

PRELIMINARY TECHNICAL REPORT



**for the
Pennsylvania
System of School Assessment**

**2008 Science
Grades 4, 8, and 11**

**Provided by
Data Recognition Corporation**

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PREFACE: An Overview of Recent and Future Assessments

The period from 2003 through 2006 brought significant structural changes in the test blueprint for the Pennsylvania System of School Assessment (PSSA). These changes necessitated extensive test development and field testing activity along with phased-in implementation in the operational assessment. Included in this process was the development and implementation of assessments in additional grade levels.

For reading and mathematics, content changes for grades 5, 8, and 11 were developed in 2003, field tested in spring 2004, and implemented in spring 2005. The *2005 PSSA Technical Report for Reading and Mathematics* provides a description of test development activities, review of open-ended tasks and multiple-choice items, field testing, selection of items, statistical analysis of assessment data, reliability, validity, Standard Setting, and other technical characteristics of the operational 2005 PSSA. Test development for the new grade levels of 4, 6, and 7 began in 2004, with field testing in 2005, and full implementation in 2006. Similarly, the *2006 PSSA Technical Report for Reading and Mathematics: Grades 4, 6, and 7* provides a complete description of test development activities, item review, field testing, statistical analysis, item selection, and technical characteristics of the operational 2006 PSSA for these grade levels. In 2007 the grade 3 reading and mathematics assessment became DRC's responsibility and is covered in the present technical report, along with grades 4 through 8, and 11.

Changes in the writing assessment were designed to sharpen the focus on what is assessed with respect to Academic Standards 1.4 and 1.5. To support this effort, a shift in grade levels assessed was made, moving from grades 6 and 9 to grades 5 and 8, thereby aligning assessment to the end of elementary and middle school years. The writing testing window was changed from fall to February for grades 5 and 8, making it consistent with grade 11. Mode-specific scoring guidelines replaced domain scoring, and the introduction of stimulus-based passages and associated multiple-choice items measuring revising and editing contributed to a more valid conventions score. An account of the development of writing prompts and stimulus-based, multiple-choice items, review processes, field testing and item analysis, Standard Setting, and other technical characteristics of the operational 2006 PSSA may be found in the *2006 PSSA Technical Report for Writing*.

The introduction of an operational science assessment in 2008 moved closer to reality with a major standalone field test at grades 4, 8, and 11 in April–May of 2007. A description of the development of science scenarios and related multiple-choice, short answer open-ended, and extended open-ended questions, item review processes, statistical analysis of field test data, and selection of items for the 2008 operational science test may be found in the *2008 PSSA Preliminary Technical Report for Science*.

To assist the reader in navigating through the year-to-year changes in all aspects of the PSSA, tables are presented along with explanatory text. Provided is an overview of the subject areas assessed, time of year the testing activity took place, and the type of testing that occurred (e.g., operational, field testing, grade 12 retest).

ASSESSMENT ACTIVITIES OCCURRING IN THE 2003–04 SCHOOL YEAR

Table P–1 outlines the operational assessments and field tests administered during the 2003–04 school year. (A spring operational assessment in mathematics and reading took place at grades 3, 5, 8, and 11.)

As a result of new Assessment Anchor Content Standards (Assessment Anchors) developed by the Pennsylvania Department of Education (PDE) during 2003, new test items were developed (see Chapter Two of *the 2005 PSSA Technical Report for Reading and Mathematics*). Following the spring operational assessment, a separate, “standalone” field test of new items for grades 5, 8, and 11 was conducted. Note that grade 11 students also took an operational writing assessment in February, and grade 6 and grade 9 students participated in a fall writing assessment. Lastly, grade 12 students who as 11th graders in the preceding spring failed to attain at least the Proficient level in any of the subject areas, were offered an opportunity to retest.

