidance, and support to all aspects of the Pennsylvania assessments. | 100% | 25 yrs. |
| Ms. Bobbi Fehrmann , Senior Project Manager | As a Senior Project Manager , Ms. Fehrmann will be responsible for the successful management of the Spring PSSA, while providing leadership, guidance, and support to all aspects of the Pennsylvania assessments. | 100% | 6 yrs. |
| Ms. Michelle McDonald , Project Manager | As a Project Manager , Ms. McDonald will be responsible for the successful management of the Winter and Summer Keystone Exams and providing customer service and project-management back up for all Pennsylvania assessments. | 100% | 4 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Wyatt Garnett III , Project Manager | As a Project Manager , Mr. Garnett III will be responsible for the successful delivery and management of the Classroom Diagnostic Tools (CDT) Exam and will provide customer service and project-management back up for all Pennsylvania assessments. | 100% | 3 yrs. |
| Mr. Seth Kahler , Director, Operations – Education Materials | Mr. Kahler will serve as the Material Production Manager , overseeing and leading the materials management process and team. | As needed | 11 yrs. |
| Ms. Carol Jullie , Materials Production Coordinator | As a Materials Production Coordinator , Ms. Jullie will lead the successful production of all documents (booklets, manuals, user guides, etc.) for the PSSA and Keystone Exams. | 100% | 13 yrs. |
| Mr. Niall Finn , Senior Director of Customer Service | Mr. Finn will serve as the Customer Service Manager , overseeing and leading DRC’s customer support team. | As needed | 24 yrs. |
| Ms. Leslie Rollag , Associate Customer Service Manager | As the Associate Customer Service Manager , Ms. Rollag will provide customer service and operational support to the Pennsylvania assessments. | 100% | 6 yrs. |
| Ms. Maggie Frye , Senior Meeting Planner | As the Senior Meeting Planner , Ms. Frye will plan, coordinate, and execute all logistical arrangements for the Pennsylvania assessments. | 42% | 16 yrs. |

TEST DEVELOPMENT

The development of high-quality items and tests depends directly on the expertise of those involved in the development effort. Therefore, DRC seeks out only the most highly qualified professionals for our Test Development Department—those who have a broad range of experience in the educational field. Many of our staff are former educators with years of classroom teaching experience, while several are also experts in designing curriculum and instruction. They have a keen understanding of the impact assessment has on teachers and students. During committee reviews, this understanding helps them to build collaborative partnerships with educators from our client states. Close collaboration results in productive sessions and—most importantly—high-quality items.

In addition to our content experts, we have several special education experts on staff, who offer their expertise for alternate assessments and who ensure that our items and tests encompass the concepts of Universal Design. These individuals also serve as knowledgeable resources when we create accommodated materials for our programs.

Our staff has developed, reviewed, and revised items and test forms for numerous statewide assessment programs across the country. Throughout the development process and every other phase of a project (i.e., printing, distribution, scoring, and reporting of the tests), they remain involved, working closely with other staff from DRC’s Program Management, Document Services, Research and Psychometric Services, and Performance Assessment departments. They understand the details and intricacies of an assessment program’s “big picture.” This broad perspective helps our professionals anticipate future client or program needs, so that they can proactively respond.

Proposed Test Development Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|-------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Data Recognition Corporation | | | |
| TEST DEVELOPMENT LEADERSHIP | | | |
| Ms. Patty McDivitt , Senior Vice President of Curriculum, Instruction, and Assessment | Ms. McDivitt will serve as the Test Development Advisor—All Programs , providing executive-level guidance and support to all staff working on test development activities for the Pennsylvania assessments. | As needed | 42 yrs. |
| Mr. Christopher McCullough , Test Development Project Director | Mr. McCullough will serve as the TD Manager—PSSA, Keystone, and CDT , supporting Ms. McDivitt to implement the development of the Pennsylvania assessments. He will advise PDE about best practices in the areas of item and test development; advise PDE about the implementation of the PA assessments from a content perspective (including the development of new item types for the PSSA); facilitate work schedules and resources of Project Leads; oversee item and test quality; and ensure project deliverables are met on time. | 70% | 23 yrs. |
| Ms. Deedra Arvin , Test Development Program Manager | As the Project Lead—PSSA and CDT , Ms. Arvin will support Mr. McCullough to implement the development of these projects. Ms. Arvin will determine project needs and resources in order to ensure project deliverables are met and to ensure item and test quality. | 100% | 13 yrs. |
| Ms. Mary Basch , Senior Project Lead | Ms. Basch will serve as the Project Lead—Keystone Exams , supporting Mr. McCullough to implement the development of these projects. Ms. Basch will determine project needs and resources in order to ensure project deliverables are met and to ensure item and test quality. | 55% | 27 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|-------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| CONTENT AREA EXPERTS | | | |
| English Language Arts | | | |
| <p>Ms. Anne Kirpes, Reading Test Development Director</p> | <p>Ms. Kirpes will serve as the Reading Content Director—All Programs, overseeing and directing all ELA development activities for the PA assessments. Ms. Kirpes will advise PDE about best practices in the areas of content and assessment and the implementation of these programs from a content perspective (including the development of new item types for the PSSA). She will facilitate the work schedules and resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables.</p> | <p>As needed</p> | <p>25 yrs.</p> |
| <p>Ms. Kara Courtney, ELA Test Development Director</p> | <p>As the ELA Test Development Director—All Programs, Ms. Courtney will support Ms. Kirpes by assisting in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present.</p> | <p>As needed</p> | <p>24 yrs.</p> |
| <p>Mr. Chris Scalercio, Senior Test Development Specialist</p> | <p>Mr. Scalercio will serve as an ELA Content Lead—Keystone Exams and CDT, overseeing all aspects of passage and item development. He will work with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists.</p> | <p>100%</p> | <p>22 yrs.</p> |
| <p>Mr. Paul Diorio, Reading/Language Arts Test Development Specialist</p> | <p>Mr. Diorio will serve as the ELA Content Lead—PSSA and CDT, working with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists.</p> | <p>100%</p> | <p>18 yrs.</p> |
| <p>Mr. Stuart Garrick, English Language Arts Test Development Specialist</p> | <p>Mr. Garrick will serve as an ELA Writing/Language Content Lead—PSSA, overseeing all aspects of the item and writing prompt development. Mr. Garrick will work with PDE to produce high-quality, aligned items and ancillary documents. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists.</p> | <p>25%</p> | <p>23 yrs.</p> |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Roxanne Semon , English Language Arts Consultant | Ms. Semon will serve as an ELA Content Specialist—All Programs , working with the Content Leads on passage and item development, ensuring alignment, quality, style, and format are adhered to and followed in all programs. | 50% | 25 yrs. |
| Dr. Jacquelyn Graham , Curriculum, Instruction, and Assessment Consultant | Ms. Graham will serve as an ELA Content Specialist—All Programs , working with the Content Leads on passage and item development, ensuring alignment, quality, style, and format are adhered to and followed in all programs. | 50% | 25 yrs. |
| Mathematics | | | |
| Dr. John Selisky , Director, Test Development for Mathematics | As the Mathematics Content Director—All Programs , Dr. Selisky will oversee and direct Mathematics development activities for the PA assessments. He will advise PDE about best practices in the areas of content and assessment and will advise PDE in the implementation of these programs from a content perspective (including the development of new item types for the PSSA). Dr. Selisky will facilitate the work schedules and resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables. | As needed | 43 yrs. |
| Mr. Darren Slack , Senior Mathematics Test Development Specialist | As a Mathematics Content Lead—PSSA and Keystone Exams , Mr. Slack will oversee all aspects of item development, including setting up auto-scoring for the Keystone SCR items. He will work with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day work of the Content Specialists. | 100% | 14 yrs. |
| Mr. Eric Jenson , Senior Mathematics Test Development Specialist | Mr. Jenson will serve as the Mathematics Content Lead—CDT , overseeing all aspects of item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 40% | 11 yrs. |
| Mr. Christopher Peterson , Senior Mathematics Test Development Specialist | As a Mathematics Content Specialist—PSSA and Keystone Exams , Mr. Peterson will work with the Content Lead on item development, ensuring that style, format, alignment, and quality are adhered to and followed. | 40% | 17 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|-----------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Holly Trotter , Mathematics Test Development Specialist | Ms. Trotter will serve as a Mathematics Content Specialist—All Programs , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 30% | 8 yrs. |
| Ms. Mary Mulhern , Senior Mathematics Test Development Specialist | Ms. Mulhern will serve as a Mathematics Content Specialist—Keystone Exams and PSSA , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 65% | 8 yrs. |
| Ms. Terra Vaughn , Mathematics Test Development Specialist | Ms. Vaughn will serve as a Mathematics Content Specialist—PSSA , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 30% | 12 yrs. |
| Science | | | |
| Mr. David Durette , Science Test Development Director | As the Science Content Director—All Programs , Mr. Durette will oversee and direct all Science development activities. He will advise PDE about best practices in the areas of science content and assessment and the implementation of these programs from a content perspective. He will participate in meetings with PA science educators. Mr. Durette will direct the resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables. | As needed | 23 yrs. |
| Mr. Joseph Schweiss , Senior Science Test Development Specialist | As a Science Content Lead—Keystone Exams , Mr. Schweiss will work with PA science educators and PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will assist in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present. | 80% | 14 yrs. |
| Mr. Patrick Erickson , Senior Science Test Development Specialist | As a Science Content Lead—PSSA and CDT , Mr. Erickson will work with PA science educators and PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will assist in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present. | 80% | 10 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Erica Hyland , Senior Science Test Development Specialist | As a Science Content Specialist—PSSA and Keystone Exams , Ms. Hyland will work with the Content Leads to produce high-quality, aligned items, as well as item and scoring samplers. | 20% | 14 yrs. |
| English Composition Option | | | |
| Dr. James Bell , Senior English Language Arts Test Development Content Specialist | Dr. Bell will serve as an ELA Senior Content Lead—Keystone English Composition , overseeing all aspects of the item and writing prompt development. He will work with PDE to produce high-quality, aligned items and ancillary documents. Dr. Bell will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists. | 30% | 23 yrs. |
| Civics & Government Option | | | |
| Mr. Robert Poppe , Test Development Director | As the Social Studies Content Director—Keystone Civics & Government , Mr. Poppe will oversee and direct all Social Studies development activities and staff. He will advise PDE about best practices, and about the implementation of the program from a content perspective. Mr. Poppe will also serve as the VMC Project Lead , leading all VMC activities. | As needed | 45 yrs. |
| Mr. Joe Eliaz , Senior Social Studies Test Development Content Lead | Mr. Eliaz will serve as a Social Studies Content Lead—Keystone Civics & Government , working with the PDE to ensure that content, style, format, alignment, and quality are adhered to and followed. | 30% | 26 yrs. |
| Ms. Julie Olson , Social Studies Test Development Specialist | As a Social Studies Content Specialist—Keystone Civics & Government , Ms. Olson will work with Mr. Eliaz to ensure that style, format, alignment, and quality are adhered to and followed. | 30% | 16 yrs. |
| TEST DEVELOPMENT TECHNOLOGIES | | | |
| Mr. Judson Sather , Senior Director of Test Development Technologies | As the Senior Director of TD Technologies , Mr. Sather will continue to lead the development of the IDEAS item banking system, and will provide training to PDE as necessary. Mr. Sather will also advise PDE on the continued transition to computer-based testing using DRC's INSIGHT system. Mr. Sather will facilitate the work schedules and resources of the TD Technologies members, oversee the quality of print and online materials, and ensure on-time project deliverables. | As needed | 26 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Tracy Tschida, Project Lead, Test Development Technology | As a TD Technologies Project Lead , Mr. Tschida will work closely with content teams and other TD technologies team members to produce high-quality print and online materials. | 40% | 10 yrs. |
| Ms. Melissa Schultz, Project Lead, Test Development Technology | As a TD Technologies Project Lead , Ms. Schultz will assist with the production of high-quality print and online materials. | 40% | 14 yrs. |
| SUPPORT SERVICES | | | |
| Ms. Denise Esner, Senior Manager, Support Services | As the Support Services Senior Manager—PSSA, Keystone, and CDT , Ms. Esner will oversee all item and passage formatting (print and online formats) for the Pennsylvania assessments. | As needed | 29 yrs. |
| Ms. Nancy Smolley, Senior Item Development Coordinator | As a Support Services Item Development Coordinator: Formatting Lead—PSSA, Keystone Exams, and CDT , Ms. Smolley will serve as the formatting lead for both print and online formats. | 25% | 11 yrs. |
| Ms. Sara LaBerge, Item Development Coordinator/Graphics | As an Support Services Item Development Coordinator—PSSA, Keystone Exams, and CDT , Ms. LaBerge will assist with item and passage formatting (print and online formats) and will develop graphics for the CDT and Keystone programs. | 25% | 6 yrs. |
| Mr. Chris Mrnak, Item Development Coordinator | Mr. Mrnak will serve as a Support Services Item Development Coordinator—PSSA, Keystone, and CDT , assisting with item and passage formatting for print and online formats. | 25% | 11 yrs. |
| SPECIALIZED TEST DEVELOPMENT SERVICES | | | |
| Ms. Maria Eiffler, Spanish Project Lead | As the Spanish Lead—PSSA and Keystone Exams , Ms. Eiffler will support Mr. McCullough to implement the development of all Spanish translation materials. She will determine project needs and resources in order to ensure project deliverables are met and to ensure the quality of item translation and Spanish test materials. | 65% | 23 yrs. |
| Ms. Kimberly Fountain, Bias/Fairness and Sensitivity Test Development Specialist | As the Bias, Fairness, and Sensitivity Lead—PSSA, Keystone Exams, and CDT , Ms. Fountain will support Mr. McCullough to facilitate matters relating to bias, fairness, and sensitivity for all Pennsylvania test items. She will develop resources, train developers and reviewers, and facilitate internal reviews and external bias meetings in order to ensure item and test quality. | 45% | 27 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Dan Maghrak , Permissions Specialist | Mr. Maghrak will serve as the ELA Permissions Specialist , working directly with content specialist to ensure validity of copyright materials. | 10% | 3 yrs. |
| EDITORIAL SERVICES | | | |
| Ms. Elizabeth Joyce , Senior Manager of Editing Services | As the Senior Editorial Manager—PSSA, Keystone Exams, and CDT , Ms. Joyce will provide editorial direction and support for the PA assessments and will oversee all editorial processes and workflow. Ms. Joyce will lead a team of editors who will provide editorial reviews for item development, forms development, quality assurance, and annual technical reports. | As needed | 24 yrs. |
| Ms. Kimberley Mancini , Senior Test Development Editor | As the Senior Editor—PSSA, Keystone Exams, and CDT , Ms. Mancini will provide editorial leadership and support for all Pennsylvania projects, including editorial reviews for item development, forms development, and technical reports. She will also provide copyediting and substantive editing, cold reads, document fact-checking, and quality assurance reviews. | 20% | 9 yrs. |
| PUBLICATIONS | | | |
| Ms. Deb Gartner , Director, Publications | As the Director, Publications , Ms. Gartner will produce support materials such as handbooks, DFAs, large-print materials, and scoring guidelines. She will ensure that all materials are produced according to client specifications. | 20% | 25 yrs. |
| Ms. Peggy Maher , Senior Technical Writer | As the Senior Technical Writer , Ms. Maher will produce support materials such as handbooks, DFAs, scoring guidelines, and technical reports. | 10% | 16 yrs. |
| Ms. Kari Johnson , Senior Graphic/ Document Designer | As a Senior Graphic/Document Designer , Ms. Johnson will support the production of materials such as handbooks, samplers, and scoring guidelines. | 10% | 24 yrs. |
| Ms. Danielle Lenz , Editing Specialist | As an Editor , Ms. Lenz will proof all materials produced in the Publications department and will provide proofing backup/support for other resource areas. | 10% | 14 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Victory Productions | | | |
| Mr. David Markson , Item Development Specialist | Mr. Markson will serve as the ELA Item Development Manager , reviewing and analyzing PDE’s item specifications and writing guidelines and reviewing each item, assessing how well the item addresses the intended standard, meets the guidelines, and is grade-appropriate. | 100% | 30 yrs. |
| Dr. Michael Avidon , Item Development Specialist | Dr. Avidon will serve as the Mathematics Item Development Manager , reviewing and analyzing PDE’s item specifications and writing guidelines and reviewing each item, assessing how well the item addresses the intended standard, meets the guidelines, and is grade-appropriate. | 90% | 27 yrs. |
| Ms. Patty Kreikemeier , Item Development Specialist | Ms. Kreikemeier will serve as the Science Item Development Manager , reviewing and analyzing PDE’s item specifications and writing guidelines and reviewing each item, assessing how well the item addresses the intended standard, meets the guidelines, and is grade-appropriate. | 100% | 21 yrs. |

RESEARCH AND PSYCHOMETRIC SERVICES

In today’s environment of high-stakes assessment programs, creating valid and defensible tests is more important than ever. DRC offers our state clients experienced and competent technical leaders who will ensure that our customized tests achieve the highest standards of psychometric quality.

Our well-qualified, in-house research and measurement professionals and psychometric experts have a collective knowledge that spans a variety of measurement models, methodologies, and settings in social science measurement. Many of these research and measurement professionals and psychometricians hold master-level or doctoral-level degrees and have extensive practical experience in the field. Working closely with our clients and other DRC departments, they provide program design and psychometric services to meet the needs of an expanding set of state assessment requirements.

Proposed Research and Psychometric Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Data Recognition Corporation | | | |
| Mr. David Chayer , Senior Vice President of Research | As the Senior Vice President of Research , Mr. Chayer will provide executive-level guidance and support to all psychometric activities for the Pennsylvania assessments. | 25% | 32 yrs. |
| Dr. Marc Julian , Senior Director, Psychometric Services | Dr. Julian will serve as a Senior Psychometric Advisor , providing guidance and support to the psychometric managers, completing analyses and technical reports, and attending TAC meetings. | 35% | 20 yrs. |
| Ms. Pamela Hermann , Senior Director, Research | Ms. Hermann will serve as the Lead Psychometric Manager , providing guidance and support to the PSSA and Keystone programs and will be attending TAC meetings as needed. She will also serve as the Psychometric Manager—CDT , completing all analyses and technical reports for the CDT program. | 100% | 21 yrs. |
| Dr. Mayuko Simon , Senior Research Scientist | As a Psychometric Manager—PSSA , Dr. Simon will complete analyses, technical reporting, data forensics, and will attend TAC meetings as needed for the PSSA program. | 100% | 13 yrs. |
| Dr. Huiqin (Ann) Hu , Senior Research Scientist II | As a Psychometric Manager—Keystone Exams , Dr. Hu will complete all technical analyses, technical reporting, and attend TAC meetings as needed for the Keystone Exams. | 100% | 19 yrs. |
| Dr. Lianghua Shu , Director, Psychometric Services | As a Psychometrician , Dr. Shu will assist Dr. Simon and Dr. Hu with psychometric analyses, data forensics, and reporting for the PSSA and Keystone programs. | 20% | 20 yrs. |
| Ms. Christie Plackner , Director, Research Quality and Data Forensics | Ms. Plackner will serve as the Quality Control Manager and the Data Forensics Manager . Ms. Plackner will manage and oversee the psychometric quality group and all data forensic analyses and reporting. | 20% | 18 yrs. |
| Mr. Ben Sorenson , Senior Statistical Analyst | As a Statistical Analyst , Mr. Sorenson will perform analyses for the Pennsylvania assessments. | 50% | 4 yrs. |
| Mr. Alassane Savadogo , Research Analyst | As a Statistical Analyst , Mr. Savadogo will assist Dr. Simon and Dr. Hu with psychometric analyses and reporting for the PSSA and Keystone programs. | 50% | 1 yr. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|-----------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| eMetric | | | |
| Dr. Huixing Tang, President | As a Psychometric Consultant , Dr. Tang will provide support for research studies and other psychometric activities under the contract. As the President and Founder of eMetric , Dr. Tang will also provide leadership support for all eMetric products and services. | 10% | 21 yrs. |
| Dr. Nathan Wall, Research Scientist | As a Research Scientist , Dr. Wall will provide psychometric support to the contract, including the third party equating verification. | 10% | 15 yrs. |

PERFORMANCE ASSESSMENT SERVICES

DRC’s experienced handscoring personnel are unsurpassed in the testing industry. Our Performance Assessment Services Team has designed, monitored, and led the scoring of several large-scale assessments, incorporating numerous scoring models and procedures. Their experience includes facilitating rangefinding committees, developing training materials, training readers, and monitoring project schedules. Our performance assessment professionals have been instrumental in DRC’s ability to meet strict reporting deadlines.

Through the hard work and leadership of our scoring directors, scoring managers, and content experts, DRC has been able to recruit readers (nearly 4,000 in the last year) and deliver millions of accurate scores for students around the nation. We have a reputation of excellence for our precise reader-training process and vigilant management of reader reliability. Our assessment programs have covered the full spectrum of content areas: English language arts (reading and writing), mathematics, science, social studies, and alternate assessment.

DRC never takes a blanket approach to our handscoring processes. Rather, our performance assessment experts work diligently with state department staff and local educators to customize handscoring for each particular program, meeting the specific needs of each assessment.

Proposed Performance Assessment Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Dr. Holly Baker, Vice President, Education Solutions | Dr. Baker will serve as a Handscoring Advisor . Along with Mr. Payne, Dr. Baker will provide executive-level guidance and support to all handscoring activities. | As needed | 15 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Dave Payne , Senior Director of Performance Assessment Services | Mr. Payne will also serve as a Handscoring Advisor , providing executive-level guidance and support to all handscoring activities. | 25% | 21 yrs. |
| Mr. Nick Hook , Senior Project Manager of Performance Assessment Services | As the Handscoring Manager , Mr. Hook will oversee all handscoring activities for the PA assessments. He will work closely with Mr. Payne and Dr. Baker to advise PDE about best practices in the areas of handscoring, including the implementation of scoring guidelines for new item types from a handscoring perspective to help ensure reliable scoring; facilitate schedules and resources so that adequate staffing is in place to complete handscoring sessions in a timely fashion; monitor handscoring sessions to ensure high quality results; collaborate with test development staff to ensure that handscoring reflects the criteria being assessed; and help the Content Specialists plan and implement rangefinding sessions and the development of training materials. | 80% | 23 yrs. |
| Ms. Annie Van der Merwe , ELA Content Specialist | Ms. Van der Merwe will serve as an ELA Content Specialist , working on ELA handscoring activities. She will oversee the rangefinding and training materials development process for the PSSA Writing test to ensure that DRC develops handscoring training materials that will result in scores that reflect the guidance of the rangefinding committees and the criteria being assessed; plan and oversee handscoring for PSSA Writing to maintain timely and reliable handscoring results; and work closely with Ms. Peulen and Mr. Kobe as part of a team of PAS ELA Content Specialists collaborating on PA assessments, including the Keystone English Composition Exam and the ELA PBAs Performance Tasks, should those options be implemented. | 75% | 29 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| <p>Mr. John Kobe, ELA Handscoring Content Specialist</p> | <p>Mr. Kobe will also serve as an ELA Content Specialist, working on ELA handscoring activities. He will oversee rangefinding and training materials development for the PSSA Text Dependent Analysis items and the grade 3 ELA constructed-response items. Mr. Kobe will oversee the ELA Scoring Directors to ensure that DRC develops handscoring training materials that will result in scores that reflect the guidance of the rangefinding committees and the criteria being assessed. He will plan and oversee handscoring for these items to maintain timely and reliable handscoring results. He will also collaborate with Ms. Van der Merwe and Ms. Peulen, providing a team of PAS ELA Content Specialists acting in concert on PA assessments, including the Keystone English Composition Exam and the ELA PBAs, should those options be implemented.</p> | <p>75%</p> | <p>12 yrs.</p> |
| <p>Ms. Melinda Peulen, ELA Handscoring Content Specialist</p> | <p>Ms. Peulen will also serve as an ELA Content Specialist, working on ELA handscoring activities. She will oversee rangefinding and training materials development for the Keystone Literacy Exams, ensuring that reliable handscoring sessions can begin with high quality handscoring training materials that reflect the guidance of the rangefinding committees and the criteria being assessed; plan and oversee handscoring for Keystone Literature to maintain timely and accurate handscoring results; and work closely with Ms. van der Merwe and Mr. Kobe as a team of a PAS ELA Content Specialists team collaborating on PA assessments, including the Keystone English Composition Exam and the ELA PBAs, should those options be implemented.</p> | <p>75%</p> | <p>13 yrs.</p> |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Dorie Rieger , Senior Handscoring Manager | Ms. Rieger will serve as a Mathematics Content Specialist , working on Mathematics handscoring activities. She will collaborate with Ms. Lawler to oversee rangefinding and training materials development for PSSA Mathematics and the Keystone Algebra I Exams, as well as the mathematic PBA (should that option be implemented). Ms. Rieger and Ms. Lawler will oversee rangefinding sessions and the subsequent development of handscoring training materials. This will lead to handscoring sessions that reflect the guidance of the rangefinding committees and the criteria being assessed. They will plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 14 yrs. |
| Ms. Roberta Lawler , Mathematics Handscoring Content Specialist | Ms. Roberta Lawler will also serve as a Mathematics Content Specialist , assisting with Mathematics handscoring activities. She will collaborate with Ms. Rieger to oversee rangefinding and training materials development for PSSA Mathematics and the Keystone Algebra I Exams, as well as the mathematics PBAs (should option 3 be implemented). Ms. Lawler and Ms. Rieger will also oversee all subsequent development of handscoring training materials, created to ensure that handscoring sessions reflect the guidance of the rangefinding committees and the criteria being assessed. Both Ms. Rieger and Ms. Lawler will plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 10 yrs. |
| Mr. Mark Szulczweski , Science Handscoring Content Specialist | Mr. Szulczweski will serve as the Science Content Specialist , working on all Science handscoring activities. He will oversee rangefinding and training materials development for PSSA Science and the Keystone Biology Exams; oversee rangefinding sessions and the subsequent development of handscoring training materials by Science Scoring Directors to ensure that training materials reflect the guidance of the rangefinding committees and the criteria being assessed; and plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 6 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| <p>Ms. Vickie Lane, Science Handscoring Content Specialist</p> | <p>Ms. Lane will also serve as a Science Content Specialist, assisting with Science handscoring activities. She will collaborate with Mr. Szulczewski to oversee rangefinding and training materials development for PSSA Science and the Keystone Biology Exams. Mr. Szulczewski and Ms. Lane will also oversee all subsequent development of handscoring training materials, created to ensure that handscoring sessions reflect the guidance of the rangefinding committees and the criteria being assessed. Both Ms. Lane and Mr. Szulczewski will plan and oversee handscoring sessions that provide timely and accurate results.</p> | <p>75%</p> | <p>35 yrs.</p> |
| <p>Mr. Jon Rodebaugh, Social Studies/ELA Handscoring Content Specialist</p> | <p>As a Civics & Government Content Specialist, Mr. Rodebaugh will work on all Social Studies handscoring activities (option 2 only). Mr. Rodebaugh will oversee rangefinding and training materials development for the Keystone Civics & Government Exam to ensure that training materials reflect the guidance of the rangefinding committees and the criteria being assessed. He will plan and oversee handscoring sessions that provide timely and accurate results.</p> | <p>50%</p> | <p>17 yrs.</p> |

INFORMATION SYSTEMS

The management, analysis, presentation, and quality of data has been the core of our business since our company’s inception more than 35 years ago. Throughout our history, DRC has continually invested in innovation to meet the increasing technology needs of our clients.

We have made a significant portion of this investment in our people. DRC has recruited and hired outstanding Information Systems (IS) and Software Quality Assurance (SQA) experts who have the experience, knowledge, and creativity to find solutions that not only meet but exceed project requirements. Our employees consistently develop innovative approaches to technology issues—approaches that ultimately enhance and improve the final deliverable for our client, whether it’s web-based tools, electronic reporting and delivery, or database management.

Throughout every stage of a project, our IS/SQA professionals work collaboratively with our state clients and other resource areas in the company to provide all of the expertise required for today’s evolving assessment programs.

Software Quality Assurance

Quality assurance is a vital component—if not the most important component—of large-scale assessment programs. Mistakes and missed deadlines harm students, educators, school districts, and state departments, and draw unwanted media attention to testing programs. Many states have experienced these negative consequences when testing vendors have fallen short of meeting high-quality standards.

In contrast, DRC has consistently led the testing industry in providing flawless service to our clients, meeting all major project milestones and providing accurate data to the students, districts, and states we serve. Much of this success is directly attributable to our Software Quality Assurance (SQA) Team.

DRC’s SQA staff has extensive experience in software testing; the average tenure for our employees is ten years of direct experience in the SQA field. In addition, our professionals have performed a broad range of software testing specifically related to large-scale, statewide assessments, from test material reviews and answer key verification to final reports.

Several of our analysts have obtained advanced training in their field and achieved professional certification through the rigorous programs of the Quality Assurance Institute (QAI), a worldwide membership organization dedicated to quality assurance in the information services industry. All SQA personnel are active members of the Twin Cities Quality Assurance Association, a local professional association, which helps to keep them current on innovations and developments in their industry. DRC’s staff includes some of the most educated and experienced SQA professionals in the testing industry.

Proposed Information Systems/Technology and Software Quality Assurance Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Data Recognition Corporation | | | |
| INFORMATION SYSTEMS/TECHNOLOGY | | | |
| Mr. John Bandy, Chief Information Officer | As the Chief Information Officer , Mr. Bandy will provide executive-level guidance and support to all IS and SQA staff. | As needed | 29 yrs. |
| Ms. Michelle Gronemeyer, Senior Director of Information Systems | As the Senior Director—Online Testing Systems , Ms. Gronemeyer will oversee the technical tasks and issues that relate to design, development, implementation, and maintenance of the online assessments. | 20% | 21 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Jonica Backes , Director, Information Services | Ms. Backes will serve as the Online Testing Program Manager , ensuring all software elements work together to provide a full-featured online testing experience. | 20% | 20 yrs. |
| Mr. Jeremiah Tanner , Information Systems Director | As the IS Director–Online Testing , Mr. Tanner will oversee the implementation of the online testing system for the Pennsylvania assessments. | 20% | 18 yrs. |
| Ms. Emily Murray , IS Project Manager | As the IS Project Manager–eDIRECT , Ms. Murray will oversee the implementation of eDIRECT for the Pennsylvania assessments. | 20% | 11 yrs. |
| Mr. Mark Bleckeberg , IS Director | As the IS Manager–eDM, IIS, and Ops MMS , Mr. Bleckeberg will manage DRC’s imaging and handscoring systems. | 20% | 21 yrs. |
| Mr. Jim Fleming , Senior Director, IS Strategy, Architecture, and Technology | As the Senior Director, IS Strategy, Architecture, and Technology , Mr. Fleming will oversee the technology infrastructure, information security, security of all DRC systems, system process and standard as well as technology readiness support, including site readiness and assessment, if needed. | As needed | 31 yrs. |
| Mr. Damon Ray , Enterprise Architect | As an Enterprise Architect , Mr. Ray will work in conjunction with Mr. Ptak to oversee system architecture and design solutions for DRC’s IS systems. | As needed | 16 yrs. |
| Mr. Kevin Ptak , Enterprise Architect | As an Enterprise Architect , Mr. Ptak will work in conjunction with Mr. Ray to oversee system architecture and design solutions for DRC’s IS systems. | As needed | 16 yrs. |
| Mr. Chad Ostergren , Information Security Systems Analyst | As the Information Security Analyst , Mr. Ostergren will certify the IT security of all DRC systems used in the Pennsylvania assessments. | As needed | 10 yrs. |
| Mr. Scott Koy , Senior Director of Information Systems | As the Senior Director of Information Systems , Mr. Koy will oversee all IS implementation and support services for the Pennsylvania assessments. | As needed | 31 yrs. |
| Ms. Gloria Aanenson , Manager of Education Information Systems | As an IS Manager , Ms. Aanenson will continue to oversee the PA project scope, budget, resources, and schedules and ensure all systems adhere to high-quality standards that meet PDE expectations. | 100% | 25 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Joan Detzler , Associate IS Project Manager | As an Associate Project Manager , Ms. Detzler will develop project plans, direct and monitor work efforts, and escalate quality and timeline issues. She will track key milestones, mitigate project risks, and coordinate deliverables to the client and approved third parties. | 100% | 14 yrs. |
| Mr. Scott Miller , Lead Support Analyst | As a Lead Support Analyst , Mr. Miller will create the system configurations to collect, process, score, and prepare the Pennsylvania Keystone Exams and CDT data for reporting. He will complete daily analysis of the data and resolve any data anomalies. He will provide backup to the PSSA project. | 100% | 16 yrs. |
| Mr. Alan Pecarina , Lead Support analyst | As a Lead Support Analyst , Mr. Pecarina will create the system configurations to collect, process, score, and prepare the PSSA data for reporting. He will complete daily analysis of the data and resolve any data anomalies. Mr. Pecarina will also provide backup to the Keystone Exams and CDT projects. | 100% | 33 yrs. |
| Mr. Dan Steinback , Support Analyst | Mr. Steinbach will serve as a Support Analyst , working directly with his Lead Analyst to create custom solutions for Pennsylvania, including: data collection, materials, scoring, aggregations, data files, and pre-defined reports. | 100% | 21 yrs. |
| Ms. Kellie Sinnott , Support Analyst | Ms. Sinnott will serve as a Support Analyst , working directly with her Lead Analyst to create custom solutions for Pennsylvania, including: data collection, materials, scoring, aggregations, data files, and pre-defined reports. | 100% | 16 yrs. |
| Ms. Nona Davis , Senior IS Business Analyst | As a Senior Business Analyst , Ms. Davis will gather detailed business requirements, create functional specifications, and produce detailed reporting solutions. | 100% | 33 yrs. |
| Ms. Gail Vonwahlde , Senior Business Analyst | As a Senior Business Analyst , Ms. VonWahlde will gather detailed business requirements, create functional specifications, produce detailed data file layouts, and perform user acceptance testing on all data files. | 100% | 20 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|---------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| SOFTWARE QUALITY ASSURANCE | | | |
| Mr. Tom Boatman, Senior Director of Software Quality Assurance | As the Senior Director of SQA , Mr. Boatman will oversee all aspects of software quality assurance for the Pennsylvania assessments. | 20% | 16 yrs. |
| Mr. Kyle Randolph, Software Quality Assurance Director | Mr. Randolph will serve as the SQA Director–eDIRECT, DRC INSIGHT, and IDEAS Application Development , overseeing software quality assurance for eDIRECT, DRC INSIGHT, and IDEAS. | 30% | 17 yrs. |
| Ms. Erin Bayer, Software Quality Assurance Manager | As the SQA Manager , Ms. Bayer will oversee software quality assurance for all operational aspects of our work for the PA assessments, including scoring, reporting, and data files. | 50% | 11 yrs. |
| Mr. Kirk Dukatz, Software Quality Assurance Manager | As the SQA Manager–Imaging, Handscoring, and Autoscoreing , Mr. Dukatz will oversee software quality assurance for DRC’s imaging, performance assessment, and auto-scoring systems. | 20% | 14 yrs. |
| Mr. Timothy Hettwer, Software quality Assurance Manager-eDIRECT | Mr. Hettwer will serve as the SQA Manager–eDIRECT, DRC INSIGHT, and IDEAS , overseeing software quality assurance for eDIRECT, DRC INSIGHT, and IDEAS. | 30% | 15 yrs. |
| Mr. Kevin Swenson, Senior Software Quality Assurance Analyst | As a Senior SQA Analyst , Mr. Swenson will verify the quality of scoring and reporting processes for the Keystone Exams and CDTs. | 100% | 14 yrs. |
| Ms. Joanna Kuhn, Senior Software Quality Assurance Analyst | As a Senior SQA Analyst , Ms. Kuhn will lead operational software processes across the Pennsylvania assessment systems. She will oversee scheduling, requirements reviews, and quality checking DRC’s online systems. | 100% | 21 yrs. |
| Mr. Daniel Braun, Software Quality Assurance Analyst | As a SQA Analyst , Mr. Braun will assist in verifying the quality of software processes of the Pennsylvania assessments. | 100% | 3 yrs. |
| Ms. Macey Robertson, Software Quality Assurance Analyst | As a SQA Analyst , Ms. Robertson will support Ms. Kuhn in all aspects of DRC’s software testing processes. | 50% | 5 yrs. |
| Ms. Brandi Lashinski, Software Quality Assurance Analyst | As a SQA Analyst , Ms. Lashinski will support Ms. Kuhn in all aspects of DRC’s software testing processes. | 30% | 3 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| eMetric | | | |
| Ms. Dixie Knight , Vice President of Operations | As Vice President of Operations , Ms. Knight will provide leadership for business operations, including Project Management, Quality Assurance, and Support. | 10% | 20 yrs. |
| Mr. Vamsi Mukkamala , Vice President of Information Technology | As Vice President of Information Technology , Mr. Mukkamala will provide leadership for the Software Development and Engineering team. | 10% | 11 yrs. |
| Mr. Darsan Tatineni , IT-Project Manager | As the IT-Project Manager , Mr. Tatineni will manage the development of the entire line of Data Interaction (DI) products. | 20% | 10 yrs. |
| Mr. Neil Gandhi , IT-Project Manager | As the IT-Project Manager , Mr. Gandhi will manage the development of the entire line of Data Interaction (DI) products. | 20% | 11 yrs. |
| Mr. Phikhanh Nguyen , Lead Developer | As a Developer , Mr. Nguyen will design, develop, and maintain reporting software. | 39% | 7 yrs. |
| Mr. Tham Tjiputra , Lead Developer | As a Developer , Mr. Tjiputra will design, develop, and maintain reporting software. | 22% | 9 yrs. |
| Ms. Zhubi You , Software Engineer | As a Developer , Ms. You will design, develop, and maintain reporting software. | 39% | 6 yrs. |
| Mr. Bailey Landress , Software Engineer | As a Developer , Mr. Landress will design, develop, and maintain reporting software. | 17% | <1 yr. |
| Mr. Amiras Gandhi , Database Analyst | As a Database Analyst , Mr. Gandhi will analyze, develop, and maintain databases. | 40% | 4.5 yrs. |
| Mr. Yongkang Hong , Database Analyst | As a Database Analyst , Mr. Hong will analyze, develop, and maintain databases. | 40% | 6 yrs. |
| Ms. Swati Cherukuri , Quality Assurance Manager | As Quality Assurance Manager , Ms. Cherukuri will lead the Quality Assurance group that develops test and verification plans and tests applications, and will maintain the quality of release products. | 18% | 7 yrs. |
| Mr. Ryan Rasti , Quality Assurance Engineer | As a Quality Assurance Engineer , Mr. Rasti will conduct Quality Assurance tests of developed and released products. | 17% | 3 yrs. |
| Mr. Fang Zhang , Quality Assurance Analyst | As a Quality Assurance Analyst , Mr. Zhang will conduct Quality Assurance tests of developed and released products. | 18% | 3 yrs. |
| Ms. Summer Li , Quality Assurance Analyst | As a Quality Assurance Analyst , Ms. Li will conduct Quality Assurance reviews of developed and released products. | 18% | 2 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Abbie Currier, Program Manager | As the Program Manager , Ms. Currier will oversee day-to-day operations and Project Management. | 21% | 6 yrs. |
| Ms. Jessica Brite, Business Analyst | As a Business Analyst , Ms. Brite will provide business documentation, including requirements gathering and specification documents. | 18% | 1 yr. |
| Ms. Kaelee Harper, Support Specialist | As a Support Specialist , Ms. Harper will provide support to users and clients for released products. | 8% | 1 yr. |
| Ms. Starre Lindgren, Support Specialist | As a Support Specialist , Ms. Lindgren will provide support to users and clients for released products. | 8% | 2 yrs. |

OPERATIONS

The DRC Operations Department has developed advanced processes for the scanning, scoring, distribution, collection, and accounting of secure materials, all of which are tailored to the specific needs of our clients.

Our experienced and dedicated staff ensures that all test materials are packaged correctly and reach districts and schools on time. We have also **developed systems that simplify and streamline return processes to reduce the time commitments needed by school staff**. Our leaders in Operations work closely with DRC personnel, our distribution carriers, and state department staff to make certain that schools have the materials they need for testing and that all secure materials are accounted for upon return.

Our scannable document processes use state-of-the-art, patented methods, producing reliable and efficient results for our state testing clients. We have successfully processed millions of scannable test materials for large-scale statewide assessments. Since we implemented image scanning and scoring more than 14 years ago, **DRC has consistently met our internal handoff deadlines and has successfully delivered results for our clients**. These impressive records are directly attributable to the excellence of the leaders in our Operations Department.

Proposed Operations Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|-----------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Mr. Doyle Kirkeby , Senior Vice President of Operations | As the Operations Advisor , Mr. Kirkeby will provide executive-level oversight of all the operations functions. | As needed | 30 yrs. |
| Ms. Ginny Burnett , Senior Director of Operations—Education | As the Senior Director of Operations—Education , Ms. Burnett will oversee the scanning and editing of all answer documents. | As needed | 29 yrs. |
| Mr. Doug Miller , Senior Director of Materials Operations and Logistics | As the Senior Director of Materials Operations and Logistics , Mr. Miller will oversee all of the packaging, distribution, receipt, and processing of test materials. | As needed | 21 yrs. |
| Mr. Joseph Pavlik , Director of Operations | As the Director of Operations , Mr. Pavlik will oversee all aspects of scannable forms production including: scheduling, pre-press, and print production for the Pennsylvania assessments. | As needed | 33 yrs. |
| Mr. Kurt Langer , Senior Manager, Materials Operations | As the Senior Manager, Materials Operations , Mr. Langer will oversee the day-to-day operations of the packaging and receiving of materials, ensuring that all customized PA requirements are met. | As needed | 26 yrs. |
| Mr. Mike Janikowski , Senior Logistics Specialist | As the Senior Logistics Specialist , Mr. Janikowski will oversee all outbound and inbound shipments for the Pennsylvania assessments, facilitating communication with carriers and ensuring problem resolution for delivery or pick-up issues. He will also help develop and maintain delivery and receipt plans. | As needed | 38 yrs. |

QUALITY MANAGEMENT

At DRC, quality is a commitment to excellence achieved through teamwork and the process of continual improvement. Quality principles are infused into each person's role within the company. We are dedicated to being the quality leader in the industry and are confident our solutions meet or exceed our customers' expectations.

As evidence of this dedication, we are proposing a quality management leader for the program who works directly with the corporate-wide quality processes at DRC, monitoring procedures, providing internal audits, and helping DRC to achieve **ISO 9001 certification**—an internationally recognized quality management standard that defines a set of core quality requirements with which

an organization must comply. Our quality management leader will provide quality assurance services for this testing program.