**Table P–1. Operational Assessment and Field Testing
During the 2003–04 School Year**

Grade	Assessment Activity	Date
3	Operational mathematics and reading with embedded field test (conducted by CTB/McGraw-Hill)	April 2004
5	Operational mathematics and reading	April 2004
	Standalone field test in mathematics and reading	April/May 2004
6	Operational writing	October 2004
8	Operational mathematics and reading	April 2004
	Standalone field test in mathematics and reading	April/May 2004
9	Operational writing	October 2004
11	Operational mathematics and reading	April 2004
	Standalone field test in mathematics and reading	April/May 2004
	Operational writing	February 2004
12	Retest opportunity for students who as grade 11 students in the spring of 2003 failed to reach at least the Proficient level in mathematics, reading, or writing	October/ November 2004

ASSESSMENT ACTIVITIES OCCURRING IN THE 2004–05 SCHOOL YEAR

Table P–2 displays the operational assessments and field tests that took place during the 2004–05 school year. The operational assessment at grades 5, 8, and 11 used items chosen from the spring 2004 field test. This was the first operational assessment that reflected the Pennsylvania Assessment Anchors and Eligible Content. Fulfilling the No Child Left Behind Act of 2001 (NCLB) requirement that states must implement a test at grades 3 through 8, a major field test in mathematics and reading was administered at grades 4, 6, and 7. Item development for these new grade levels took place during 2004.

The grades 6 and 9 writing assessment was reassessed in favor of moving the writing assessment to grades 5 and 8. This accounts for the separate (standalone) field test at these grade levels. There was also a test administration change from October to February. The writing assessment also underwent changes to align the test to the Academic Standards for writing. New writing prompts and stimulus-based, multiple-choice items were also field tested at grade 11 as part of the operational assessment, hence the reference to an “embedded” field test. No assessment activity of any kind occurred at grade 9. As in fall 2003, the retest opportunity at grade 12 continued.

**Table P–2. Operational Assessment and Field Testing
During the 2004–05 School Year**

Grade	Assessment Activity	Date
3	Operational mathematics and reading with embedded field test (conducted by CTB/McGraw-Hill)	April 2005
4	Standalone field test for mathematics and reading	April 2005
5	Operational mathematics and reading with embedded field test	April 2005
	Standalone field test in writing	February 2005
6	Standalone field test for mathematics and reading	April 2005
7	Standalone field test for mathematics and reading	April 2005
8	Operational mathematics and reading with embedded field test	April 2005
	Standalone field test in writing	February 2005
11	Operational mathematics and reading with embedded field test	April 2005
	Operational writing with embedded field test	February 2005
12	Retest opportunity for students who as grade 11 students in the spring of 2004 failed to reach at least the Proficient level in mathematics, reading, or writing	October/ November 2004

ASSESSMENT ACTIVITIES OCCURRING IN THE 2005–06 SCHOOL YEAR

Table P–3 shows the assessment activities that occurred during the 2005–06 school year. Note that the reading and mathematics operational assessments ran consecutively from grades 3 through 8 and at grade 11. For grades 4, 6, and 7, it was the first year for operational assessments. Field testing for mathematics and reading was embedded as part of the operational assessment at each grade level. At grade 3, the reference to field testing with items developed by DRC reflects the transition process of shifting the assessment from CTB/McGraw-Hill to DRC in 2007. As in previous years, the retest opportunity at grade 12 continued.

The first operational assessments for writing at grades 5 and 8 took place this year while the grade 11 writing assessment continued in the same February test window. New this year for all three grade levels, the operational writing assessments featured mode-specific scoring guidelines; stimulus-based, multiple-choice items; and a grade-specific emphasis shift in writing modes assessed. See the *2006 PSSA Technical Report for Writing: Grades 5, 8, and 11* for further information about the new writing assessments. Since extensive field testing in February 2005 produced a pool of prompts for use over several years, no additional writing prompts were field tested in 2006. However, new multiple-choice items were field tested in the 2006 writing assessment.