In addition, DRC will leverage Dr. Richard Kohr’s 44 years of expertise and familiarity with the Pennsylvania assessments to support our quality management processes

Proposed Quality Management Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|--------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Lisa Peterson-Nelson, Chief Quality Officer | As the Chief Quality Officer , Ms. Peterson-Nelson will provide executive-level oversight of all quality processes and standards. | As needed | 31 yrs. |
| Dr. Richard Kohr, Program Consultant, Statewide Assessments | Dr. Kohr will serve as a Data Quality Consultant , writing and reviewing reports for the PSSA and Keystone Exams and reviewing final data files for accuracy. | As needed | 44 yrs. |

ASSESSMENT SUPPORT

DRC is committed to supporting our clients in all aspects of assessment programs. We believe that full service means that we are partners for a variety of ancillary needs, as well as for the specific requirements of the contract. We are pleased to present a team of highly qualified professionals to act in a support role on the program for communications, product planning, and policy/legislative consultation.

Proposed Assessment Support Personnel

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Sandra Wiese, Senior Vice President, Business Development and Government Affairs | As the Senior Vice President, Business Development and Government Affairs , Ms. Wiese manages government affairs and follows education policy on behalf of DRC, and co-leads business development efforts for DRC. | As needed | 21 yrs. |
| Dr. Pat Roschewski, Vice President, Education Solutions | As Vice President, Educational Solutions , Dr. Roschewski will provide direction for DRC’s new product offerings and work with PDE to identify needs, track trends in accountability and assessment, and monitor innovations in the industry. | As needed | 46 yrs. |

| Name and Title | Position | Time Dedicated to PA Programs | Years of Relevant Experience |
|----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|------------------------------|
| Ms. Pam Enstad , Senior Director, Marketing Communications | As Senior Communications Director , Ms. Enstad will collaborate with PDE on messaging and communications support, including providing counsel on the best communications strategies and tactics to reach key stakeholders. | As needed | 26 yrs. |
| Dr. Jennifer Norlin-Weaver , Senior Director, Educational Marketing | As Senior Director, Educational Marketing , Dr. Norlin-Weaver will support PDE through formulating strategic direction, market and research analysis, and product planning. | As needed | 36 yrs. |
| Ms. Billie Kaye Kraus , Director of Education Solutions | As DRC's Director of Education Solutions , Ms. Kraus will track and monitor relevant legislation, regulation, and education policy in Pennsylvania and serve as an integral member of the Pennsylvania Project Management Team. | As needed | 26 yrs. |

Office Locations of Proposed Personnel

DRC's proposed personnel for the Pennsylvania assessments will work out of the following DRC locations:

- Maple Grove Headquarters
13490 Bass Lake Road
Maple Grove, MN 55311
- Boone Avenue Warehouse
7303 Boone Avenue
Brooklyn Park, MN 55428
- Brooklyn Park Office
8900 Wyoming Avenue
Brooklyn Park, MN 55445
- Plymouth Campus and Scoring Center
2800 Northwest Blvd.
Plymouth, MN 55441
- Sharonville Scoring Center
3645 Park 42 Drive
Sharonville, OH 45241
- Woodbury Scoring Center
737 Commerce Drive
Woodbury, MN 55125

Locations for each named staff are included in the “Personnel Experience by Key Position” table behind a colored tab at the end of this section.



Pennsylvania Department of Education

Data Recognition Corporation

Assessment Support
Sr. VP, Business Development and Government Affairs
Sandy Wiese
VP, Education Solutions
Pat Roschewski
Sr. Communications Director
Pam Enstad
Sr. Director, Educational Marketing
Jennifer Norlin-Weaver
Director of Education Solutions
Billie Kay Krause

Executive Support
CEO and President
Susan Engeleiter
CFO
Lonny Wittnebel
Sr. VP, Education Program Management
Doug Russell
General Counsel and Sr. VP, Contract Management and Human Resources
Jennifer Eastman

Project Director
Ms. Shaundra Sand
Assessment Administration Manager
Chris Schiller

DRC's Small Diverse Business Partners
eMetric, LLC and
Victory Productions

Program Lead
Kevin Trenholm
Sr. Project Manager
Bobbi Fehrmann
Project Managers
Michelle McDonald
Wyatt Garnett III
Meeting Planner
Maggie Frye
Materials Production Manager
Seth Kahler
Materials Production Coordinator
Carol Jullie
Customer Service Manager
Niall Finn
Associate Customer Service Manager
Leslie Rollag

Test Development and Performance Assessment Services

Psychometric Services and Research

Information Systems/Technology and Software Quality Assurance

Operations

Quality Management

Sr. VP of Curriculum, Instruction, and Assessment
Patty McDivitt

Sr. VP of Research
Dave Chayer

Chief Information Officer
John Bandy

Sr. VP of Operations
Doyle Kirkeby

Chief Quality Officer
Lisa Peterson-Nelson

Test Development Manager
Christopher McCullough
Test Development Project Leads
Deedra Arvin
Mary Basch

Handscoring Advisors
Dr. Holly Baker
Dave Payne
Handscoring Manager
Nick Hook
ELA Content Specialists
John Kobe
Melinda Peulen
Annie van der Merwe
Mathematics Content Specialists
Dorie Rieger
Roberta Lawler
Science Content Specialist
Mark Szulczewski
Vickie Lane
Civics & Government Option
Jon Rodebaugh

Senior Psychometric Advisor
Marc Julian
Lead Psychometric Manager
Pam Hermann
Psychometric Managers
Mayuko Simon
Huiqin (Ann) Hu
Psychometrician
Dr. Lianghua Shu
Manager of Psychometric Quality Control and Data Forensics
Christie Plackner
Statistical Analysts
Ben Sorenson
Alassane Savadogo

Sr. Director-Online Testing Systems
Michelle Gronemeyer
Online Testing Program Manager
Jonica Backes
IS Director-Online Testing
Jeremiah Tanner
IS Project Manager-eDIRECT
Emily Murray
IS Manager-eDM, IIS, and Ops MMS
Mark Bleckeberg
Sr. Director, IS Strategy, Architecture, and Technology
Jim Fleming
Enterprise Architects
Damon Ray
Kevin Ptak
Information Security Analyst
Chad Ostergren
Sr. IS Director
Scott Koy
IS Manager
Gloria Aanenson
Associate Project Manager
Joan Detzler

Lead Support Analysts
Scott Miller
Alan Pecarina
Support Analysts
Dan Steinbach
Kellie Sinnott
Sr. Business Analysts
Nona Davis
Gail VonWahlde
Sr. SQA Director
Tom Boatman
SQA Director-eDIRECT, DRC INSIGHT, and IDEAS
Kyle Randolph
SQA Manager
Erin Bayer
SQA Manager-Imaging, Handscoring, and Autoscoreing
Kirk Dukatz
SQA Manager-eDIRECT, DRC INSIGHT, and IDEAS
Timothy Hettwer
Sr. SQA Analysts
Kevin Swenson
Joanna Kuhn
SQA Analysts
Daniel Braun
Macey Robertson
Brandi Lashinski

Sr. Director, Operations-Education
Ginny Burnett
Sr. Director of Materials Operations and Logistics
Doug Miller
Director of Operations
Joseph Pavlik
Sr. Manager, Materials Operations
Kurt Langer
Sr. Logistics Specialist
Mike Janikowski

Data Quality Consultant
Richard Kohr

eMetric, LLC
President and Founder and Psychometric Consultant
Dr. Huixing Tang
Research Scientist
Dr. Nathan Wall

eMetric, LLC
Vice President of Operations
Dixie Knight
Vice President of Information Technology
Vamsi Mukkamala
IT-Project Managers
Darsan Tatineni
Neil Gandhi
Developers
Phikhanh Nguyen
Tham Tjiputra
Zhubi You
Bailey Landress
Database Analysts
Amira Gandhi

Database Analyst
Yongkang Hong
Quality Assurance Manager
Swati Cherukuri
Quality Assurance Engineer
Ryan Rasti
Quality Assurance Analysts
Fang Zhang
Summer Li
Program Manager
Abbie Currier
Business Analyst
Jessica Brite
Support Specialists
Kaelee Harper
Starre Lindgren

ELA Content Area Experts
Reading Content Director
Anne Kirpes
ELA Test Development Director
Kara Courtney
Content Leads
Chris Scelarcio
Paul Diorio
Stuart Garrick
Content Specialists
Roxanne Semon
Jacquelyn Graham

Science Content Area Experts
Content Director
Dave Durette
Content Leads
Joe Schweiss
Patrick Erickson
Content Specialist
Erica Hyland

Keystone English Composition Option
ELA Sr. Content Lead
Dr. James Bell

Keystone Civics & Government Option
Content Director
Robert Poppe
Content Lead
Joe Eliaz
Content Specialist
Julie Olson

TD Technologies
Sr. Director
Judson Sather
TD Technologies Project Leads
Tracy Tschida
Melissa Schultz

Support Services
Sr. Manager
Denise Esner
Item Development Coordinator: Formatting Lead
Nancy Smolley
Item Development Coordinators
Sara LaBerge
Chris Mrnak

Specialized TD Services
Bias, Fairness, and Sensitivity Lead
Kimberly Fountain
Spanish Lead
Maria Eiffler
ELA Permissions Specialist
Dan Maghrak

Editorial Services
Editorial Manager
Elizabeth Joyce
Sr. Editor
Kim Mancini

Publications
Director of Publications
Deb Gartner
Sr. Technical Writer
Peggy Maher
Sr. Graphic/Document Designer
Kari Johnson
Editor
Danielle Lenz

Victory Productions
ELA Item Development Manager
David Markson
Mathematics Item Development Manager
Michael Avidon
Science Item Development Manager
Patty Kreikemeier

Mathematics Content Area Experts
Content Director
John Selisky
Content Leads
Darren Slack
Eric Jenson
Content Specialists
Chris Peterson
Holly Trotter
Mary Mulhern
Terra Vaughn

DRC's Personnel Experience by Key Position

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| PROGRAM MANAGEMENT | | | | | | | | | |
| Mr. Doug Russell, Senior Vice President, Education Programs | Mr. Russell will serve as the Program Management Advisor , providing executive-level guidance and support for the Pennsylvania assessments. | As needed | | Maple Grove Office | 2 yrs. | 13 yrs. | Mr. Russell has over 37 years of industry experience, mostly with direct division P&L responsibility. He is the senior leader responsible for DRC's Education Program Management organization. In this role, he oversees program management teams that develop and deliver assessment solutions to DRC's Education clients nationwide. Mr. Russell acts as an executive client liaison, ensuring the company's Education teams have the right resources, capabilities, and skills to meet evolving customer needs. | B.S., Business A.S., Journalism | Charles A. Bronstein Award for leadership in youth education |
| Ms. Shaundra Sand, Vice President, Education Program Management | As the Project Director , Ms. Sand will continue to provide senior-level expertise, oversight, and leadership to DRC's Pennsylvania Assessments Program Management Team, as well as all DRC resource areas and vendors that support the program. | 100% | 0% | Maple Grove Office | 20 yrs. | 20 yrs. | Ms. Sand has provided program management services to programs in Pennsylvania for more than 19 years. Since 1995, she has served in progressive program management roles at DRC, including: project assistant, project coordinator, project director, manager of state assessment programs, director of state assessment programs, senior director of state assessment programs, and, most recently, Vice President of Education Program Management. | B.A., Secondary Education | Project Management Professional (PMP®) |
| Mr. Chris Schiller, Director of State Assessment Programs | As the Assessment Administration Manager , Mr. Schiller will collaborate with PDE for all program deliverables, guide development of the assessments across DRC resources and external resources, and provide guidance to all staff supporting the Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 11 yrs. | 11 yrs. | For the past 11 years, Mr. Schiller has served in progressive roles for the Pennsylvania System of School Assessment (PSSA) program, including: project manager, senior project manager, program manager, and, most recently, Director. While obtaining his degree, Mr. Schiller received training as a secondary educator and served as a student teacher. In addition, he has well-rounded writing and editing education and work experience, including a position serving as co-editor for a small university newspaper. | B.A., English and Education, Minor in Communications | Project Management Professional (PMP®) |
| Mr. Kevin Trenholm, Program Lead | As a Program Lead , Mr. Trenholm will be responsible for the successful management of the Spring Keystone Exams, while providing leadership, guidance, and support to all aspects of the Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 15 yrs. | 22 yrs. | Mr. Trenholm has more than 25 years of experience in large-scale educational assessment and teaching. He has worked on the PSSA program since 1993 in various capacities, including serving as: reader, team leader, scoring director, associate project manager, project manager, and, most recently, Senior Project Manager, responsible for the successful management of the Spring Keystone Exams. Prior to joining DRC, Mr. Trenholm served as a substitute teacher for three years. | B.S., English Education | Project Management Professional (PMP®) |
| Ms. Bobbi Fehrmann, Senior Project Manager | As a Senior Project Manager , Ms. Fehrmann will be responsible for the successful management of the Spring PSSA, while providing leadership, guidance, and support to all aspects of the Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 6 yrs. | 6 yrs. | Ms. Fehrmann has over six years of experience as a Senior Project Manager on the PSSA and PSSA Modified Assessment programs. She is responsible for the successful management of the Spring PSSA while providing leadership, guidance, and support to the entire team in all aspects of the Pennsylvania program. | B.S., International Business, Minor in French | Localization Project Management Certification |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Michelle McDonald , Project Manager | As a Project Manager , Ms. McDonald will be responsible for the successful management of the Winter and Summer Keystone Exams, and providing customer service and project-management back up for all Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 4 yrs. | 4 yrs. | For the past four years, Ms. McDonald has been responsible for the successful management of the Winter and Summer Keystone Exams and providing customer service and project management back-up for all Pennsylvania programs. Prior to joining DRC, Ms. McDonald worked as an admissions coordinator for two years at a private medical university, supporting the admissions team with follow-up phone calls, coordinating information sessions, and submitting documentation. | B.S., Business Management, Minor in Finance | |
| Mr. Wyatt Garnett III , Project Manager | As a Project Manager , Mr. Garnett III will be responsible for the successful delivery and management of the Classroom Diagnostic Tools (CDT) Exam and will provide customer service and project-management back up for all Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 3 yrs. | 3 yrs. | Since joining DRC, Mr. Garnett III has been responsible for the successful delivery and management of the CDT, while providing customer service and project management back-up for the entire Pennsylvania program. Prior to joining DRC, Mr. Garnett III served as a long-term substitute teacher for three years and was a small business owner for 10 years, responsible for day-to-day operations, including marketing, sales, and customer service. | B.A., Education | |
| Ms. Maggie Frye , Senior Meeting Planner | As a Senior Meeting Planner , Ms. Frye will plan, coordinate, and execute all logistical arrangements for the Pennsylvania assessments. | 42% | 58% | Maple Grove Office | 16 yrs. | 6 yrs. | Ms. Frye's prior work includes 16 years of experience in contracting, organizing, and managing events, conferences, and travel programs for corporations and hotels. She has provided meeting planning services for Pennsylvania programs since 2009. | B.S., Hotel, Restaurant and Institution Management, Minor in Economics | Meeting Professionals International, Member |
| Mr. Seth Kahler , Director, Operations – Education Materials | Mr. Kahler will serve as the Materials Production Manager , overseeing and leading the materials management process and team. | As needed | | Maple Grove Office | 2 yrs. | 11 yrs. | Mr. Kahler has more than 11 years of extensive operational and project management experience. He is responsible for leading DRC's materials management processes from manufacturing through delivery, ensuring all client specifications are adhered to, and internal and external schedules are achieved. Since joining DRC in 2004, he has served in progressively responsible roles, including materials processor, associate project manager, quality systems specialist, senior corporate quality systems specialist, and most recently, Manager, Operations – Education Materials. | B.A., Business Administration, emphasis in Management | ISO 9001:2008 QMS Internal Auditor Certified 2009 ISO 9001:2008 QMS Auditor/Lead Auditor Certified 2009 ISO 14001:2004/OHSAS 18001:2007 EMS Internal Auditor Certified 2010 Six Sigma Green Belt Certified 2012 |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Carol Jullie , Materials Production Coordinator | As a Materials Production Coordinator , Ms. Jullie will lead the successful production of all documents (booklets, manuals, user guides, etc.) for the PSSA and Keystone Exams. | 100% | 0% | Maple Grove Office | 2 yrs. | 12 yrs. | Ms. Jullie provides a consistent structure to clients, vendors, and internal resources during the development of DRC produced materials. Prior to joining the materials production team at DRC, Ms. Jullie provided program management support to programs in three states, including Pennsylvania, having worked on the CDT, PSSA and PSSA-Modified, and Keystone Exams. Prior to her experience with assessments, Ms. Jullie worked as a copy editor at various newspapers. | B.A., English Education and Journalism | |
| Mr. Niall Finn , Senior Director of Customer Service | Mr. Finn will serve as the Customer Service Manager , overseeing and leading DRC's customer support team | As needed | | Maple Grove Office | 24 yrs. | 8 yrs. | Mr. Finn has more than 24 years of quality management experience, serving in numerous senior-level roles. Mr. Finn is a trained Kaizen facilitator, won the Examiner to the State of Michigan Quality Award, and was a founding member of the State of Michigan Quality Council. He has participated in numerous trainings and leadership programs throughout his career, including Green Belt training in six sigma technology. | Master of Management B.S., Production Management | ISO 27001 Information Security–Certified Auditor ISO 14001 Environmental Standard–Certified Auditor |
| Ms. Leslie Rollag , Associate Customer Service Manager | As the Associate Customer Service Manager , Ms. Rollag will provide customer service and operational support to the Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 3 yrs. | 3 yrs. | Ms. Rollag has extensive experience leading DRC's customer service initiatives in Missouri and Idaho, and has provided customer service and operational support in the state of Washington. She has versatility in supporting both the printed materials and online components of the program, which includes customer service, materials development, and materials shipment and return. Prior to joining DRC, Ms. Rollag worked in the aerospace and defense industries, serving as an operations manager and assistant manager. | | |
| TEST DEVELOPMENT | | | | | | | | | |
| TEST DEVELOPMENT LEADERSHIP | | | | | | | | | |
| Ms. Patty McDivitt , Senior Vice President of Curriculum, Instruction, and Assessment | Ms. McDivitt will serve as the Test Development Advisor—All Programs , providing executive-level guidance and support to all staff working on test development activities for the Pennsylvania assessments. | As needed | | Plymouth Office | 13 yrs. | 13 yrs. | Ms. McDivitt has over 30 years of direct “hands-on” educational curriculum, instruction, and assessment development experience, including experience in the development of assessments designed to link students’ results with postsecondary education and career decision-making. As Senior Vice President of Curriculum, Instruction, and Assessment, Ms. McDivitt oversees all test development activities for all of our testing programs, including those for Pennsylvania. She is an experienced professional development trainer and facilitator of teacher committees, including item writing committees, standards alignment review committees, curriculum review committees, content item and item/data review committees, bias, fairness, and sensitivity review committees, and committees responsible for the development of content curriculum standards and performance-level descriptors and standards. | M.S., Education, School Guidance and Counseling: Secondary Teaching English Language Arts: Special Education Endorsement B.S., Secondary Education English Language Arts | State of Michigan: Lifetime Secondary English Language Arts Grades 9-12 Lifetime Guidance and Counseling, Grades K–12, with Special Education K–12 endorsement |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Mr. Christopher McCullough , Test Development Project Director | Mr. McCullough will serve as the TD Manager—PSSA, Keystone, and CDT , supporting Ms. McDivitt to implement the development of the Pennsylvania assessments. He will advise PDE about best practices in the areas of item and test development; advise PDE about the implementation of the PA assessments from a content perspective (including the development of new item types for the PSSA); facilitate work schedules and resources of Project Leads; oversee item and test quality; and ensure project deliverables are met on time. | 50% | 50% | Plymouth Office | 11 yrs. | 11 yrs. | Mr. McCullough has more than 23 years of test development experience, including 11 years in item and test development project leadership at DRC. Since 2008, he has worked on programs for Pennsylvania, playing a key role in the development of the Pennsylvania Core Standards (PCS), and the development of the Keystone Exams, the CDT, and the PCS-based PSSA. His college- and career-readiness (CCR) experience includes providing project coordination and oversight for DRC's work on the development of CCR-aligned items for Smarter Balanced, the Pennsylvania Classroom Diagnostic Tools (CDT), the Pennsylvania System of School Assessment (PSSA), and the Keystone Exams, and providing project coordination and oversight for committees of PA educators to develop assessment anchors and eligible content (standards and objectives), learning progressions, and Voluntary Model Curriculum (VMC) aligned to the PCS. | B.A., Communications; English—Writing A.A., Communications | |
| Ms. Deedra Arvin , Test Development Program Manager | As the Project Lead—PSSA and CDT , Ms. Arvin will support Mr. McCullough to implement the development of these projects. Ms. Arvin will determine project needs and resources in order to ensure project deliverables are met and to ensure item and test quality. | 100% | 0% | Plymouth Office | 11 yrs. | 5 yrs. | Ms. Arvin has 11 years of experience in the educational assessment industry, and has worked on 15 educational assessment projects, including the CDT, Keystone Exams, and PSSA. Prior to working in educational assessment, Ms. Arvin served as a science teacher for two years and volunteered with the Indiana State 4-H program, developing assessments for a competition of equine knowledge for students in grades 3–12. | M.S., Educational Psychology: Research Methods and Measurement B.S., Chemistry with Teaching Option | American Educational Research Association TESOL, International Graduate Certificate, Teaching English Language Learning in K–12 |
| Ms. Mary Basch , Senior Project Lead | Ms. Basch will serve as the Project Lead—Keystone Exams , supporting Mr. McCullough to implement the development of these projects. Ms. Basch will determine project needs and resources in order to ensure project deliverables are met and to ensure item and test quality. | 55% | 45% | Plymouth Office | 5 yrs. | 9 yrs. | Ms. Basch has 8 years of educational assessment experience. She has worked on thirteen educational assessment projects, including the Keystone Exams, PSSA, VMC, and PSSA-Modified. Prior to joining DRC, she served as an adjunct professor teaching graduate-level courses for teacher licensure, was a classroom teacher for 19 years with a focus on gifted and talented education, and served on numerous committees aligning curriculum to standards. | M.A., Curriculum and Instruction B.S., Elementary Education, Early Childhood minor | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| CONTENT AREA EXPERTS | | | | | | | | | |
| English Language Arts | | | | | | | | | |
| Ms. Anne Kirpes, Reading Test Development Director | Ms. Kirpes will serve as the Reading Content Director—All Programs , overseeing and directing all ELA development activities for the PA assessments. Ms. Kirpes will advise PDE about best practices in the areas of content and assessment and the implementation of these programs from a content perspective (including the development of new item types for the PSSA). She will facilitate the work schedules and resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables. | As needed | | Plymouth Office | 17 yrs. | 13 yrs. | Ms. Kirpes has 17 years of reading and language arts test development experience at all grade levels. She has played a key role in the development of the PCS, the Keystone Literature Exam, the CDT, and K-12 VMC units and lesson plans. Her assessment experience ranges from test design to standard setting, including directing and participating in item/rubric development and test construction, participating in performance assessment scoring processes, facilitating and participating standard setting, and facilitating rangefinding and data committee reviews. In addition to her assessment experience, she has eight years of teaching experience. | Ed.M. Education, concentration in Teaching and Learning B.A., Elementary Education, Reading/Language Arts | State of Illinois— Language Arts and Elementary Certification |
| Ms. Kara Courtney, ELA Test Development Director | As the ELA Test Development Director—All Programs , Ms. Courtney will support Ms. Kirpes by assisting in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present. | As needed | | Plymouth Office | 11 yrs. | 11 yrs. | Ms. Courtney has more than 16 years of test development experience and has worked on more than 15 statewide assessments, including the CDT, Keystone Exams, PSSA, and VMT, providing leadership as a project manager, team lead, or content lead. Her assessment experience covers a wide range of activities including developing cognitive lab studies, blueprints, and test designs as well as facilitating committees through all development processes. Ms. Courtney has presented at numerous professional conferences and served as a teacher for four years prior to joining DRC. | B.S., English Education | Certificate in Educational Assessment for Practitioners State of Illinois— Language Arts and English Certification State of Ohio— Language Arts and English |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Mr. Chris Scalerchio , Senior Test Development Specialist | Mr. Scalerchio will serve as an ELA Content Lead—Keystone Exams and CDT , overseeing all aspects of passage and item development. He will work with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists. | 100% | 0% | Plymouth Office | 14 yrs. | 8 yrs. | Mr. Scalerchio has 13 years of reading and language arts test development experience across all grade levels. He has worked on six educational assessment projects, including the CDT, Keystone Exams, and PSSA. Mr. Scalerchio has been instrumental in the development of the Keystone Literature Exam. In addition to his experience in large-scale assessment, he has seven years of teaching experience at the high school level. | M.A., Adult and Higher Education B.A., English | Texas Secondary Teaching Certificate—English Association for Supervision and Curriculum Development International Reading Association |
| Mr. Paul Diorio , Senior Reading/Language Arts Test Development Specialist | Mr. Diorio will serve as the ELA Content Lead—PSSA and CDT , working with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists. | 100% | 0% | Plymouth Office | 15 yrs. | 15 yrs. | Mr. Diorio has 15 years of experience in large-scale assessment and has worked on more than 15 projects, including the PA Writing Assessment, Keystone Exams, PSSA, and PSSA-Modified. He has been instrumental in the development of the ELA assessment and oversees all aspects of passage and item development, including the new item types of EBSRs and TDAs. His CCR experience includes developing CCR-aligned items for the CDT and Keystone Exams. Mr. Diorio also served as a teacher for three years. | B.A., English | Teacher Certification Program |
| Mr. Stuart Garrick , English Language Arts Test Development Specialist | Mr. Garrick will serve as an ELA Writing/Language Content Lead—PSSA , overseeing all aspects of the item and writing prompt development. Mr. Garrick will work with PDE to produce high-quality, aligned items and ancillary documents. He will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists. | 25% | 75% | Plymouth Office | 3 yrs. | 3 yrs. | Mr. Garrick has worked on more than five educational assessment projects since joining DRC, including the PSSA. He has helped PDE develop ELA assessment anchors and eligible content aligned to the PCS and participated in the development of new writing items, passages, and writing prompts aligned to the new Pennsylvania standards. He also developed PCS-aligned items for the CDT. In addition to his educational assessment experience, Mr. Garrick has 18 years of teaching experience. | B.A., English | State of Minnesota, State of Montana, and State of North Dakota—Teacher, English Language Arts |
| Ms. Roxanne Semon , English Language Arts Consultant | Ms. Semon will serve as an ELA Content Specialist—All Programs , working with the Content Leads on passage and item development, ensuring alignment, quality, style, and format are adhered to and followed in all programs. | 50% | 50% | Plymouth Office | 20 yrs. | n/a | Ms. Semon has worked on 12 educational assessment projects. As a consultant for DRC, she has worked on the CDT, Keystone Exams, PSSA, and VMC. She has developed new reading passages and items aligned to the new PCS, and developed PCS-aligned items for the CDT and Keystone Exams. In addition, Ms. Semon has served as an adjunct instructor, teaching beginning and advanced composition and literature. | M.A., English B.A. English, Minor in French and Religion | |