**Table P–3. Operational Assessment and Field Testing
During the 2005–06 School Year**

Grade	Assessment Activity	Date
3	Operational mathematics and reading with embedded field test of DRC-written items (conducted by CTB/McGraw-Hill)	April 2006
4	Operational mathematics and reading with embedded field test	March 2006
5	Operational mathematics and reading with embedded field test	March 2006
	Operational writing with embedded field test	February 2006
6	Operational mathematics and reading with embedded field test	March 2006
7	Operational mathematics and reading with embedded field test	March 2006
8	Operational mathematics and reading with embedded field test	March 2006
	Operational writing with embedded field test	February 2006
11	Operational mathematics and reading with embedded field test	March 2006
	Operational writing with embedded field test	February 2006
12	Retest opportunity for students who as grade 11 students in the spring of 2005 failed to reach at least the Proficient level in mathematics, reading, or writing	October/ November 2005

ASSESSMENT ACTIVITIES OCCURRING IN THE 2006–07 SCHOOL YEAR

Table P–4 shows the assessment plan that occurred during the 2006–07 school year. Note that the mathematics and reading assessments ran consecutively from grades 3 through 8 and at grade 11. For grades 4, 6, and 7, it was the second year for operational assessments and the first year in which these grade levels were included in the AYP calculations. Field testing for mathematics and reading continued to be embedded as part of the operational assessments at each grade level. This was the first year in which DRC was responsible for the grade 3 assessment, as the transition from CTB/McGraw-Hill was completed. As in the previous years, the retest opportunity at grade 12 will continue.

The operational assessment for writing at grades 5, 8, and 11 continued in the same February test window featuring the mode-specific scoring guidelines; stimulus-based, multiple-choice items; and a grade-specific emphasis in writing modes assessed, which were introduced in 2006. Since extensive field testing in February 2005 produced a pool of prompts for use over several years, no additional writing prompts needed to be field tested in 2007. However, new multiple-choice items were field tested in the 2007 writing assessment.

Following the spring operational assessments in writing and reading and mathematics, a separate, “standalone” field test in science occurred for grades 4, 8, and 11 with full implementation scheduled for 2008.

**Table P–4. Operational Assessment and Field Testing
During the 2006–07 School Year**

Grade	Assessment Activity	Date
3	Operational mathematics and reading with embedded field test	March 2007
4	Operational mathematics and reading with embedded field test	March 2007
	Standalone field test in science	April/May 2007
5	Operational mathematics and reading with embedded field test	March 2007
	Operational writing with embedded field test	February 2007
6	Operational mathematics and reading with embedded field test	March 2007
7	Operational mathematics and reading with embedded field test	March 2007
8	Operational mathematics and reading with embedded field test	March 2007
	Operational writing with embedded field test	February 2007
	Standalone field test in science	April/May 2007
11	Operational mathematics and reading with embedded field test	March 2007
	Operational writing with embedded field test	February 2007
	Standalone field test in science	April/May 2007
12	Retest opportunity for students who as grade 11 students in the spring of 2006 failed to reach at least the Proficient level in mathematics, reading, or writing	October/ November 2006

ASSESSMENT ACTIVITIES PLANNED FOR THE 2007–08 SCHOOL YEAR

Table P–5 shows the assessment plan for the 2007–08 school year. The mathematics and reading assessments will be operational for grades 3 through 8 and at grade 11. Field testing for mathematics and reading will continue to be embedded as part of the operational assessments at each grade level. As in the previous years, the retest opportunity at grade 12 will continue.

The operational assessment for writing at grades 5, 8, and 11 continues in a February test window using mode-specific scoring guidelines; stimulus-based, multiple-choice items; and a grade-specific emphasis in writing modes assessed. Since extensive field testing in February 2005 produced a pool of prompts for use over several years, no additional writing prompts will be field tested in 2008. However, new multiple-choice items will be field tested in the 2008 writing assessment.

The first operational assessment in science will be fully implemented in April/May. Similar to the other operational assessments, field testing for science will be embedded as part of the operational assessments at each grade level.

**Table P–5. Operational Assessment and Field Testing
During the 2007–08 School Year (Planned)**

Grade	Assessment Activity	Date
3	Operational mathematics and reading with embedded field test	March/April 2008
4	Operational mathematics and reading with embedded field test	March/April 2008
	Operational science with embedded field test	April/May 2008
5	Operational mathematics and reading with embedded field test	March/April 2008
	Operational writing with embedded field test	February 2008
6	Operational mathematics and reading with embedded field test	March/April 2008
7	Operational mathematics and reading with embedded field test	March/April 2008
8	Operational mathematics and reading with embedded field test	March/April 2008
	Operational writing with embedded field test	February 2008
	Operational science with embedded field test	April/May 2008
11	Operational mathematics and reading with embedded field test	March/April 2008
	Operational writing with embedded field test	February 2008
	Operational science with embedded field test	April/May 2008
12	Retest opportunity for students who as grade 11 students in the spring of 2007 failed to reach at least the Proficient level in mathematics, reading, writing, or science	October/ November 2007

Chapter One: Background of Pennsylvania System of School Assessment (PSSA)

This brief overview of assessment in Pennsylvania describes the original and subsequent legislative mandates, previous assessment programs, the history of the current program's development process, the program's intent and purpose, recent changes to the program, and the student population that participates in the assessments.

THE ORIGIN OF STATE ASSESSMENT IN PENNSYLVANIA

State assessment of student achievement came about as a result of legislation enacted in 1963. Generally known as the School District Reorganization Act (Act 299), the issue of whether large or small district size provided a better quality education led to the development of Section 299.1 of Act 299, which required the State Board of Education to

... develop or cause to be developed an evaluation procedure designed to measure objectively the adequacy and efficiency of the educational program offered by the public schools of the Commonwealth . . . The evaluation procedure shall be so constructed and developed as to provide each school district with relevant comparative data to enable directors and administrators to more readily appraise the educational performance and to effectuate without delay the strengthening of the district's educational program. Tests developed . . . shall be used for the purpose of providing a uniform evaluation of each school district . . .

In response to the legislative mandate, the State Board of Education contracted with Educational Testing Service of Princeton, New Jersey, to engage in a two-year process of surveying and interviewing stakeholders in business, industry, education, and the general public as to what constituted a quality education. This led to the State Board adoption of *The Goals of Quality Education* in 1965. In 1967, the Department of Education formed an organizational unit along with staff to begin developing appropriate measures and engaging in extensive field testing during the 1967–68 and 1968–69 school years.

Educational Quality Assessment (EQA) Program

The first state assessment of students in Pennsylvania took place in the 1969–70 school year. Initially, state assessment was a purely school-based evaluation in the form of the *Educational Quality Assessment (EQA)* program, which reported grade 5 and 11 school-level results in ten goal areas. Grade 8 was added in 1974. Measuring both cognitive and non-cognitive areas, the program operated from 1970 through 1988. As the program evolved, a matrix sampling design was used in measuring and reporting school results in subject areas such as reading, language arts, mathematics, science, health, social studies, and analytical thinking. Initially, it operated as a voluntary program, but in 1974 it became mandatory on a cyclical basis.

Testing for Essential Learning and Literacy Skills (TELLS)

The next major revision in state assessment was the advent of the state's first mandated competency testing program, *Testing for Essential Learning and Literacy Skills (TELLS)* in the 1984–85 school year. The impetus for a statewide essential skills test evolved from an October 1983 document entitled *Turning the Tide: An Agenda for Excellence in Pennsylvania Public Schools*. A two-pronged approach was advocated, calling for:

1. competency testing in grades 3, 5, and 8 as an “early warning system” to identify students with reading and mathematics difficulties and
2. state-funded remedial instruction to provide needed additional help.

In response to this and other recommendations, the State Board of Education added *Chapter 3: Student Testing* to its regulations on June 14, 1984. It required all public school students in grades 3, 5, and 8 to be given criterion-referenced tests in reading and mathematics. The second part of the program, remedial instruction, was mandated by Act 93-1984, and required districts to provide remedial instruction programs to students identified by the tests given under the State Board regulation. Subsequently, funds were distributed to districts and intermediate units for this part of the program. The *TELLS* and *EQA* testing programs coexisted until the *EQA* was concluded in 1988. The *TELLS* program continued through the spring of 1991.