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| Dr. Jacquelyn Graham, Curriculum, Instruction, and Assessment Consultant | Dr. Graham will serve as an ELA Content Specialist—All Programs , working with the Content Leads on passage and item development, ensuring alignment, quality, style, and format are adhered to and followed. | 50% | 50% | Plymouth Office | 14 yrs. | n/a | Dr. Graham offers subject-area expertise in the development of model curriculum, formative assessment, item and passage review, alignment of CCR standards with grade-level expectations, and the creation of item samplers with annotations. As a DRC consultant, Dr. Graham has developed new reading passages, items, and scoring guidelines aligned to the new PCS and has developed PCS-aligned items for the CDT and Keystone Exams. Prior to working as a consultant for DRC, Dr. Graham served as DRC's ELA Test Development Director for two years. | Ph.D., English Education M.Ed., Reading Education B.S., Elementary Education, Summa Cum Laude | State of Florida—Clinical Educator Trainer State of Maryland Advanced Professional Teaching License |
| Mathematics | | | | | | | | | |
| Dr. John Selisky, Director, Test Development for Mathematics | As the Mathematics Content Director—All Programs , Dr. Selisky will oversee and direct Mathematics development activities for the PA assessments. He will advise PDE about best practices in the areas of content and assessment and will advise PDE in the implementation of these programs from a content perspective (including the development of new item types for the PSSA). Dr. Selisky will facilitate the work schedules and resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables. | As needed | | Plymouth Office | 18 yrs. | 6 yrs. | Dr. Selisky has 19 years of test development and educational measurement experience and more than 25 years of teaching experience. He has played a key role in the development of the PCS, items for the Keystone and PSSA Exams, the CDT, and the K–12 VMC units and lesson plans. Some of Dr. Selisky's most important assessment policy contributions have been in the area of organizing, mapping, and coding state curriculum content standards, including the development of mathematics learning progressions. He has worked with the education departments of Georgia, Michigan, Oklahoma, and Washington to train educators to effectively use assessments and interpret and report results. | Ed.D., Mathematics Education M.A., Instructional Technology M.A., Secondary Education B.S., Earth and Planetary Sciences and Mathematics | Green Belt Certification Project Management Professional (PMP®) Commonwealth of Pennsylvania—Permanent Instructional Certificate Instructional Certificates in New York and Illinois |
| Mr. Darren Slack, Senior Mathematics Test Development Specialist | As a Mathematics Content Lead—PSSA and Keystone Exams , Mr. Slack will oversee all aspects of item development, including setting up auto-scoring for the Keystone SCR items. He will work with PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will maintain direct communication with PDE and oversee the day-to-day work of the Content Specialists. | 100% | 0% | Plymouth Office | 9 yrs. | 9 yrs. | Since joining DRC, Mr. Slack has worked on 21 testing projects, including the PSSA, PSSA-Modified, CDT, and VMC. He has been instrumental in the development of the PSSA Mathematics exams and the Keystone Algebra I, Geometry, and Algebra II exams since 2007. In addition to his educational assessment experience, Mr. Slack has five years of experience teaching high school and middle school mathematics. He also has experience with both reformed and traditional curriculum and developing alternative education programs for students who did not meet assessment requirements. | B.S., Mathematics | Initial Licensure—Mathematics State of Minnesota—Secondary Mathematics |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Mr. Eric Jenson , Senior Mathematics Test Development Specialist | Mr. Jenson will serve as the Mathematics Content Lead—CDT , overseeing all aspects of item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 40% | 60% | Plymouth Office | 5 yrs. | 5 yrs. | Mr. Jenson has worked on 12 educational assessment projects since joining DRC, including the CDT, Keystone Exams, PSSA, and VMC. His CCR experience includes working with Pennsylvania educators in developing CCR-aligned curriculum for the VMC. He aligned the items in the CDT to the CCR standards and developed items to augment the existing pool. Prior to joining DRC, Mr. Jenson served as a teacher for six years, teaching high school mathematics courses, and two years as a college mathematics instructor to undergraduates. | B.A., Mathematics | Initial Licensure—Mathematics State of Minnesota—Secondary Mathematics Certification |
| Mr. Christopher Peterson , Senior Mathematics Test Development Specialist | As a Mathematics Content Specialist—PSSA and Keystone Exams , Mr. Peterson will work with the Content Lead on item development, ensuring that style, format, alignment, and quality are adhered to and followed. | 40% | 60% | Plymouth Office | 5 yrs. | 5 yrs. | Mr. Peterson has worked on 10 educational assessment projects since joining DRC, including the CDT, Keystone Exams, and PSSA. He has worked with committees of PA educators to facilitate reviews and develop assessment anchors and eligible content and learning progressions aligned to CCR standards. He is responsible for the development of new mathematics items and scoring guidelines aligned to PCS. Prior to joining DRC, he served as a teacher for eight years, working extensively with special needs students in mathematics classrooms. | M.Ed., Teaching B.S., Mathematics | State of Minnesota—Secondary Mathematics Certification |
| Ms. Holly Trotter , Mathematics Test Development Specialist | Ms. Trotter will serve as a Mathematics Content Specialist—All Programs , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 30% | 70% | Plymouth Office | 3 yrs. | 3 yrs. | Ms. Trotter has worked on 12 assessment projects over the last two years, including the CDT, Keystone Exams, PSSA, and VMC. Prior to joining DRC, she served as a mathematics teacher, mathematics intervention paraprofessional, and a mathematics student teacher. She also co-developed an innovative new student assessment strategy, which she presented at the annual Minnesota Council of Teachers of Mathematics Spring Conference (2012). Ms. Trotter has also facilitated reviews with Pennsylvania educators. | B.A., Mathematics and Spanish | National Council of Teachers of Mathematics (NCTM) |
| Ms. Mary Mulhern , Senior Mathematics Test Development Specialist | Ms. Mulhern will serve as a Mathematics Content Specialist—Keystone Exams and PSSA , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 65% | 35% | Plymouth Office | 6 yrs. | 6 yrs. | Ms. Mulhern has worked on nearly 20 educational assessment projects since joining DRC, including the CDT, Keystone Exams, PSSA, and VMC. She has developed new mathematics items and scoring guidelines aligned to PA CCR standards. In addition to her assessment experience, Ms. Mulhern has two years of mathematics teaching experience. | Master of International Management B.A., Mathematics/Education | |
| Ms. Terra Vaughn , Mathematics Test Development Specialist | Ms. Vaughn will serve as a Mathematics Content Specialist—PSSA , working with Content Leads on item development and review, ensuring that style, format, alignment, and quality are adhered to and followed. | 30% | 70% | Plymouth Office | 2 yrs. | 2 yrs. | Since joining DRC, Ms. Vaughn has worked on more than 10 educational assessment projects, including the CDT and PSSA. Prior to joining DRC, she served as a classroom teacher for 10 years, teaching elementary and middle school mathematics. She taught in a wide range of settings, including urban, suburban, and private schools. | M.A., Education B.A., Child Psychology | State of Minnesota—Grades K–6, Elementary, and Grades 5–8 Mathematics Certification |

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| Science | | | | | | | | | |
| Mr. David Durette, Science Test Development Director | As the Science Content Director—All Programs , Mr. Durette will oversee and direct all Science development activities. He will advise PDE about best practices in the areas of science content and assessment and the implementation of these programs from a content perspective. He will facilitate some meetings with PA science educators. Mr. Durette will direct the resources of the content team members, oversee content quality and alignment, and ensure on-time project deliverables. | As needed | | Plymouth Office | 17 yrs. | 10 yrs. | Mr. Durette has over 17 years of large-scale assessment experience, including 10 years of experience working on programs in Pennsylvania, providing his expertise and leadership in the content area of science. He has played a key role in the development of the Assessment Anchors and Eligible Content for the Keystone Biology Exam, the CDT and Learning Progressions, and VMC units and lesson plans. He also served as a science educator for five years. | M.S. Candidate, Teaching and Learning B.S., Biology, Minor in Chemistry | |
| Mr. Joseph Schweiss, Senior Science Test Development Specialist | As a Science Content Lead—Keystone Exams , Mr. Schweiss will work with PA science educators and PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will assist in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present. | 80% | 20% | Plymouth Office | 10 yrs. | 10 yrs. | Mr. Schweiss has 10 years of large-scale assessment experience at DRC. He has provided his expertise to 19 testing projects in more than 10 states, including the CDT, Keystone Exams, PSSA, and VMC. Prior to joining DRC, Mr. Schweiss served as a biology teacher, physical science teacher, and marine biologist/educator. | M.Ed., Science Education B.S., Science | State of Minnesota Teaching License—Life Sciences, Grades 9–12 TOEFL Certification |
| Mr. Patrick Erickson, Senior Science Test Development Specialist | As a Science Content Lead—PSSA and CDT , Mr. Erickson will work with PA science educators and PDE to produce high-quality, aligned items, as well as item and scoring samplers. He will assist in determining project needs and resources in order to ensure project deliverables are met and that content quality and alignment are present. | 80% | 20% | Plymouth Office | 5 yrs. | 5 yrs. | Since joining DRC, Mr. Erickson has contributed item development and assessment expertise to five projects in four states, including the PSSA, CDT, and VMC. In addition to his assessment experience, Mr. Erikson has five years of teaching experience. | M.Ed., Elementary Education B.S., Integrated Sciences | State of Minnesota Teaching License—Elementary National Science Teacher Association |
| Ms. Erica Hyland, Senior Science Test Development Specialist | As a Science Content Specialist—PSSA and Keystone Exams , Ms. Hyland will work with the Content Leads to produce high-quality, aligned items, as well as item and scoring samplers. | 20% | 80% | Plymouth Office | 8 yrs. | 8 yrs. | Since joining DRC, Ms. Hyland has provided science content expertise to 10 assessment projects, including the PSSA and Keystone Exams. She has successfully developed dually-aligned science items and has worked collaboratively to develop and present professional development assessment workshops for science teachers. Prior to joining DRC, she served as a science teacher for six years. | M.Ed., Science Education B.S., Biology | State of Minnesota Teaching License—Life Science and General Science |

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| Keystone English Composition Option | | | | | | | | | |
| Dr. James Bell, Senior English Language Arts Test Development Content Specialist | Dr. Bell will serve as an ELA Senior Content Lead—Keystone English Composition , overseeing all aspects of the item and writing prompt development. He will work with PDE to produce high-quality, aligned items and ancillary documents. Dr. Bell will maintain direct communication with PDE and oversee the day-to-day activities of the Content Specialists. | 30% | 70% | Plymouth Office | 23 yrs. | 2 yrs. | Dr. Bell has more than 25 years of experience in education and assessment. As a contractor for DRC, he has worked on six assessment projects, including the Keystone Exams and PSSA. Prior to taking a full-time position at DRC, Dr. Bell served as chair and associate professor in the Department of English, Foreign Language and Humanities at Northwestern Oklahoma State University. He has also served as director of Institutional Assessment and associate professor at College of the Ozarks, and as a freelance English language arts writer, editor, and facilitator in assessment. | Ph.D., English M.A., English B.S., Secondary Education: English and Psychology | Southwest/Texas Popular Culture Association South Central Modern Language Association Cormac McCarthy Society |
| Civics & Government Option | | | | | | | | | |
| Mr. Robert Poppe, Test Development Director | As the Social Studies Content Director—Keystone Civics and Government , Mr. Poppe will oversee and direct all Social Studies development activities and staff. He will advise PDE about best practices, and about the implementation of the program from a content perspective. Mr. Poppe will also serve as the VMC Project Lead , leading all VMC activities. | As needed | | Plymouth Office | 30 yrs. | 19 yrs. | Mr. Poppe has more than 30 years of educational assessment experience. He has played a key role in the development of standards and items for the Keystone Civics and Government program, and was instrumental in the development of the Voluntary Model Curriculum and the Learning Progressions currently in use through the CDT and Pennsylvania's SAS website. His CCR experience includes overseeing the alignment of existing assessments to meet the expectations of CCR. | B.A., Botany and Zoology | |
| Mr. Joe Eliaz, Senior Social Studies Test Development Content Lead | Mr. Eliaz will serve as a Social Studies Content Lead—Keystone Civics and Government , working with the PDE to ensure that content, style, format, alignment, and quality are adhered to and followed. | 30% | 85% | Plymouth Office | 20 yrs. | 8 yrs. | Mr. Eliaz has over 20 years of experience in educational assessment, 11 years of experience teaching social studies and language arts, and three years of experience serving as an assistant principal. He has worked on more than 15 testing projects, including the Keystone program since 2010. | M.S., Educational Administration B.S., History | Texas Teaching Certifications: History, English, ESL |
| Ms. Julie Olson, Social Studies Test Development Specialist | As a Social Studies Content Specialist—Keystone Civics and Government , Ms. Olson will work with the Content Lead to ensure that style, format, alignment, and quality are adhered to and followed. | 30% | 85% | Plymouth Office | 11 yrs. | 11 yrs. | Ms. Olson has written and edited items for more than 10 paper/pencil and online statewide educational assessments, including the Keystone Exams since 2010. Prior to joining DRC, Ms. Olson served as a teacher for five years, teaching reading, social studies, and special education. | M.A., Teaching (Secondary Social Studies emphasis) B.A., Economics and German | Minnesota Standard License, Social Studies National Council for the Social Studies |

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| TEST DEVELOPMENT TECHNOLOGIES | | | | | | | | | |
| Mr. Judson Sather , Senior Director of Test Development Technologies | As the Senior Director of TD Technologies , Mr. Sather will continue to lead the development of the IDEAS item banking system, and will provide training to PDE as necessary. Mr. Sather will also advise PDE on the continued transition to computer-based testing using DRC's INSIGHT system. Mr. Sather will facilitate the work schedules and resources of the TD Technologies members, oversee the quality of print and online materials, and ensure on-time project deliverables. | As needed | | Plymouth Office | 7 yrs. | 11 yrs. | Mr. Sather provides leadership for the creation and production of all materials for both print and online delivery. He has also taken a leadership role in facilitating the use and enhancement of DRC's item-banking system—the Item Development and Educational Assessment System (IDEAS)—and its interaction with the online environment—DRC INSIGHT. Mr. Sather is responsible for training and guiding remote users of IDEAS and DRC INSIGHT, which include DRC employees and state department representatives. Mr. Sather's CRR experience includes providing leadership and guidance on the item banking and online testing technologies used in the item development process. He also has 14 years of experience teaching mathematics and computer science. | M.A., Curriculum and Instruction B.S., Secondary Education B.C.E., Structural Design | |
| Ms. Melissa Schultz , Project Lead Test Development Technology | As a TD Technologies Project Lead , Ms. Schultz will assist with the production of high-quality print and online materials. | 40% | 60% | Plymouth Office | 6 yrs. | 13 yrs. | Ms. Schultz works closely with content teams to produce high-quality online materials for the CDT project. Since joining DRC, she has worked on more than 20 testing projects and held progressively responsible roles, including: item development coordinator, project lead, technology specialist, senior technology specialist, and, most recently, Project Lead. | A.A.S., Accounting | |
| Mr. Tracy Tschida , Project Lead Test Development Technology | As a TD Technologies Project Lead , Mr. Tschida will work closely with content teams and other TD technologies team members to produce high-quality print and online materials. | 40% | 60% | Plymouth Office | 5 yrs. | 10 yrs. | Since joining the test development team at DRC, Mr. Tschida has served as the item and test development representative for item banking and online testing for 20 testing projects, including projects in Pennsylvania. He works with content teams for the PSSA and Keystone projects to produce high-quality print and online materials. Since joining DRC, he has held progressive roles, including: publications designer, technology specialist, senior technology specialist, and, most recently, Project Lead Test Development Technology. | A.A.S., Commercial Art and Computer Graphics | Business Management Certificate Network Administration Certificate |
| SUPPORT SERVICES | | | | | | | | | |
| Ms. Denise Esner , Senior Manager, Support Services | As the Support Services Senior Manager—PSSA, Keystone, and CDT , Ms. Esner will oversee all item and passage formatting (print and online formats) for the Pennsylvania assessments. | As needed | | Plymouth Office | 12 yrs. | 12 yrs. | Ms. Esner has over 26 years of design experience, including managing design and publishing departments for item and test development programs. Since joining DRC, she has contributed her expertise to more than 20 educational assessment projects, including the PSSA and Keystone Exams, for which she has been instrumental in graphic development for these projects. | B.F.A., Illustration | |
| Ms. Nancy Smolley , Senior Item Development Coordinator | As a Support Services Item Development Coordinator: Formatting Lead—PSSA, Keystone Exams, and CDT , Ms. Smolley will serve as the formatting lead for both print and online formats. | 25% | 75% | Plymouth Office | 11 yrs. | 11 yrs. | Ms. Smolley has 11 years of experience at DRC. She has provided her expertise to 20 testing projects, including the PSSA, PSSA-Modified, CDT, and Keystone Exams. Through her understanding of formatting of various media needed for items and passages and her collaborative team efforts, she ensures the understanding of comprehensive and cohesive processes, procedures, and attention to detail. | | |

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| Ms. Sara LaBerge, Item Development Coordinator/Graphics | As an Support Services Item Development Coordinator—PSSA, Keystone Exams, and CDT , Ms. LaBerge will assist with item and passage formatting (print and online formats) and will develop graphics for the CDT and Keystone programs. | 25% | 75% | Plymouth Office | 6 yrs. | 6 yrs. | Ms. LaBerge has more than six years of experience in graphic design. Since joining DRC, she has worked on more than 15 testing projects, including the Keystone Exams, PSSA, and CDT, ensuring that all of DRC's assessment graphics are of superior quality and accuracy. | Master of Letters, History of Art B.A., History | |
| Mr. Chris Mrnak, Item Development Coordinator | Mr. Mrnak will serve as a Support Services Item Development Coordinator—PSSA, Keystone, and CDT , assisting with item and passage formatting for print and online formats. | 25% | 75% | Plymouth Office | 11 yrs. | 11 yrs. | Over the past 11 years, Mr. Mrnak has worked on more than 15 testing projects for DRC, including the Keystone Exams, PSSA, and PSSA-Modified. He has implemented a universal payment system that more efficiently pays DRC's item writers and passage finders. As a result, the system for submitting and processing items and passages has run more smoothly and efficiently. In addition to his assessment experience, Mr. Mrnak has experience as a publications coordinator and a production assistant. | B.A., Communications | |
| SPECIALIZED TEST DEVELOPMENT SERVICES | | | | | | | | | |
| Ms. Maria Eiffler, Spanish Project Lead | As the Spanish Lead—PSSA and Keystone Exams , Ms. Eiffler will support Mr. McCullough to implement the development of all Spanish translation materials. She will determine project needs and resources in order to ensure project deliverables are met and to ensure the quality of item translation and Spanish test materials. | 50% | 50% | Plymouth Office | 4 yrs. | 4 yrs. | Since joining DRC, Ms. Eiffler has provided expertise to educational assessment programs in two states, including Pennsylvania, working on the Keystone Exams and the PSSA. Prior to joining DRC, she served as a reader/scorer of Advanced Placement Spanish exams, a specialist in the oral assessment of Spanish proficiency for Minneapolis Public Schools, and a Spanish teacher at the University of Minnesota and Minneapolis Community and Technical College. She participated in the development of the U of M's listening portion of the computer-delivered language proficiency assessment, as well as recorded a significant portion of the listening dialogue. | M. Ed., Applied Linguistics M.A., Spanish B.A., Spanish B.S., Chemistry | |
| Ms. Kimberly Fountain, Bias/Fairness and Sensitivity Test Development Specialist | As the Bias, Fairness, and Sensitivity Lead—PSSA, Keystone Exams, and CDT , Ms. Fountain will support Mr. McCullough to facilitate matters relating to bias, fairness, and sensitivity for all Pennsylvania test items. She will develop resources, train developers and reviewers, and facilitate internal reviews and external bias meetings in order to ensure item and test quality. | 35% | 65% | Plymouth Office | 10 yrs. | 10 yrs. | As a leader in bias/fairness and sensitivity, Ms. Fountain provides training for local educators, state departments of education, national experts, and test development specialists on best practices and current research. She has contributed her expertise to 16 educational assessment projects, including the CDT, Keystone Exams, PSSA, and PSSA-Modified. Her extensive professional development background includes DRC INSIGHT™ iPad Usability Studies, CCR standards, Cognitive Labs, Accommodations for Special Education Students, NCLB compliance, Peer Review Process, Balanced Literacy, Six Plus One Traits of Writing, the New Jersey Writing Project, and Learning Strategies Institute. She has worked on Pennsylvania programs since 2005. | M.S. Ed., Education B.S. Ed., Education | Mississippi Teacher License (Class AA) Texas Educator Certificate International Reading Association |

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| Mr. Dan Maghrak , Permissions Specialist | Mr. Maghrak will serve as the ELA Permissions Specialist , working directly with content specialist to ensure validity of copyright materials. | 10% | 90% | Plymouth Office | 1 yrs. | 3 yrs. | Over the past 3 years, Mr. Maghrak has worked on more than 10 testing projects for DRC, including the Keystone and PSSA projects. As DRC's permissions specialist he has improved the internal permissions processes to operate in a smoother and more efficient manner. A Microsoft Access database houses all permissioned material where Mr. Maghrak can generate necessary requests to secure permissions as well as the usage history for each piece. | B.A., Business Management | |
| EDITORIAL SERVICES | | | | | | | | | |
| Ms. Elizabeth Joyce , Senior Manager of Editing Services | As the Senior Editorial Manager—PSSA, Keystone Exams, and CDT , Ms. Joyce will provide editorial direction and support for the PA assessments and will oversee all editorial processes and workflow. Ms. Joyce will lead a team of editors who will provide editorial reviews for item development, forms development, quality assurance, and annual technical reports. | As needed | | Plymouth Office | 24 yrs. | 14 yrs. | Ms. Joyce has more than 24 years of experience as a technical and science content editor and has contributed her editorial expertise to Pennsylvania for 14 years, providing editorial direction and support for all PA projects and overseeing all editorial processes and workflow. She has been the sole or co-author of more than 200 technical and scientific reports and public relations materials and has edited in excess of 750 reports in these areas. In addition, Ms. Joyce has fifteen years of secondary classroom teaching experience and five years of post-secondary research and teaching experience. | B.A., Geology B.S., Earth Sciences B.S., Comprehensive General Sciences, Physics emphasis, grades 7–12 B.S., English Language Arts/Biology | Licensed Professional Geologist, State of Minnesota Licensed Professional Geologist, State of Wisconsin |
| Ms. Kimberley Mancini , Senior Test Development Editor | As the Senior Editor—PSSA, Keystone Exams, and CDT , Ms. Mancini will provide editorial leadership and support for all Pennsylvania projects, including editorial reviews for item development, forms development, and technical reports. She will also provide copyediting and substantive editing, cold reads, document fact-checking, and quality assurance reviews. | 20% | 80% | Plymouth Office | 7 yrs. | 7 yrs. | Ms. Mancini has over seven years of direct test development experience with many state assessment programs. Since joining DRC, she has worked on more than 25 testing projects, including the CDT, Keystone Exams, PSSA, and VMC. She brings a comprehensive background to her role at DRC, including editorial work for a non-profit organization, secondary teaching experience as a Grade 9 English teacher, and years of tutoring experience specializing not only in ACT/SAT, but also in basic subject skills, study skills, and homework help for Algebra I and Algebra II students. While serving as a Grade 9 English teacher, the majority of her students were second-language learners. | B.A., English Literature and Russian Language | Standard License in Texas, Grades 8–12 English/Language Arts Instruction, Fully Certified SIOP Certified—Sheltered Instruction Observation Protocol |
| PUBLICATIONS | | | | | | | | | |
| Ms. Deb Gartner , Director, Publications | As the Director, Publications , Ms. Gartner will produce support materials such as handbooks, DFAs, large-print materials, and scoring guidelines. She will ensure that all materials are produced according to client specifications. | 20% | 80% | Plymouth Office | 25 yrs. | 25 yrs. | Ms. Gartner has developed large-scale assessment publications at DRC for more than 25 years. Her experience includes the design, layout, and production of test booklets, manuals, and other documents for statewide testing programs in numerous states, including the PSSA since 1990. Before joining DRC, she managed the desktop publishing and word processing department of a technical translations company and worked as a technical writer for a mortgage company. | B.A., English (in progress) | |

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| Ms. Peggy Maher, Senior Technical Writer | As the Senior Technical Writer , Ms. Maher will produce support materials such as handbooks, DFAs, scoring guidelines, and technical reports. | 10% | 90% | Plymouth Office | 12 yrs. | 12 yrs. | Ms. Maher has developed large-scale assessment publications at DRC for more than 12 years. Her experience includes the writing, editing, design, layout, and production of test administration manuals, district test coordinator manuals, user guides, interpretive guides, technical reports, and other documents for statewide testing programs in numerous states, including Pennsylvania. Throughout her career, Ms. Maher has received numerous hours of technical training in desktop publishing and graphic design applications. | M.S., Technical Communication Program B.A., Electronic Publishing, Minor: Art—Graphic Design Emphasis | |
| Ms. Kari Johnson, Senior Graphic/ Document Designer | As a Senior Graphic/Document Designer , Ms. Johnson will support the production of materials such as handbooks, samplers, and scoring guidelines. | 10% | 90% | Plymouth Office | 24 yrs. | 10 yrs. | Ms. Johnson has assisted in the development and production of large-scale assessment publications at DRC for more than 10 years. Her experience includes the typesetting, layout, graphics development, and production of test booklets, manuals, and other documents for statewide testing programs in numerous states, including Pennsylvania. | B.S., Costume Design | |
| Ms. Danielle Lenz, Editing Specialist | As an Editor , Ms. Lenz will proof all materials produced in the Publications department and will provide proofing backup/support for other resource areas. | 10% | 90% | Plymouth Office | 14 yrs. | 14 yrs. | Ms. Lenz has more than eleven years of experience developing large-scale assessment publications at DRC, including the design, layout, and editing of test booklets, manuals, and other ancillary materials for statewide testing programs, including Pennsylvania. She also served as a word processing specialist at DRC for two years and a freelance writer for one year, and served in the Peace Corps as a volunteer English teacher in West Africa. | B.A., English | Professional Editors Network |
| RESEARCH | | | | | | | | | |
| Mr. David Chayer, Senior Vice President of Research | As the Senior Vice President of Research , Mr. Chayer will provide executive-level guidance and support. | 25% | 75% | Maple Grove Office | 16 yrs. | 16 yrs. | Mr. Chayer has more than 31 years of experience performing and directing research for test design and development activities. As Senior Vice President of Research, Mr. Chayer has overseen all research activities for all of our testing programs, including those for Pennsylvania. His work has included large-scale educational assessments, norm-referenced tests, and licensure/certification testing programs for both paper-and-pencil and computer-based tests. He has produced and evaluated measurement instruments; coordinated, designed, and implemented standard setting procedures; and ensured that all methodologies and processes were valid and legally defensible. | M.A., Measurement, Educational Psychology B.A., Statistics | American Educational Research Association American Statistical Association Association of American Publishers Association of Test Publishers National Council on Measurement in Education |

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| Dr. Marc Julian , Senior Director, Psychometric Services | Dr. Julian will serve as a Senior Psychometric Advisor , providing guidance and support to the psychometric managers, completing analyses and technical reports, and attending TAC meetings. | 35% | 65% | Maple Grove Office | 20 yrs. | 3 yrs. | Dr. Julian has over 20 years of psychometric research experience including serving as director of research, research manager, senior research scientist/team leader, and research scientist at multiple educational assessment companies. He has worked on more than ten testing projects, including the Keystone Exams and PSSA. Since joining DRC, Dr. Julian has been responsible for designing, computing, and evaluating all traditional and Item Response Theory (IRT) statistical analyses, including defining, managing, and monitoring all psychometric analyses for programs in Pennsylvania and Alabama. | Ph.D., Research, Evaluation, Measurement and Statistics B.S., Psychology | American Educational Research Association National Council on Measurement in Education NCME Dissertation Award Committee Educational Measurement: Issues and Practice Applied Psychological Measurement |
| Ms. Pamela Hermann , Senior Director, Research | Ms. Hermann will serve as the Lead Psychometric Manager , providing guidance and support to the PSSA and Keystone programs and will be attending TAC meetings as needed. She will also serve as the Psychometric Manager—CDT , completing all analyses and technical reports for the CDT program. | 100% | 0% | Maple Grove Office | 21 yrs. | 16 yrs. | Ms. Hermann has 21 years of experience in data analysis and psychometrics. Her duties have included item analysis, test design and construction, item calibration, equating, scaling, and standard setting for paper and pencil, computer-based, and computer-adaptive assessments for programs in multiple states, including Pennsylvania. She has also served as a teaching assistant and a member of the Undergraduate Curriculum Committee at the University of Wisconsin. | Ph.D., ABD, Economics and Econometrics/ Statistics M.S., Economics and Econometrics/ Statistics B.S., Mathematics and Economics with Mathematical Analysis | |

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| Dr. Mayuko Simon, Senior Research Scientist | As a Psychometric Manager—PSSA , Dr. Simon will complete analyses, technical reporting, data forensics, and will attend TAC meetings as needed for the PSSA program. | 100% | 0% | Maple Grove Office | 13 yrs. | 7 yrs. | Dr. Simon has more than 13 years of educational experience, including 10 years in research and statistical analysis. She has worked on testing programs in multiple states, including Pennsylvania, having worked on the CDT, Keystone Exams, PSSA, and PSSA-Modified. She has been responsible for conducting operational work, including calibration, equating, and data forensics analysis, for multiple state testing programs, including those for Pennsylvania. Prior to joining DRC, Dr. Simon's experience includes: providing consultation to graduate students and faculty on research design and analysis and serving as a research assistant, teaching assistant, and psychometric research intern. | Ph.D., Educational Psychology; minor Statistics M.A., Educational Psychology; minor statistics M.S., Soil Science | |
| Dr. Huiqin (Ann) Hu, Senior Research Scientist II | As a Psychometric Manager—Keystone Exams , Dr. Hu will complete all technical analyses, technical reporting, and attend TAC meetings as needed for the Keystone Exams. | 100% | 0% | Maple Grove Office | 13 yrs. | 11 yrs. | Dr. Hu has extensive experience conducting psychometric analysis in the process of test development and validation for more than 10 testing projects in five states, including Pennsylvania. Her psychometric analysis experience includes conducting item analysis; differential item functioning analysis (DIF); calibration, equating, and reliability and validity analysis based on Classical Test Theory (CTT); Item Response Theory (IRT); and Rasch Measurement. Her experience also includes test design and test development using IRT and generalizability theory. | Ph.D., Measurement, Evaluation, and Cognition M.Ed., Educational Psychology B.S., Psychology | American Educational Research Association National Council on Measurement in Education Rasch Measurement SIG (AERA) |
| Dr. Lianghua Shu, Director, Psychometric Services | As a Psychometrician , Dr. Shu will assist Dr. Simon and Dr. Hu with psychometric analyses, data forensics, and reporting for the PSSA and Keystone programs. | 20% | 80% | Maple Grove Office | 20 yrs. | 1 yr. | Dr. Shu has over 20 years of experience in research and statistics, including 14 years of experience in psychometric research and educational assessment. Dr. Shu is a skilled computer programmer and excels in the development of statistical and psychometric tool development, including, but not limited to, item response theory-based tools, calibration, equating, scaling, scoring, computer-adaptive testing, and simulation. Dr. Shu works with the psychometric data forensics team in automating irregularity reporting, as well as the implementation of new data forensic statistics. Dr. Shu is also responsible for the development and maintenance of psychometric software that includes all traditional statistical and psychometric analyses required to support large-scale assessment programs. | Ph.D., Physical Oceanography M.S., Physical Oceanography B.S., Atmospheric Science | National Council on Measurement in Education Psychometric Society |

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| Ms. Christie Plackner , Director, Research Quality and Data Forensics | Ms. Plackner will serve as the Quality Control Manager and the Data Forensics Manager . Ms. Plackner will manage and oversee the psychometric quality group and all data forensic analyses and reporting. | 20% | 80% | Maple Grove Office | 18 yrs. | 13 yrs. | Ms. Plackner has 18 years of educational assessment and research experience. She has worked on nine state testing projects, including the Keystone Exams and PSSA. Her experience in large-scale assessment includes: item analysis, calibration, linking, and sampling; conducting analyses related to technical reports; contributing to special studies and reports; facilitating standard setting sessions and committee reviews; and assisting with the development of test forms and providing psychometric sign-off for multiple state testing programs, including those for Pennsylvania. | Ph.D., Educational Psychology, Quantitative Methods in Education (in progress) M.A., Industrial/Organizational Psychology B.S., Psychology | |
| Mr. Ben Sorenson , Senior Statistical Analyst | As a Statistical Analyst , Mr. Sorenson will perform analyses for the Pennsylvania assessments. | 50% | 52% | Maple Grove Office | 4 yrs. | 4 yrs. | Mr. Sorenson joined DRC in 2011, and has since been involved in calibrating, linking, and equating on several large-scale assessments including the Keystone Exams and PSSA. In 2011, he was a part of the Keystone standard setting activity as a data analyst. He has developed software for data forensics, technical reporting, and forms construction for Pennsylvania's Keystone, CDT, and PSSA, respectively. | B.A., Mathematics and Economics | |
| Mr. Alassane Savadogo , Research Analyst | As a Statistical Analyst , Mr. Savadogo will assist Dr. Simon and Dr. Hu with psychometric analyses and reporting for the PSSA and Keystone programs. | 50% | 50% | Maple Grove Office | 1 yr. | 1 yr. | Mr. Savadogo has experience working on a number of studies, including statistical modeling using Pareto chart, linear regression, logistic regression, and data mining including classification tree and random forest. Since joining DRC, Mr. Savadogo has focused on the Keystone Exams. Prior to joining DRC, he served as a statistics tutor, graduate assistant teaching statistics, and data analyst. | M.S., Applied Statistics B.S., Statistics, Minor in Applied Economics | |
| PERFORMANCE ASSESSMENT SERVICES | | | | | | | | | |
| Dr. Holly Baker , Vice President, Education Solutions | Dr. Baker will serve as a Handscoring Advisor . Dr. Baker will provide executive-level guidance and support to all handscoring activities. | As needed | | Plymouth Office | 5 yrs. | 1 yr. | Dr. Baker has over 15 years of experience in the fields of education serving at local, state, and national levels. Prior to joining DRC, Dr. Baker served as Vice President for Performance Assessment Scoring at Measurement Incorporated. In addition to providing leadership for all performance scoring services, Dr. Baker served as a primary contact for federal, state, and local policy makers, strategic partners, and education organizations. | Ph.D., Education Leadership and Policy Studies M.A., Teaching Secondary English B.A., English | |

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| Mr. Dave Payne, Senior Director of Performance Assessment Services | Mr. Payne will also serve as a Handscoring Advisor , providing executive-level guidance and support to all handscoring activities. | 25% | 75% | Plymouth Office | 21 yrs. | 21 yrs. | Mr. Payne has more than 21 years of performance assessment experience at DRC, including serving as a reader, team leader, scoring director, senior project manager, manager, director, and, most recently, Senior Director. He also served as a test development specialist at DRC for three years. Mr. Payne has overseen all handscoring and rangefinding activities for the Keystone Exams since their inception in 2010. Mr. Payne and Mr. Hook are currently collaborating on planning the fall 2015 item writing and handscoring training workshops with which Mr. Payne will be intricately involved. | M.L.I.S. (Master of Library Information Science) B.A., English Literature | |
| Mr. Nick Hook, Senior Project Manager of Performance Assessment Services | As the Handscoring Manager , Mr. Hook will oversee all handscoring activities for the PA assessments. He will work closely with Mr. Payne and Dr. Baker to advise PDE about best practices in the areas of handscoring, including the implementation of scoring guidelines for new item types from a handscoring perspective to help ensure reliable scoring; facilitate schedules and resources so that adequate staffing is in place to complete handscoring sessions in a timely fashion; monitor handscoring sessions to ensure high quality results; collaborate with test development staff to ensure that handscoring reflects the criteria being assessed; and help the Content Specialists plan and implement rangefinding sessions and the development of training materials. | 80% | 20% | Woodbury Office | 23 yrs. | 23 yrs. | Mr. Hook has 23 years of experience working on large-scale assessment projects, including 21 years of experience working on Pennsylvania assessments. He has served as Handscoring Project Manager for the PSSA since 2010 and has collaborated with Mr. Payne to oversee the Keystone Exams since their inception. He has participated in new item review, as well as other item development meetings for both writing and ELA. He continues to play a role in the ongoing TDA study meetings with PDE and the Center for Assessment. Mr. Hook and Mr. Payne are currently collaborating on planning the fall 2015 item writing and handscoring training workshops with which Mr. Hook will be intricately involved. Prior to joining DRC, Mr. Hook has served as an editor and a substitute E.S.L. teacher, teaching adult English language learners. | B.A., Anthropology | Teaching English as a Second Language (T.E.F.L.) Certification |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Annie Van der Merwe , ELA Content Specialist | Ms. Van der Merwe will serve as an ELA Content Specialist , working on ELA handscoring activities. She will oversee the rangefinding and training materials development process for the PSSA Writing test to ensure that DRC develops handscoring training materials that will result in scores that reflect the guidance of the rangefinding committees and the criteria being assessed; plan and oversee handscoring for PSSA Writing to maintain timely and reliable handscoring results; and work closely with Ms. Peulen and Mr. Kobe as part of a team of PAS ELA Content Specialists collaborating on PA assessments, including the Keystone English Composition Exam and the ELA PBAs Performance Tasks, should those options be implemented. | 75% | 25% | Sharonville Office | 7 yrs. | 14 yrs. | Ms. Van der Merwe has 14 years of performance assessment experience. She has worked on the PSSA program for the last 13 years as a content specialist, scorer, team leader, and scoring director. She has participated in rangefinding, new item review, and data review meetings with educators from several states. Prior to joining DRC, Ms. Van der Merwe served as a high school language arts classroom teacher for fifteen years and as an assistant principal for two years. During both of these periods, Ms. Van der Merwe worked closely with the state department to refine rubrics, train groups of teachers to score language arts test items, and monitor quality of scoring. | Master's Degree in Linguistics Post Graduate Diploma in Education B.S., Education B.A., Liberal Arts | |