THE PENNSYLVANIA SYSTEM OF SCHOOL ASSESSMENT (PSSA)

The Pennsylvania System of School Assessment (PSSA) program was instituted in 1992. The PSSA returned to a school evaluation model with reporting at the school level only. Test administration took place in February/March, and school district participation was every third year based on the strategic planning cycle. Reading and mathematics were assessed at grades 5, 8, and 11; districts could choose to participate in the writing assessment at grades 6 and 9. State Board revisions to Chapter 5 in November 1994 brought major changes to the PSSA, beginning with the spring 1995 assessment. These changes included

1. all districts were required to participate in the reading and mathematics assessment each year,
2. student-level reports were generated in addition to school reports, and
3. the grades 6 and 9 writing assessment became mandatory on a three-year cycle corresponding to the district’s strategic planning cycle.

Pennsylvania Academic Standards and the PSSA

A major structural change took place in test content with the State Board of Education’s adoption of the Pennsylvania Academic Standards for Reading, Writing, Speaking and Listening, and Mathematics in January 1999 (Pennsylvania State Board of Education, 1999). The Academic Standards, which are part of *Chapter 4: Regulations on Academic Standards and Assessment*, detailed what students should know (knowledge) and be able to do (skills) at various grade levels. Subsequently, the State Board approved a set of criteria defining Advanced, Proficient, Basic, and Below Basic levels of performance. Reading and mathematics performance level results were reported at both the student and school levels for the 2000 PSSA. At that point, the PSSA became a standards-based, criterion-referenced assessment measuring student attainment of the Academic Standards while simultaneously determining the extent to which school programs enabled students to achieve proficiency of the standards.

ASSESSMENT ANCHOR CONTENT STANDARDS, CONTENT STRUCTURE, AND NEW GRADE LEVELS

Assessment in 2005 was marked by major structural changes in the PSSA. Assessment Anchor Content Standards (Assessment Anchors) developed during the previous school year to clarify content structure and improve articulation between assessment and instruction were implemented in terms of test design and reporting. At the same time field testing of mathematics and reading

occurred at grades 4, 6, and 7. The third year of calculations for AYP were conducted and reported for grades 5, 8, and 11.

The 2006 operational reading and mathematics assessment incorporated grades 4, 6, and 7 for the first time. The assessed grade levels for 2006 included grades 3 through 8 and 11. The fourth year of calculations for AYP were conducted and reported for grades 5, 8, and 11 and for the first time in grade 3.

In 2007 the operational reading and mathematics assessment continued in grades 3 through 8 and 11. AYP calculations for grades 4, 6, and 7 took place in 2007 when they were assessed for the second time.

Purposes of the PSSA

As outlined in Chapter 4 of the State Board Regulations, the purposes of the statewide assessment component of the PSSA are as follows:

1. Provide students, parents, educators, and citizens with an understanding of student and school performance.
2. Determine the degree to which school programs enable students to attain proficiency of academic standards.
3. Provide results to school districts (including charter schools) and Area Vocational Technical Schools (AVTSs) for consideration in the development of strategic plans.
4. Provide information to state policymakers, including the State Senate, the General Assembly, and the State Board, on how effective schools are in promoting and demonstrating student proficiency of academic standards.
5. Provide information to the general public on school performance.
6. Provide results to school districts (including charter schools and AVTSs) based upon the aggregate performance of all students, for students with an Individualized Education Program (IEP), and for those without an IEP.

The broad purpose of the state assessments is to provide information to teachers and schools to guide the improvement of curricula and instructional strategies to enable students to reach proficiency in the academic standards.