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| Mr. John Kobe, ELA Handscoring Content Specialist | Mr. Kobe will also serve as an ELA Content Specialist , working on ELA handscoring activities. He will oversee rangefinding and training materials development for the PSSA Text Dependent Analysis items and the grade 3 ELA constructed-response items. Mr. Kobe will oversee the ELA Scoring Directors to ensure that DRC develops handscoring training materials that will result in scores that reflect the guidance of the rangefinding committees and the criteria being assessed. He will plan and oversee handscoring for these items to maintain timely and reliable handscoring results. He will also collaborate with Van der Merwe and Ms. Peulen, providing a team of PAS ELA Content Specialists acting in concert on PA assessments, including the Keystone English Composition Exam and the ELA PBAs, should those options be implemented. | 75% | 25% | Woodbury Office | 12 yrs. | 12 yrs. | Mr. Kobe has worked on ten testing projects since joining DRC, including the PSSA since 2003. He has worked alongside DRC's test development department to give handscoring input at item development meetings with PDE. He has helped extensively with rubric editing for PSSA reading comprehension items. He also participated in the joint PDE/DRC item development workshops for the TDA and EBSR item-types. Prior to his work in educational assessment, he served as an editor and chief writer for eight years. | B.A., History | |

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| Ms. Melinda Peulen, ELA Handscoring Content Specialist | Ms. Peulen will also serve as an ELA Content Specialist , working on ELA handscoring activities. She will oversee rangefinding and training materials development for the Keystone Literacy Exams, ensuring that reliable handscoring sessions can begin with high quality handscoring training materials that reflect the guidance of the rangefinding committees and the criteria being assessed; plan and oversee handscoring for Keystone Literature to maintain timely and accurate handscoring results; and work closely with Ms. Van der Merwe and Mr. Kobe as a team of a PAS ELA Content Specialists team collaborating on PA assessments, including the Keystone English Composition Exam and the ELA PBAs, should those options be implemented. | 75% | 25% | Woodbury Office | 13 yrs. | 13 yrs. | Ms. Peulen has 13 years of Pennsylvania handscoring experience. She has overseen all handscoring and rangefinding activities associated with the Keystone Literature exam since its inception in 2010. She also oversaw rangefinding, training materials development, and handscoring for the Keystone Composition exams standalone field test. | M.A., Public and Nonprofit Administration B. A., English and Education | |
| Ms. Dorie Rieger, Senior Handscoring Manager | Ms. Rieger will serve as a Mathematics Content Specialist , working on Mathematics handscoring activities. She will collaborate with Ms. Lawler to oversee rangefinding and training materials development for PSSA Mathematics and the Keystone Algebra I Exams, as well as the mathematic PBA (should that option be implemented). Ms. Rieger and Ms. Lawler will oversee rangefinding sessions and the subsequent development of handscoring training materials. This will lead to handscoring sessions that reflect the guidance of the rangefinding committees and the criteria being assessed. They will plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 25% | Plymouth Office | 14 yrs. | 14 yrs. | Ms. Rieger has 14 years of experience working with the Pennsylvania assessments. She has served as a Content Specialist for PSSA since 2006 and for the Keystone Algebra I Exam since its inception. She continues to work closely with PDE to ensure timely and accurate handscoring efforts. She has also served as a scorer, team leader, and scoring director since joining DRC. | B.A., Allied Health | |

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| Ms. Roberta Lawler , Mathematics Handscoring Content Specialist | Ms. Roberta Lawler will also serve as a Mathematics Content Specialist , assisting with Mathematics handscoring activities. She will collaborate with Ms. Rieger to oversee rangefinding and training materials development for PSSA Mathematics and the Keystone Algebra I Exams, as well as the mathematics PBAs (should that option be implemented). Ms. Lawler and Ms. Rieger will also oversee all subsequent development of handscoring training materials, created to ensure that handscoring sessions reflect the guidance of the rangefinding committees and the criteria being assessed. Both Ms. Rieger and Ms. Lawler will plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 25% | Plymouth Office | 10 yrs. | 10 yrs. | Ms. Lawler has extensive experience in performance assessment, including 10 years of Pennsylvania-specific experience. She has served as mathematics Content Specialist from 2009 to present. During that time, she has been involved in mathematics training materials development for the PSSA and Keystone Exams including rubric development/editing. Prior to her time as a Content Specialist, Ms. Lawler served as a scorer, team Leader, and scoring director for an array of statewide testing programs, including the PSSA. | B.A., Biology Core | |
| Mr. Mark Szulczweski , Science Handscoring Content Specialist | Mr. Szulczweski will serve as the Science Content Specialist , working on all Science handscoring activities. He will oversee rangefinding and training materials development for PSSA Science and the Keystone Biology Exams; oversee rangefinding sessions and the subsequent development of handscoring training materials by Science Scoring Directors to ensure that training materials reflect the guidance of the rangefinding committees and the criteria being assessed; and plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 25% | Sharonville Office | 6 yrs. | 6 yrs. | Mr. Szulczweski has six years of experience working with Pennsylvania assessments. He has served as the Science Content Specialist for the PSSA and the Keystone Exams since 2001. Prior to serving as a Science Content Specialist, Mr. Szulczweski served in progressive roles, including reader, team leader, and scoring director. | B.S., Mechanical Engineering | Passed the Engineers in Training/ Fundamentals of Engineering Exam |

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| Ms. Vickie Lane, Science Handscoring Content Specialist | Ms. Lane will also serve as a Science Content Specialist , assisting with Science handscoring activities. She will collaborate with Mr. Szulczewski to oversee rangefinding and training materials development for PSSA Science and the Keystone Biology Exams. Mr. Szulczewski and Ms. Lane will also oversee all subsequent development of handscoring training materials, created to ensure that handscoring sessions reflect the guidance of the rangefinding committees and the criteria being assessed. Both Ms. Lane and Mr. Szulczewski will plan and oversee handscoring sessions that provide timely and accurate results. | 75% | 25% | Sharonville Office | 7 yrs. | 13 yrs. | Ms. Lane has 13 years of experience working with large-scale assessments, with a focus in the area of science. Before achieving her present job as Content Specialist, Ms. Lane served as a scorer, team leader, and scoring director for an array of testing projects, including the PSSA and Keystone Exams. | M.A., Education B.A., Education | |
| Mr. Jon Rodebaugh, Social Studies/ELA Handscoring Content Specialist | As a Civics & Government Content Specialist , Mr. Rodebaugh will work on all Social Studies handscoring activities (option 2 only). Mr. Rodebaugh will oversee rangefinding and training materials development for the Keystone Civics & Government Exam to ensure that training materials reflect the guidance of the rangefinding committees and the criteria being assessed. He will plan and oversee handscoring sessions that provide timely and accurate results. | 50% | 50% | Plymouth Office | 17 yrs. | 17 yrs. | Mr. Rodebaugh has 17 years of experience working with large-scale assessments, predominantly in the areas of social studies and ELA. Prior to his role as Content Specialist, Mr. Rodebaugh served as a scorer, team leader, and scoring director for more than ten large-scale testing projects, including the PSSA, for which he served as a scorer and team leader for seven years. | B.A., English | |
| INFORMATION SYSTEMS/TECHNOLOGY AND SOFTWARE QUALITY ASSURANCE | | | | | | | | | |
| INFORMATION SYSTEMS/TECHNOLOGY | | | | | | | | | |
| Mr. John Bandy, Chief Information Officer | As the Chief Information Officer , Mr. Bandy will provide executive-level guidance and support to all IS and SQA staff. | As needed | | Maple Grove Office | 5 yrs. | 10 yrs. | Mr. Bandy is an information systems executive with more than 29 years of experience leading large-scale, corporate initiatives. He provides leadership and direction to all of Information Services and Software Quality Assurance personnel who support all of our clients in DRC's Education, Surveys, and Document Services Divisions. He has been a champion of quality, process, and cost-effective delivery throughout his career. Mr. Bandy holds a B.S. in Computer Science. | B.S., Computer Science | |

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| Ms. Michelle Gronemeyer, Senior Director –Online Testing System | As the Senior Director–Online Testing Systems , Ms. Gronemeyer will oversee the technical tasks and issues that relate to design, development, implementation, and maintenance of the online assessments. | 20% | 80% | Maple Grove Office | 18 yrs. | 18 yrs. | Ms. Gronemeyer has more than 21 years of experience in the information systems field and has provided her expertise to the PSSA since 2000 and the Keystone Exams since 2010. She oversees program management and implementation of the DRC INSIGHT™ Online Learning System for DRC's online testing programs. She has performed requirements analysis and system design for numerous statewide assessments. She also led the effort to identify common requirements across all state-wide projects for DRC's shipping, receiving, operational, editing, and hand scoring processes. | M.B.A., concentration in Information and Decisions Sciences B.S., Business | Project Management Professional (PMP®) |
| Ms. Jonica Backes, Director Information Services | Ms. Backes will serve as the Online Testing Program Manager , ensuring all software elements work together to provide a full-featured online testing experience. | 20% | 80% | Maple Grove Office | 20 yrs. | 3 yrs. | Ms. Backes has 15 years of experience in information systems and over 20 years in project management. She currently oversees program management for the INSIGHT Online Test Delivery System. Ms. Backes is a seasoned program manager with experience and knowledge in agile development methodologies, web-based software, and education assessment systems. She has performed requirements analysis and system design for numerous projects and programs. | Cardinal Stritch University Milwaukee, WI B.S., Business Management St. Cloud State University St. Cloud, MN Computer Science and Math North Hennepin Community College Brooklyn Park, MN A.A., Liberal Arts | Scrum Master Scrum Alliance Indianapolis, IN |
| Mr. Jeremiah Tanner, Information Systems Director | As the IS Director–Online Testing , Mr. Tanner will oversee the implementation of online testing for the Pennsylvania assessments. | 20% | 80% | Plymouth Office | 18 yrs. | 4 yrs. | Mr. Tanner has over 18 years of information technology experience working in software development/engineering and information systems. Mr. Tanner has proven this ability in a technical leadership position in the development and support of a DRC enterprise system responsible for student data processing and reporting, as well as in management positions overseeing IS projects and the resources responsible for development of DRC INSIGHT. He has worked on the CDT for the past two years. | B.S., Computer Engineering Technology | |
| Ms. Emily Murray, IS Project Manager | As the IS Project Manager–eDIRECT , Ms. Murray will oversee the implementation of eDIRECT for the Pennsylvania assessments. | 20% | 80% | Maple Grove Office | 8 yrs. | 8 yrs. | Ms. Murray has extensive experience in all aspects of the product development lifecycle, including project plan development, requirements review, test creation and execution, customer feedback, design review, requirements traceability matrices, risk and issue tracking, test data collection, summarization, and presenting to executive management. She is an expert in agile and waterfall project management methodologies and is known for high-quality deliverables. | Business Systems Specialist Diploma | Certified Scrum Master Completed ACE Leadership Training |

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| Mr. Mark Bleckeberg, IS Director | As the IS Manager—eDM, IIS, and Ops MMS , Mr. Bleckeberg will manage DRC's imaging and handscoring systems. | 20% | 80% | Brooklyn Park (Wyoming) Office | 21 yrs. | 14 yrs. | Mr. Bleckeberg has over 21 years of experience in project management, program management, process improvement, business analysis, software development, and testing. For the last six years, he has managed projects in support of DRC's imaging system, handscoring system, and student data processing system. Prior roles include: IS manager, project manager, software developer, programmer, IT specialist, and student analyst. | B.S., Finance and Economics | Project Management Professional (PMP®) |
| Mr. Jim Fleming, Senior Director, IS Strategy, Architecture, and Technology | As the Senior Director, IS Strategy, Architecture, and Technology , Mr. Fleming will oversee the technology infrastructure, information security, security of all DRC systems, system process and standard as well as technology readiness support, including site readiness and assessment, if needed. | As needed | | Maple Grove Office | 31 yrs. | 2 yrs. | Mr. Fleming is an accomplished IS leader with more than 31 years of experience leading enterprise information management, enterprise architecture, applications development, information security, and infrastructure initiatives. Since joining DRC, Mr. Fleming has provided leadership and direction for DRC's Education, Surveys, and Document Services Divisions' infrastructure services, information security, enterprise architecture practice, and IT Service Management processes. | B.S., Management Information Systems, Minor in Management | Information Systems Analysis and Design Certificate ITIL Foundation Certificate in IT Service Management Certified Scrum Master |
| Mr. Damon Ray, Enterprise Architect | As an Enterprise Architect , Mr. Ray will work in conjunction with Mr. Ptak to oversee system architecture and design solutions for DRC's IS systems. | As needed | | Maple Grove Office | 16 yrs. | 14 yrs. | Mr. Ray has 16 years of experience with information systems, mainly focusing on software development and IS architecture. For the past five years, he has provided corporate guidance on software development, quality assurance, production support, and overall infrastructure. He has provided expertise to 25 testing projects, including the PSSA (since 2003) and the Keystone Exams (since 2010). | B.S.B., Management Information Systems | Associate Training—Computer Science Corporation |
| Mr. Kevin Ptak, Enterprise Architect | As an Enterprise Architect , Mr. Ptak will work in conjunction with Mr. Ray to oversee system architecture and design solutions for DRC's IS systems. | As needed | | Maple Grove Office | 16 yrs. | 8 yrs. | Mr. Ptak has more than 16 years of experience in software development. For the past five years, he has provided corporate guidance on software development, quality assurance, production support, and overall infrastructure. He has provided expertise to 20 testing projects, including the PSSA (since 2007) and the Keystone Exams (since 2009). Prior to joining DRC, Mr. Ptak worked on numerous software systems for the travel industry. | M.B.A. B.S., Computer Engineering | |
| Mr. Chad Ostergren, Information Security Systems Analyst | As the Information Security Analyst , Mr. Ostergren will certify the IT security of all DRC systems used in the Pennsylvania assessments. | As needed | | Maple Grove Office | 2 yrs. | <1 yr. | Mr. Ostergren conducts internal security assessments; plans and implements security controls to remediate security shortcomings and improve existing DRC security controls; operates network scanning tools to find network and computer vulnerabilities; and creates and rewrites DRC security policies, standards, and procedures. He has several years of experience in ISO certification, has had experience with certifications and audits for ISO 27001, ISO 9001, SOC 2, and PCI compliance and holds both implementation and internal audit certifications for ISO 27001. | B.S., Mass Communications, Minor in Art and Graphic Design Emphasis on Public Relations and News Editorial | |

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| Mr. Scott Koy , Senior Director of Information Systems | As the Senior Director of Information Systems , Mr. Koy will oversee all IS implementation and support services for the Pennsylvania assessments. | As needed | | Maple Grove Office | 31 yrs. | 13 yrs. | Mr. Koy has more than 31 years of experience providing information systems technology leadership in a variety of business sectors. For the last 13 years, Mr. Koy has directed Information Services work required to meet the needs of large-scale educational assessment projects, including project management, business analysis, system design, quality control, processing, and report production, for more than 35 testing projects, including multiple programs in Pennsylvania. | Mini-Master's in IT and IS Mini-Master's in Software Design and Development B.S., Computer Science, Minors in Mathematics and Management Information Systems | Project Management Professional (PMP®) |
| Ms. Gloria Aanenson , Manager of Education Information Systems | As an IS Manager , Ms. Aanenson will continue to oversee the PA project scope, budget, resources, and schedules and ensure all systems adhere to high-quality standards that meet PDE expectations. | 100% | 0% | Maple Grove Office | 25 yrs. | 16 yrs. | Ms. Aanenson has over 25 years of experience as an Information Systems Manager. Since joining DRC more than 16 years ago, she has been involved with multiple testing programs, including managing programs in Pennsylvania for more than 15 years. Prior to joining DRC, she served as an Information Technology Manager supporting network infrastructure, help desk, and user's hardware, nationwide, for over 400 sites. | A.A., Accounting | Project Management Professional (PMP®) |
| Ms. Joan Detzler , Associate IS Project Manager | As an Associate Project Manager , Ms. Detzler will develop project plans, direct and monitor work efforts, and escalate quality and timeline issues. She will track key milestones, mitigate project risks, and coordinate deliverables to the client and approved third parties. | 100% | 0% | Maple Grove Office | 14 yrs. | 8 yrs. | For over eight years, Ms. Detzler has been an integral part of the software development team at DRC. She has worked on programs in Pennsylvania for more than eight years, most recently serving in an IS project management role, developing and maintaining project schedules, monitoring the progress of project deliverables, and communicating project-related information. | M.S., Technical Communication B.S., Management Information Systems | |
| Mr. Scott Miller , Lead Support Analyst | As a Lead Support Analyst , Mr. Miller will create the system configurations to collect, process, score, and prepare the Pennsylvania Keystone Exams and CDT data for reporting. He will complete daily analysis of the data and resolve any data anomalies. He will provide backup to the PSSA project. | 100% | 0% | Maple Grove Office | 16 yrs. | 7 yrs. | Mr. Miller has 16 years of experience in the field of software development. He is an integral part of the software development team at DRC and was involved in the start-up of the Keystone Exams and CDT. Prior to joining DRC, Mr. Miller's experience included working on a variety of mainframe and PC applications in the financial services industry. | B.A., Computer Science, Minor in Mathematics | |

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| Mr. Alan Pecarina, Lead Support analyst | As a Lead Support Analyst , Mr. Pecarina will create the system configurations to collect, process, score, and prepare the PSSA data for reporting. He will complete daily analysis of the data and resolve any data anomalies. Mr. Pecarina will also provide backup to the Keystone Exams and CDT projects. | 100% | 0% | Maple Grove Office | 33 yrs. | 8 yrs. | Mr. Pecarina has 33 years of experience in the software development field and is an integral part of the software development team at DRC. Since 2007, he has worked on seven state testing projects in five states. Prior to joining DRC, Mr. Pecarina served as a programmer/analyst and an IT consultant. | | |
| Mr. Dan Steinback, Support Analyst | Mr. Steinbach will serve as a Support Analyst , working directly with his Lead Analyst to create custom solutions for Pennsylvania, including: data collection, materials, scoring, aggregations, data files, and pre-defined reports. | 100% | 0% | Maple Grove Office | 21 yrs. | 9 yrs. | Mr. Steinbach has over 21 years of software development, production support, and testing experience in the IT field. He is an integral part of the Pennsylvania team, monitoring and controlling the processing of programs to ensure the highest levels of service and system availability are attained. | Diploma in Data Processing | |
| Ms. Kellie Sinnott, Support Analyst | Ms. Sinnott will serve as a Support Analyst , working directly with her Lead Analyst to create custom solutions for Pennsylvania, including: data collection, materials, scoring, aggregations, data files, and pre-defined reports. | 100% | 0% | Maple Grove Office | 16 yrs. | 4 yrs. | Ms. Sinnott has more than 16 years of experience in software development and information technology. She has worked on the Keystone Exams and PSSA since 2012. Ms. Sinnott's past experience includes graphic/web design, central support analysis, and technical diagnosis and analysis. | A.A.S., Software Development | |
| Ms. Nona Davis, Senior IS Business Analyst | As a Senior Business Analyst , Ms. Davis will gather detailed business requirements, create functional specifications, and produce detailed reporting solutions. | 100% | 0% | Maple Grove Office | 33 yrs. | 14 yrs. | Ms. Davis has more than 33 years of experience in information technology. Since joining DRC, she has worked extensively on programs for Pennsylvania, functioning as the subject matter expert between PDE and the DRC team for accountability and required federal reporting measures reports. She is responsible for writing the requirements for individual student and reports, summary reports, adequate yearly progress, and required federal reporting measures reports. | | |
| Ms. Gail VonWahlde, Senior Business Analyst | As a Senior Business Analyst , Ms. VonWahlde will gather detailed business requirements, create functional specifications, produce detailed data file layouts, and perform user acceptance testing on all data files. | 100% | 0% | Maple Grove Office | 20 yrs. | 3 yrs. | Ms. VonWahlde has over 20 years of experience in analysis, programming, and technical writing. Ms. VonWahlde has worked on testing programs in Pennsylvania since joining DRC. She is responsible for writing requirement documents to define all scoring and processing rules at the student and summary levels, tracking future enhancements to the system and tests, and checking data files for accuracy. | B.S., Computer Science | |

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| SOFTWARE QUALITY ASSURANCE | | | | | | | | | |
| Mr. Tom Boatman, Senior Director, SQA | As the SQA Senior Director , Mr. Boatman will oversee all aspects of software quality assurance for the Pennsylvania assessments. | 20% | 80% | Maple Grove Office | 16 yrs. | 11 yrs. | Mr. Boatman has more than 16 years of software testing and quality assurance experience, including extensive work on user acceptance testing for the Minnesota Department of Education, and 13 years of experience with statewide testing programs, including those for Pennsylvania. Since joining DRC, Mr. Boatman has worked on more than 30 state testing projects. Prior roles include: supervisor, data and reporting; software quality assurance manager; senior software quality assurance analyst; software test engineer; and software test consultant. | B.A., Social Studies and French Education | Twin Cities Quality Assurance Association (TCQAA) Certified Quality Analyst (CQA) Certified Software Test Engineer (CSTE) |
| Mr. Kyle Randolph, Software Quality Assurance Director | Mr. Randolph will serve as the SQA Director–eDIRECT, DRC INSIGHT, and IDEAS Application Development , overseeing software quality assurance for all DRC software systems. | 20% | 80% | Maple Grove Office | 17 yrs. | 6 yrs. | Mr. Randolph has more than 17 years of experience working with software systems. For the last two years, he has led the effort to validate the proper and efficient function of DRC's online education systems. Since joining DRC, he has worked on more than 20 state testing projects, including the CDT, PSSA, and Keystone Exams. | Mini MBA for Technical Professionals B.S., Biology | |
| Ms. Erin Bayer, Software Quality Assurance Manager | As the SQA Manager , Ms. Bayer will oversee software quality assurance for all operational aspects of our work for the PA assessments, including scoring, reporting, and data files. | 50% | 50% | Maple Grove Office | 11 yrs. | 10 yrs. | For the last three years, Ms. Bayer has ensured adherence to quality processes for eight large-scale assessment projects, including the PSSA and Keystone Exams. In addition to her work on state teams, Ms. Bayer has been closely involved in software quality assurance for DRC's item banking system, the Item Development and Educational Assessment System (IDEAS), along with the DRC's customer service database system, known as the Education Project Information Center (EPIC). | B.A., Management Information Systems, Minor in Business Management A.A. | Twin Cities Quality Assurance Association (TCQAA) |
| Mr. Kirk Dukatz, Software Quality Assurance Manager | As the SQA Manager–Imaging, Handscoring, and Autoscoreing , Mr. Dukatz will oversee software quality assurance for DRC's imaging, performance assessment, and auto-scoring systems. | 20% | 80% | Brooklyn Park (Wyoming) Office | 14 yrs. | 12 yrs. | Mr. Kirk Dukatz has more than 14 years of experience in the software quality assurance (SQA) field. His project experience includes: developing and administering test scripts; test automation and load/performance testing; performing defect classifications and severity assessments; and developing SQA process flows and guidelines encompassing all phases of a project. | | Network Support Specialist Certified Scrum Master |
| Mr. Timothy Hettwer, Software quality Assurance Manager-eDIRECT | Mr. Hettwer will serve as the SQA Manager–eDIRECT, DRC INSIGHT, and IDEAS , overseeing software quality assurance for eDIRECT, DRC INSIGHT, and IDEAS. | 30% | 70% | Maple Grove Office | 15 yrs. | 13 yrs. | Mr. Hettwer has 15 years of experience in quality assurance. Since joining DRC, Mr. Hettwer has performed software quality assurance functions on a number of statewide assessments in Alabama and South Carolina. Mr. Hettwer has also provided software quality assurance testing and support for the DRC Image Scanning and Scoring System, Operations Materials Management System, eDIRECT System, and Web Based Test Engine. | B.S., Finance | Twin Cities Quality Assurance Association |
| Mr. Kevin Swenson, Senior Software Quality Assurance Analyst | As a Senior SQA Analyst , Mr. Swenson will verify the quality of scoring and reporting processes for the Keystone Exams and CDT. | 100% | 0% | Maple Grove Office | 14 yrs. | 17 yrs. | Mr. Swenson has 14 years of experience in software quality assurance. He is responsible for developing and managing test scripts, plans, and schedules for other software quality assurance (SQA) analysts. Mr. Swenson has provided his SQA expertise for seven assessment projects, including the PSSA, and for DRC's internal Ops MMS Program and the Imaging System and Testing Program. | B.S., Industrial Management with a focus in Business A.A.S., Information Technology | Twin Cities Quality Assurance Association |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Joanna Kuhn, Senior Software Quality Assurance Analyst | As a Senior SQA Analyst , Ms. Kuhn will lead operational software processes across the PA assessments systems. She will oversee scheduling, requirements reviews, and quality checking DRC's online systems. | 100% | 0% | Maple Grove Office | 21 yrs. | 13 yrs. | Ms. Kuhn has over 21 years of experience as a software quality assurance analyst. Since joining DRC, Ms. Kuhn has contributed her expertise to nine testing projects, including the PSSA since 2003. Most recently, Ms. Kuhn has been designing and implementing processes for quality standards, controls, test plans, schedules, and procedures. | | |
| Mr. Daniel Braun, Software Quality Assurance Analyst | As a SQA Analyst , Mr. Braun will assist in verifying the quality of software processes of the Pennsylvania assessments. | 100% | 0% | Maple Grove Office | 3 yrs. | 3 yrs. | Mr. Braun has helped develop and enhance many testing processes used to verify testing materials, reports, and applications with great accuracy, for testing projects in Pennsylvania and Washington. This includes such items as Pre-ID Labels, District/School Labels, ISRs, Summary Reports, and the scoring system used to calculate students' results. | B.S., Computer Science and Information Systems, Minor in Mathematics | |
| Ms. Macey Robertson, Software Quality Assurance Analyst | As a SQA Analyst , Ms. Robertson will support Ms. Kuhn in all aspects of DRC's software testing processes. | 50% | 50% | Maple Grove Office | 5 yrs. | 3 yrs. | Since joining DRC, Ms. Robertson has been responsible for reviewing requirements, testing data, coding, reporting issues, ensuring professional look of state reports, and testing software for eight testing projects, including the PSSA and Keystone Exams. Prior to joining DRC, Ms. Robertson served as a business analyst at Infinite Campus, a student information system vendor, where she worked closely with the Department of Education in four states to ensure expectations and standards for federal student reporting were met. | M.S., Information and Communication Technologies B.A., Psychology | |
| Ms. Brandi Lashinski, Software Quality Assurance Analyst | As a SQA Analyst , Ms. Lashinski will support Ms. Kuhn in all aspects of DRC's software testing processes. | 30% | 70% | Maple Grove Office | 3 yrs. | 3 yrs. | Since joining DRC, Ms. Lashinski has helped develop and enhance many testing processes used to verify testing materials and reports with great accuracy, for programs in Pennsylvania. This includes items such as Pre-ID Labels, Range Sheets, District/School Labels, ISRs, Summary Reports, and Data Files. | B.S., Statistics with emphasis in Actuarial Science, Minor in Economics | |
| OPERATIONS | | | | | | | | | |
| Mr. Doyle Kirkeby, Senior Vice President of Operations | As the Operations Advisor , Mr. Kirkeby will provide executive-level oversight of all the operations functions. | As needed | | Maple Grove Office | 30 yrs. | 20 yrs. | Mr. Kirkeby has over 40 years of experience in corporate operations management and software development. He has effectively implemented projects and managed staff for a variety of corporate clients. | A.A., Computer Programming/Data Processing Management | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
|----------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|-----------------------------------------------|---------------------------|--------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Ms. Ginny Burnett, Senior Director of Operations—Education | As the Senior Director of Operations—Education , Ms. Burnett will oversee the scanning and editing of all answer documents. | As needed | | Brooklyn Park (Wyoming) Office | 29 yrs. | 15 yrs. | Ms. Burnett has over 29 years of experience in operations activities and has implemented significant quality assurance procedures in the Operations environment at DRC, expanding the use of technology as it applies to scanning functions, updating systems, and providing staff training on new equipment. She has worked on more than 40 testing projects, including the Keystone Exams, PSSA, and PSSA Modified Assessment. | | <1,650 hours of training in Management, Quality (Green Belt, Black Belt), Project Management, Customer Workouts, Team Building and Revitalization, Process Improvement, Product Development, Customer Service, and numerous technical applications. |
| Mr. Doug Miller, Senior Director of Materials Operations and Logistics | As the Senior Director of Materials Operations and Logistics , Mr. Miller will oversee all of the packaging, distribution, receipt, and processing of test materials. | As needed | | Brooklyn Park (Boone Ave and Wyoming) Offices | 15 yrs. | 21 yrs. | Mr. Miller has successfully fulfilled all DRC materials delivery commitments for more than 15 years. Since joining DRC, he's worked on more than 40 projects, in 15 states, including Pennsylvania, serving as a materials processor, materials processing lead, production team leader, materials manager, director of materials operations, and most recently, Senior Director of Materials Operations and Logistics. | B.A., English and Psychology | |
| Mr. Joseph Pavlik, Director of Operations | As the Director of Operations , Mr. Pavlik will oversee all aspects of scannable forms production including: scheduling, pre-press, and print production for the Pennsylvania assessments. | As needed | | Maple Grove Office | 34 yrs. | 11 yrs. | Mr. Pavlik has more than 10 years of experience as Director of Operations at DRC. For more than 30 thirty years, Mr. Pavlik has provided industry-related experience in production management, recruitment, staff training, quality control and accuracy analysis, plant operations, coaching and counseling, performance development, and improved service implementation. His employment record includes printers in the top Fortune 500 companies. | A.A., Commercial Art, Illustration | Certification in Digital Printing |
| Mr. Kurt Langer, Senior Manager, Materials Operations | As the Senior Manager, Materials Operations , Mr. Langer will oversee the day-to-day operations of the packaging and receiving of materials, ensuring that all customized PA requirements are met. | As needed | | Brooklyn Park (Boone Ave and Wyoming) Offices | 26 yrs. | 5 yrs. | Mr. Langer has over 26 years of experience in Education and Commercial Survey processing arena. He has led a variety of departments including, logistics/transportation, warehouse/inventory, purchasing, OMR/image scanning, data prep, and field service parts distribution, and has served as an Oracle process owner. | | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
|----------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|----------------------------------|---------------------------|--------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| Mr. Mike Janikowski , Senior Logistics Specialist | As the Senior Logistics Specialist , Mr. Janikowski will oversee all outbound and inbound shipments for the Pennsylvania assessments, facilitating communication with carriers and ensuring problem resolution for delivery or pick-up issues. He will also help develop and maintain delivery and receipt plans. | As needed | | Brooklyn Park Office (Boone Ave) | 38 yrs. | 2 yrs. | Mr. Janikowski has more than 36 years of logistics experience. Since joining DRC, he has provided safe and cost effective outgoing and incoming transportation and coordinated shipment with carriers, audited freight bills, prepared, negotiated, and monitored claims, freight rates, and carrier penalties for work on all of DRC's current programs, including the Keystone Exams and PSSA. His long history working with UPS makes his oversight of Pennsylvania especially effective due to the large volume of materials UPS handles for their projects. | | Over 80 internal UPS training courses, including many annual certifications |
| QUALITY MANAGEMENT | | | | | | | | | |
| Ms. Lisa Peterson-Nelson , Chief Quality Officer | As the Chief Quality Officer , Ms. Peterson-Nelson will provide executive-level oversight of all quality processes and standards. | As needed | | Maple Grove Office | 6 yrs. | 14 yrs. | Ms. Peterson-Nelson has an engineering and operations management background spanning over 31 years across several Fortune 100 corporations. She has led, developed, and implemented quality measurement systems and monitoring processes within these organizations, including Six Sigma quality approaches and processes. | M.S. in Operations Management B.S. in Electrical Engineering | |
| Dr. Richard Kohr , Program Consultant, Statewide Assessments | Dr. Kohr will serve as a Data Quality Consultant , writing and reviewing reports for the PSSA and Keystone Exams and reviewing final data files for accuracy. | As needed | | Harrisburg Office | 44 yrs. | n/a | Dr. Richard Kohr has more than 41 years of experience in all phases of large-scale educational assessment. For the past 12 years, Dr. Kohr has served as a Program Consultant, Statewide Assessments at DRC, working on the PSSA and the Keystone Exams. Prior to this, Dr. Kohr worked for PDE for more than 30 years, where he was involved in all aspects of test development. He also served as a university lecturer, adjunct professor, research associate, graduate assistant, and diagnostic assistant. In addition to his educational experience, Dr. Kohr is a retired, licensed psychologist. | Ph.D., Educational Psychology M.S., Educational Research B.A., Psychology, Minor in Mathematics | Psychologist: Licensed for independent practice in Pennsylvania |
| ASSESSMENT SUPPORT PERSONNEL | | | | | | | | | |
| Ms. Sandra Wiese , Senior Vice President, Business Development and Government Affairs | As the Senior Vice President, Business Development and Government Affairs , Ms. Wiese manages government affairs and follows education policy on behalf of DRC, and co-leads business development efforts for DRC. | As needed | | Maple Grove Office | 21 yrs. | 11 yrs. | Ms. Wiese is a senior attorney, with more than 21 years of experience in government affairs, education policy, corporate law, and small business assistance. Prior to joining DRC, she worked in the federal government as the chief of staff of the U.S. Small Business Administration in Washington, D.C. and in state government as the chief of staff to the Wisconsin Senate Minority Leader. Ms. Wiese also served in senior-level positions in Government Affairs and Law with two Fortune 500 companies. | Juris Doctorate B.A., Political Science | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Dr. Pat Roschewski , Vice President, Education Solutions | As Vice President, Educational Solutions , Dr. Roschewski provides direction for DRC's new product offerings and works with DRC's education clients to identify needs, track trends in accountability and assessment, and monitor innovations in the industry. | As needed | | Maple Grove Office | 46 yrs. | 3 yrs. | Dr. Roschewski has 46 years of experience serving as an administrator, college professor, and classroom teacher. Prior to joining DRC, Dr. Roschewski served as director of statewide assessment for the Nebraska Department of Education for 12 years. She has served on many regional, state, and national committees and task forces advising state and national policy makers on issues of curriculum, instruction, assessment data, and accountability. | Ph.D., Administration, Curriculum and Instruction M.S., Curriculum and Instruction with gifted endorsement B.S., Education with distinction | Specialist's Certification of Superintendency |
| Ms. Pam Enstad , Senior Director, Marketing Communications | As Senior Communications Director , Ms. Enstad will collaborate with PDE on messaging and communications support, including providing counsel on the best communications strategies and tactics to reach key stakeholders. | As needed | | Maple Grove Office | 26 yrs. | 8 yrs. | Ms. Enstad has over 26 years of experience leading marketing communications initiatives for large and medium-sized corporations as well as start-up technology companies. Her extensive experience covers a broad range of communications disciplines, including business-to-business and consumer marketing, corporate communications, technical communications, media relations, and issues management. Throughout her career, Ms. Enstad has served as a company spokesperson and has been quoted in numerous business, consumer, and trade publications. | B.A., Journalism | |
| Dr. Jennifer Norlin-Weaver , Senior Director, Educational Marketing | As Senior Director, Educational Marketing , Dr. Norlin-Weaver will support PDE through formulating strategic direction, market and research analysis, and product planning. | As needed | | Maple Grove Office | 36 yrs. | 3 yrs. | Dr. Norlin-Weaver has worked in the areas of Curriculum, Assessment, Instruction, and Professional Development for over 36 years in local, national, and international settings. Prior to assuming district administrative roles, she was an elementary and middle school classroom teacher and led programs in the areas of Title I and Gifted and Talented. As an Assistant Professor with local graduate programs, Dr. Norlin-Weaver works primarily with aspiring administrators focused on leadership in curriculum, assessment, and instruction. | Ed.D., Educational Policy and Administration Ed.S., Licensed as a Principal and a Superintendent M.Ed., Curriculum and Instructional Systems B.A., Elementary Education | MINNSPRA Publications-Print Award Minnesota Staff Development Council Service Award Gates Foundation Technology Leadership Fellow |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at DRC | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Billie Kay Kraus , Director of Education Solutions | As Director of Education Solutions , Ms. Kraus will track and monitor relevant legislation, regulation, and education policy in Pennsylvania and serve as an integral member of the Pennsylvania project management team. | As needed | | Harrisburg Office | 26 yrs. | n/a | Ms. Billie Kay Kraus has more than 26 years of experience in a career spanning work at the Pennsylvania legislature, Pennsylvania Schools Boards Association, and the Pennsylvania Department of Education, and Data Recognition Corporation. Prior to joining DRC, Ms. Kraus' experience included formulating education legislation and policies while at the Pennsylvania House of Representatives. Ms. Kraus also used her knowledge and expertise in Pennsylvania education while serving as the registered lobbyist for the Pennsylvania School Boards Association and while serving as the director of Community College Affairs at the Pennsylvania Department of Education. | B.S., Education | |
| DRC'S EXECUTIVE TEAM (For those not already listed) | | | | | | | | | |
| Ms. Susan Engeleiter , Chief Executive Officer and President | As the Chief Executive Officer and President , Ms. Engeleiter leads the organization and manages the day-to-day operations of DRC's three divisions (Education Services, Survey Services, and Document Services). She is responsible for business planning and development that includes strategic investments, acquisitions, and partnerships. | As needed | | Maple Grove Office | 41 yrs. | 16 yrs. | Ms. Engeleiter has more than 40 years of experience. She has established a strong track record of driving innovation and expanding technology solutions within DRC. Her primary focus has been to create and improve processes within DRC and to keep pace with evolving customer needs and the increasing demand for our company's services. Ms. Engeleiter was appointed to direct and manage the U.S. Small Business Administration in Washington, D.C. She served as a State Senator for Wisconsin's 33rd District and Senate Minority Leader. | Juris Doctor B.S., English and Communications, Teaching Degree | Ms. Engeleiter belongs to numerous professional and civic organizations, and has received many service awards |
| Mr. Lonny Wittnebel , Chief Financial Officer | As DRC's Chief Financial Officer , Mr. Wittnebel leads the finance and accounting functions for DRC. | As needed | | Maple Grove Office | 34 yrs. | 5 yrs. | Mr. Wittnebel is a proven leader and manager of critical business processes, with broad-based financial planning, analysis and accounting expertise complemented by strong management information systems and internal operations experience in global, technology-oriented firms. Prior to joining DRC, Mr. Wittnebel served as vice president of finance and IT (CFO) at Paddock Laboratories, Inc. for nine years. | M.B.A., Management Information Systems B.S., Accounting | Generic Pharmaceutical Association Finance and Technology Committee The Collaborative CFO Work |
| Ms. Jennifer Eastman , General Counsel and Senior Vice President of Contract Management and Human Resources | As the General Counsel and Senior Vice President of Contract Management and Human Resources , Ms. Eastman leads the contract management process for the negotiation and implementation of contracts for DRC. She is also responsible for all aspects of DRC's human resources function, including: employee recruitment and retention, health and wellness benefits, compensation, and employee relations | As needed | | Maple Grove Office | 31 yrs. | 6 yrs. | Ms. Eastman is a senior attorney with over 31 years of experience in corporate law and contract management. Ms. Eastman has extensive in-house experience in contract management and transactions in federal and commercial contracting for aerospace and energy conservation programs. Prior to joining DRC, she worked on the internal counsel team at Honeywell International Inc., where she gained expertise in counseling an international sales force on deal structures, contract formation, and regulatory and compliance matters. | Juris Doctor B.A., Liberal Arts and Education & Child Study | Minnesota State Bar Six Sigma: Green Belt certified and Black Belt trained |

eMetric's Personnel Experience by Key Position

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at eMetric | Other Relevant Experience | Education | Other Professional Qualifications |
|-------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|-----------------|---------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------|
| Dr. Huixing Tang, President | As a Psychometric Consultant , Dr. Tang will provide support for research studies and other psychometric activities under the contract. As the President and Founder of eMetric , Dr. Tang will also provide leadership support for all eMetric products and services. | 10% | 90% | San Antonio, TX | 14 yrs. | 14 yrs. | Dr. Tang leads eMetric and provides the company with its overall direction and vision based upon 20 years of psychometric and measurement experience. | Ph.D. Measurement and Statistics M.A. Linguistics | AERA, NCME |
| Mr. Vamsi Mukkamala, Vice President of Information Technology | As Vice President of Information Technology , Mr. Mukkamala will provide leadership for the Software Development and Engineering team. | 10% | 90% | San Antonio, TX | 5 yrs. | 11 yrs. | Mr. Mukkamala designs and architects enterprise level applications. | M.S. Information Technology B.T. Information Technology | |
| Ms. Dixie Knight, Vice President of Operations | As Vice President of Operations , Ms. Knight will provide leadership for business operations, including Project Management, Quality Assurance, and Support. | 10% | 90% | San Antonio, TX | 1.5 yrs. | 1.5 yrs. | Ms. Knight provides leadership to implement organization plans through effective and deliberate use of data and technology. | M.B.A. Management of Technology B.B.A Business | |
| Dr. Nathan Wall, Research Scientist | As a Research Scientist , Dr. Wall will provide psychometric support to the contract, including the third party equating verification. | 10% | 90% | Marion, IA | 3.5 yrs. | 3.5 yrs. | Dr. Wall manages an assessment portal project and provides psychometric support. | Ph.D. Educational Measurement and Statistics M.S. Sociology | NCME |
| Mr. Darsan Tatineni, IT-Project Manager | As the IT-Project Manager , Mr. Tatineni will manage the development of the entire line of Data Interaction (DI) products. | 36% | 64% | San Antonio, TX | 10 yrs. | 10 yrs. | Mr. Tatineni manages and leads a development team to create and customize implementations of DI for a variety of clients and works with business-side project managers to collect and develop client-specific requirements. | M.S. Computer Science and Engineering B.S. Information Science and Engineering | |
| Mr. Neil Gandhi, IT-Project Manager | As the IT-Project Manager , Mr. Gandhi will manage the development of the entire line of Data Interaction (DI) products. | 20% | 80% | San Antonio, TX | 11 yrs. | 11 yrs. | Mr. Gandhi manages and leads a development team to create and customize implementations of DI for a variety of clients and works with business-side project managers to collect and develop client-specific requirements. | M.S. Information Technology B.S. Computer Science | Business Foundations Certificate (McCombs School of Business, University of Texas at Austin) |
| Ms. Zhubi You, Software Engineer | As a Developer , Ms. You will design, develop, and maintain reporting software. | 39% | 61% | San Antonio, TX | 1 yrs. | 1 yr. | Ms. You develops and engineers all of eMetric's reporting applications. | B.S. Computer Science | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at eMetric | Other Relevant Experience | Education | Other Professional Qualifications |
|----------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|-----------------|---------------------------|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------|----------------------------------------------------|
| Mr. Phikhanh Nguyen, Lead Developer | As a Developer , Mr. Nguyen will design, develop, and maintain reporting software. | 39% | 61% | San Antonio, TX | 5 yrs. | 6 yrs. | Mr. Nguyen develops custom versions of eMetric's Data Interaction platform. In addition, he identifies feature and architectural improvements to existing software. | B.S. Computer Science | |
| Mr. Tham Tjiputra, Lead Developer | As a Developer , Mr. Tjiputra will design, develop, and maintain reporting software. | 22% | 78% | San Antonio, TX | 6 yrs. | 9 yrs. | Mr. Tjiputra develops and engineers custom reporting applications. | B.S. Computer Science | |
| Mr. Bailey Landress, Software Engineer | As a Developer , Mr. Landress will design, develop, and maintain reporting software. | 17% | 83% | San Antonio, TX | >1 yr. | > 1 yr. | Mr. Landress develops and engineers custom reporting applications. | B.S. Computer Science | |
| Mr. Yongkang Hong, Database Analyst | As a Database Analyst , Mr. Hong will analyze, develop, and maintain databases. | 40% | 60% | San Antonio, TX | 6 yrs. | 6 yrs. | Mr. Hong designs and implements high-quality ETL solutions for database deliverables on several of eMetric's projects. | M.S. Applied Statistics B.S. Computer Science | Oracle Certified DBA Oracle Certified Developer |
| Mr. Amiras Gandhi, Database Analyst | As a Database Analyst , Mr. Gandhi will analyze, develop, and maintain databases. | 40% | 60% | San Antonio, TX | 4.5 yrs. | 4.5 yrs. | Mr. Gandhi designs and maintains high-quality ETLs for eMetric's DI and testing portal platforms. | M.S. Computer Science B.E. Computer | |
| Mr. Ryan Rasti, Quality Assurance Engineer | As a Quality Assurance Engineer , Mr. Rasti will conduct Quality Assurance tests of developed and released products. | 17% | 83% | San Antonio, TX | > 1 yr. | 4 yrs. | Mr. Rasti provides infrastructure support for all of eMetric's operations. | B.B.B. Information Systems | |
| Ms. Swati Cherukuri, Quality Assurance Manager | As Quality Assurance Manager , Ms. Cherukuri will lead the Quality Assurance group that develops test and verification plans and tests applications, and will maintain the quality of release products. | 18% | 82% | San Antonio, TX | 5 yrs. | 7 yrs. | Ms. Cherukuri develops and maintains QA standards, test procedures, and test cases. She uses Selenium, QTP, SAS, and SQL to conduct QA checks on all of eMetric's products. | B.T. Computer Science and Engineering | |
| Mr. Fang Zhang, Quality Assurance Analyst | As a Quality Assurance Analyst , Mr. Zhang will conduct Quality Assurance tests of developed and released products. | 18% | 82% | Austin, TX | > 1 yr. | 2 yrs. | Mr. Zhang conducts automated regression testing and manual black-box testing of eMetric products. Involved in QA documentation and process improvement | B.B.A. Information Systems | |
| Ms. Summer Li, Quality Assurance Analyst | As a Quality Assurance Analyst , Ms. Li will conduct Quality Assurance reviews of developed and released products. | 18% | 82% | San Antonio, TX | 2 yrs. | 2 yrs. | Ms. Li conducts quality assurance of eMetric's portal solutions and newest version of Data Interaction. | M.S. Industrial Engineering M.S. Automation of Electronic Engineering B.S. Automation of Electronic Engineering | |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at eMetric | Other Relevant Experience | Education | Other Professional Qualifications |
|---------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|-----------------|---------------------------|------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------|-----------------------------------|
| Ms. Abbie Currier, Program Manager | As the Program Manager , Ms. Currier will oversee day-to-day operations and Project Management. | 21% | 79% | San Antonio, TX | 5 yrs. | 3 yrs. | Ms. Currier manages several of eMetric's test administration/delivery and data warehousing and reporting contracts. She provides user training and support. | B.A. General Studies in English Literature, English Composition, and Women's Studies | |
| Ms. Jessica Brite, Business Analyst | As a Business Analyst , Ms. Brite will provide business documentation, including requirements gathering and specification documents. | 18% | 82% | San Antonio, TX | 1 yrs. | 1 yr. | Ms. Brite collaborates with the Program Manager, clients, and developers to collect detailed requirements for solutions. | M.S. Psychology B.A. Psychology | |
| Ms. Kaelee Harper, Support Specialist | As a Support Specialist , Ms. Harper will provide support to users and clients for released products. | 8% | 92% | San Antonio, TX | 1 yrs. | 1 yr. | Ms. Harper provides level 1 support for several eMetric products. | B.A. Business Administration | |
| Ms. Starre Lindgren, Support Specialist | As a Support Specialist , Ms. Lindgren will provide support to users and clients for released products. | 8% | 92% | San Antonio, TX | 2 yrs. | 2 yrs. | Ms. Lindgren provides level 1 support for several eMetric products. | B.B.A. Management (Expected May 2015) | |

Victory Production's Personnel Experience by Key Position

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at Victory | Other Relevant Experience | Education | Other Professional Qualifications |
|-----------------------------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|--------------------------|-----------------|---------------------------|------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------|--------------------------------------------------------------------------------------|
| Mr. David Markson, Item Development Specialist | Mr. Markson will serve as the ELA Item Development Manager , carefully reviewing and analyzing PDE's item specifications and writing guidelines. Mr. Markson will synthesize this information, disseminate the necessary criteria to the writers, and provide specification overview training to the item writing team. He will carefully review each item provided by the writers, assessing how well the item addresses the intended standard, meets the guidelines, and is grade appropriate. If any issues arise, Mr. Markson will determine the most effective way to address the concern (outliers, cluing, non-alignment, etc.). If revisions are needed, he can direct in-house staff to make edits or return the item to the writer with directions for improvements. | 100% | 0% | San Antonio, TX | 18 yrs. | 3 yrs. | Mr. Markson has 30 years of reading and language arts test development experience across all grade levels. Over the years he has worked on assessment programs in more than 30 states. In all projects, Mr. Markson has applied not only his expertise in creating career- and college-ready items and in managing a team process for development of items, but also his firsthand experience he has gained as a classroom teacher and in his work with teachers in passage and item review workshops. Mr. Markson is keenly familiar with the Career- and College- Readiness standards, and is well versed in the best practices for creating high-stakes assessment items. | M.A. in Education/Reading Specialist | The International Reading Association The National Council of Teachers of English |
| Dr. Michael Avidon, Item Development Specialist | Dr. Avidon will serve as the Mathematics Item Development Manager , carefully reviewing and analyzing PDE's item specifications and writing guidelines. Dr. Avidon will synthesize this information, disseminate the necessary criteria to the writers, and provide specification overview training to the item writing team. He will carefully review each item provided by the writers, assessing how well the item addresses the intended standard, meets the guidelines, and is grade appropriate. If any issues arise, he will determine the most effective way to address the concern (outliers, cluing, etc.). If revisions are needed, he can direct in-house staff to make edits or return the item to the writer with directions for improvements. | 90% | 10% | Worcester, MA | 8 yrs. | 5 yrs. | Mr. Avidon has eight years of mathematics test development experience across grades 3–12. He is an accomplished mathematician whose career includes teaching, writing, and assessment item development. Michael has eight years of experience with mathematics content development and item writing, including work on nationally recognized programs with Pearson/Prentice Hall. Mr. Avidon is keenly familiar with the Career- and College-Readiness standards and is well versed in the best practices for creating high-stakes assessment items. | Ph.D. in Mathematics | Commonwealth of Massachusetts— Mathematics (grades 8–12) |

| Personnel Name/Title | Position | % Time on PA Programs | % Time on other Programs | Location | Years in Similar Position | Years at Victory | Other Relevant Experience | Education | Other Professional Qualifications |
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| Ms. Patty Kreikemeier , Item Development Specialist | Ms. Kreikemeier will serve as the Science Item Development Manager . She will carefully review and analyze PDE's item specifications and writing guidelines. She will synthesize this information, disseminate the necessary criteria to the writers and provide specification overview training to the item writing team. She will carefully review each item provided by the writers, assessing how well the item addresses the intended standard, meets the guidelines, and is grade appropriate. If any issues arise, Ms. Kreikemeier will determine the most effective way to address the concern (outliers, clueing, etc.). If revisions are needed, she can direct in-house staff to make edits or return the item to the writer with directions for improvements. | 100% | 0% | Norfolk, NE | 21 yrs. | 1 yr. | Ms. Kreikemeier has nearly 20 years of science test development experience across all grade levels. She is experienced in all facets of assessment development. Recently working as an independent consultant specializing in science curriculum, assessment, and standards, Ms. Kreikemeier has demonstrated a wealth of proficiencies from research to professional training. Her work encompasses designing, revising, and developing test items, including technology-enhanced items; creating test forms and blueprints; and participating in NSF-funded research on assessments. Ms. Kreikemeier is keenly familiar with the career- and college-readiness standards and is well versed in the best practices for creating high-stakes assessment items. | M.S. in Developmental Biology | |



SECTION 6. TRAINING (REDACTED)

Data Recognition Corporation (DRC) is excited to provide training opportunities for Pennsylvania Department of Education (PDE) staff members. DRC proposes holding training sessions regarding several of DRC's systems, as well as training on eMetric's Data Interaction™. DRC will work with PDE and develop additional training, as needed, for PDE staff throughout the contract.

eDIRECT Training

DRC proposes to provide hands-on training sessions to PDE related to various aspects of eDIRECT, DRC's online assessment management portal for educators and PDE. eDIRECT is a robust system that contains most of the tools that school and district personnel need to successfully administer the Pennsylvania System of Assessments.

The eDIRECT training for PDE staff will take place at a location of PDE's choosing, and will last 2–3 hours, to up to a day, for each session. Sessions can be combined, based on PDE preferences. During these hands-on training sessions, participants will be able to navigate sections of the site on their own and practice using the system with training data. Participants will also be provided hardcopies of the training PowerPoint and copies of any applicable eDIRECT user guide(s) that go with each training session. DRC recommends that the eDIRECT training sessions occur in year one of the contract. Depending on PDE's availability and preferences, subsequent sessions can be held face-to-face, or via WebEx, a widely-used online meeting software.

GENERAL eDIRECT TRAINING

In the General eDIRECT Training, two DRC Program Management staff members will walk through the various aspects of the eDIRECT system, including navigation and managing eDIRECT users. DRC proposes to spend time covering user permissions, an important security aspect of the eDIRECT system. Additionally, DRC recommends covering the Enrollments part of the system. Enrollments is where district and school contact information is housed. It used by district personnel to identify quantities for each test and accommodated materials.

DRC estimates that this training will take 2–3 hours. DRC recommends that the General eDIRECT Training occur early in year one of the contract. Subsequent sessions can be held as needed, based on the needs of PDE staff. Follow-up training sessions can be held via WebEx, if preferred.

eDIRECT TEST SETUP TRAINING

The eDIRECT Test Setup Training will focus on the tools associated with setting up students for testing. The training will delve deeply into this part of the system with topics that include setting up teachers and students, managing student accommodations, and the importance of student groups and test sessions. DRC

estimates that this training will take 2–3 hours. The training will be conducted by DRC Program Management staff, which has a wealth of experience in the system and how it is being used in the field. DRC recommends that the Test Setup Training occur in Fall 2016, before the first administrations of the Keystone Exams and the PSSA in the new contract. The training can be repeated via WebEx, or face-to-face, as needed throughout the duration of the contract.

EDIRECT CORRECTION SYSTEM AND GENERAL REPORTING TOOLS TRAINING

DRC proposes to provide training to PDE staff on the various data correction systems, including attributions and associated eDIRECT reports, corrections, match-to-master, and 1% (PSSA) redistribution. In the same session, DRC also recommends providing training on results reporting found in the eDIRECT system. The first Correction System and Reporting Tools training should take place in Winter 2016, prior to the systems going live, and will take approximately 2–3 hours. Sessions in subsequent years can be held via WebEx, if preferred. Similar to the previous eDIRECT training topics, this training will be presented by DRC Program Management staff.

EDIRECT CLASSROOM DIAGNOSTIC TOOLS REPORTING TRAINING

The CDT Reporting Training will be 4–5 hours in duration and will cover all aspects of the CDT interactive reports. Participants will learn how to interact with the various data displays, as well as how to use the export features. DRC also proposes to cover the CDT Usage Reports during this training. In addition to DRC Program Management staff, Test Development and Psychometric staff will attend. Participants will be provided a copy of a sample CDT Report Training Simulation, in addition to the eDIRECT user guide for CDT reporting. DRC recommends that this training take place in year one. This can be repeated as needed.

DRC INSIGHT Training

DRC proposes to provide thorough training to PDE staff covering the DRC INSIGHT Online Learning System. This training will cover logistical aspects of computer-based testing, such as downloading software and the Test Site Manager (TSM), as well as the student interface and the various tools provided for students. Participants will have a chance to interact with sample items, tools, and navigation using the Online Tools Training (OTT). Participants will also be trained on the use of the Tutorials. Additionally, this training will cover many of the monitoring tools available to PDE.

The DRC INSIGHT training will be conducted by DRC Program Management and DRC technical staff. DRC recommends allotting 3–4 hours for this training in year one of the contract. Subsequent training can be held via WebEx, if preferred.

IDEAS Training

DRC Test Development staff trains users of our item banking system, IDEAS, in a variety of ways. We offer an online, web-based training experience utilizing the virtual meeting software, WebEx. DRC's experienced trainers and system administrators share their desktops and allow PDE users to follow along in guided practice sessions designed to familiarize the user with the functionality and ease of use of the system. This two-way training also allows PDE to take control and share the user's desktop to facilitate asking specific questions so that DRC's trainers can see exactly what the user is referencing.

These sessions will be tailored to fit the specific needs of PDE. Follow-up sessions will be available to address just-in-time training for specific tasks or for crucial points in the item and form development cycle. Training videos and recorded training sessions will also be available for PDE's use. Face-to-face training is also available in PDE's offices or at another location of PDE's choosing. DRC anticipates that the training can be held in a couple of hours, to a couple of days, depending on the needs and preferences of PDE.

Data Interaction Training

The eMetric team members will provide one onsite training session per year for the Intermediate Units (IU) and PDE staff covering its Data Interaction query tool and associated reports for PSSA and Keystone Exams. The training will be done at the location of PDE's choosing and will last for two days. The format of the training session will be a train-the-trainer model, and will include IU personnel in addition to PDE staff to ensure that participants have the tools and knowledge to train their respective colleagues in the field. This live, onsite training will consist of an overview of the Data Interaction query tool, how users access the site, overviews of each report, and training to provide users with knowledge and familiarity of eMetric's ad hoc analytical tools. Training materials, such as PowerPoint presentations, will be provided to participants.

eMetric currently hosts three brief video tutorials for the Data Interaction query tool that hosts the Keystone Exams data. These videos will be updated to reflect any changes associated with changes to the report and Pennsylvania assessments, as needed. These videos are accessible by all users with access to the secure reporting site.

In addition to the one onsite training session, eMetric proposes to provide three webinars that will allow users to log in to a training session remotely, receive similar training on the Data Interaction query tool, and ask questions of the presenter. Content of the webinars will reflect the same topics that are addressed in the onsite training session, but can easily include additional information that PDE staff deems necessary. This would allow the content to evolve, based upon the needs of the users of the Data Interaction query tool and reports. The webinar format can be recorded for future use and offers training without travel costs.





SECTION 7. FINANCIAL CAPABILITY (REDACTED)

Data Recognition Corporation (DRC) is a privately-held company; our financial information is not for public disclosure. Therefore, Section 7, Financial Capability has been redacted.





SECTION 8. OBJECTIONS AND ADDITIONS TO STANDARD CONTRACT TERMS AND CONDITIONS (REDACTED)

Data Recognition Corporation (DRC) has no objections or additions to the terms and conditions contained in Part V of the Request for Proposals (RFP).





SECTION 9. SMALL DIVERSE BUSINESS PARTICIPATION SUBMITTAL (REDACTED)

Data Recognition Corporation (DRC) has provided our Small Diverse Business Participation Submittal under separate cover.





SECTION 10. COST SUBMITTAL (REDACTED)

Data Recognition Corporation (DRC) has provided our Cost Submittal under separate cover.





SECTION 11. DOMESTIC WORKFORCE UTILIZATION CERTIFICATION (REDACTED**)**

Data Recognition Corporation (DRC) has completed the Domestic Workforce Utilization Certification; it is included on the following page.



APPENDIX F
DOMESTIC WORKFORCE UTILIZATION CERTIFICATION (07/24/09)

To the extent permitted by the laws and treaties of the United States, each proposal will be scored for its commitment to use the domestic workforce in the fulfillment of the contract. Maximum consideration will be given to those offerors who will perform the contracted direct labor exclusively within the geographical boundaries of the United States or within the geographical boundaries of a country that is a party to the World Trade Organization Government Procurement Agreement. Those who propose to perform a portion of the direct labor outside of the United States and not within the geographical boundaries of a party to the World Trade Organization Government Procurement Agreement will receive a correspondingly smaller score for this criterion. In order to be eligible for any consideration for this criterion, offerors must complete and sign the following certification. This certification will be included as a contractual obligation when the contract is executed. Failure to complete and sign this certification will result in no consideration being given to the offeror for this criterion.

I, Susan S. Engeleiter, Chief Executive Office and President of Data Recognition Corporation a Minnesota corporation or other legal entity, ("Contractor") located at 13490 Bass Lake Road, Maple Grove, MN 55311, having a Social Security or Federal Identification Number of 41-1810970, do hereby certify and represent to the Commonwealth of Pennsylvania ("Commonwealth") (Check **one** of the boxes below):

- ✓ All of the direct labor performed within the scope of services under the contract will be performed exclusively within the geographical boundaries of the United States or one of the following countries that is a party to the World Trade Organization Government Procurement Agreement: Aruba, Austria, Belgium, Bulgaria, Canada, Chinese Taipei, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hong Kong, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Liechtenstein, Lithuania, Luxemburg, Malta, the Netherlands, Norway, Poland, Portugal, Romania, Singapore, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, and the United Kingdom

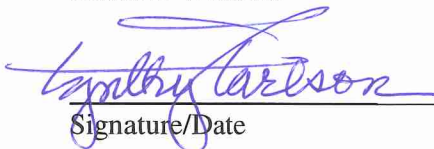
OR

_____ percent (____ %) [Contractor must specify the percentage] of the direct labor performed within the scope of services under the contract will be performed within the geographical boundaries of the United States or within the geographical boundaries of one of the countries listed above that is a party to the World Trade Organization Government Procurement Agreement. Please identify the direct labor performed under the contract that will be performed outside the United States and not within the geographical boundaries of a party to the World Trade Organization Government Procurement Agreement and identify the country where the direct labor will be performed: _____

[Use additional sheets if necessary]

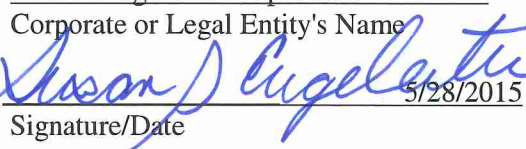
The Department of General Services [or other purchasing agency] shall treat any misstatement as fraudulent concealment of the true facts punishable under Section 4904 of the *Pennsylvania Crimes Code*, Title 18, of Pa. Consolidated Statutes.

Attest or Witness:

 5/28/2015
Signature/Date

Cynthia Carlson /Executive Assistant
Printed Name/Title

Data Recognition Corporation

Corporate or Legal Entity's Name
 5/28/2015
Signature/Date

Susan S. Engeleiter/CEO and President
Printed Name/Title



SECTION 12. LOBBYING CERTIFICATION AND DISCLOSURE (REDACTED)

Data Recognition Corporation (DRC) has completed the Lobbying Certification and Disclosure; it is included on the following pages.





APPENDIX G - LOBBYING CERTIFICATION FORM

Certification for Contracts, Grants, Loans, and Cooperative Agreements

The undersigned certifies, to the best of his or her knowledge and belief, that:

(1) No federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with the awarding of any federal contract, the making of any federal grant, the making of any federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any federal contract, grant, loan, or cooperative agreement.

(2) If any funds other than federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with this federal contract, grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, Disclosure of Lobbying Activities, which can be found at:

<http://www.whitehouse.gov/sites/default/files/omb/assets/omb/grants/sfillin.pdf>

(3) The undersigned shall require that the language of this certification be included in the award documents for all sub-awards at all tiers (including subcontracts, sub-grants, and contracts under grants, loans, and cooperative agreements) and that all sub-recipients shall certify and disclose accordingly.

This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed under *Section 1352, Title 31, U. S. Code*. Any person who fails to file the required certification shall be subject to a civil penalty of not less than \$10,000 and not more than **\$100,000** for such failure.

SIGNATURE: _____

TITLE: Chief Executive Officer and President

DATE: May 29, 2015