THE PENNSYLVANIA WRITING ASSESSMENT

In 1990 the state initiated an on-demand writing assessment in which students wrote an essay in response to a particular topic or prompt. Offered to school districts on a voluntary basis, the writing assessment consisted of three modes of writing: narrative, informational, and persuasive. The test administration for grades 6 and 9 used a matrix sampling design; nine prompts (three per mode) were administered to students within a school, although each student responded to just one randomly distributed prompt. Scoring was based on a six-point holistic scale. Student results were aggregated and reported at the school level only. In 1992 the writing assessment was incorporated as part of the PSSA. Beginning in 1995, districts were required to participate in the writing assessment every third year in accordance with their strategic planning cycle. However, districts were also given the choice to participate more frequently. As a result, participation rose dramatically from the expected 167 districts (one-third) in any given year to 235 (47%) in 1995, 306 (61%) in 1996, 412 (82%) in 1997, 445 (89%) in 1998, and 449 (90%) in 1999.

With the advent of the Pennsylvania Academic Standards in 1999, major changes took place in the writing assessment, including alignment to the Academic Standards as well as changes in scoring method, prompts, testing date, and reporting. These changes, which are summarized below, were implemented in the 2000–01 school year and were followed by performance level reporting in the 2001–02 school year.

- The writing assessment became mandatory for all districts every year.
- Administration of the grades 6 and 9 writing assessment was changed from February to October.
- Scoring changed to a 4-point scale for each of five domains (focus, content, organization, style, and conventions).
- Prompts were different for grade 6 and grade 9 rather than being identical at the two grade levels.
- Within a grade level all students responded to two common prompts.
- The reporting model was greatly revised, and individual student reports were issued for the first time.
- A writing assessment for grade 11 was administered for the first time in February 2001.
- In 2002, performance levels were adopted for writing and implemented in the reporting of total writing results for the February grade 11 and fall 2002 grades 6 and 9 writing assessment.

The 2006 PSSA operational writing assessment featured additional revisions that included the following enhancements:

- A shift from grades 6 and 9 to grades 5 and 8, to provide better alignment to the end of elementary school and middle school.
- Grades 5 and 8 joined grade 11 in a February test window rather than the October window used previously for grades 6 and 9.
- Students responded to two writing prompts, which were evaluated in terms of (1) a mode-specific scoring guideline and (2) a conventions scoring guideline instead of the former domain scoring.
- Stimulus-based revising/editing multiple-choice items were incorporated to provide a more reliable and valid measure of the conventions academic standard.

The 2007 PSSA operational writing assessment continued with the same structure and time of year as in 2006.

THE PENNSYLVANIA SCIENCE ASSESSMENT

In accordance with the NCLB requirement to implement an operational science assessment in 2008, a major test development effort in science took place during 2006, followed by a large-scale, standalone field test in April/May of 2007. A full implementation of an operational science assessment at grades 4, 8, and 11 is scheduled for 2008.

Several historical milestones were significant to the development of a science test in

Pennsylvania. These include:

- Adoption of Act 16 or Pennsylvania Senate Bill 652 in 2000, which redefined the PSSA “as a test developed and implemented by the Department of Education to determine only academic achievement relating directly to objective academic standards in the areas of reading, mathematics, and science.” (See the *Science Assessment Handbook*, PDE, November 2006).
- Pennsylvania State Board of Education adoption of Science and Technology Standards on July 12, 2001 and the Environment and Ecology Standards on January 5, 2002.

Aligned to the Pennsylvania Science Assessment Anchor Content Standards and Eligible Content, the science test is designed to measure and report results in four major categories:

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

At grade 4, test questions consist of standalone multiple-choice and two-point short answer open-ended items, and at grade 8 and 11 test questions also consist of sets of multiple-choice questions associated with science scenarios. Grade 11 also has four-point open-ended items associated with the science scenarios. A science scenario consists of a description of a class project, an experiment, or other research. Scenarios typically contain text, graphs, charts and/or tables. Students use their content knowledge and science process skills to answer a set of multiple-choice items and, at grade 11 only, a four-point extended open-ended item related to the scenario. More information may be found in the following two Pennsylvania Department of Education publications available on the PDE website: *Science Assessment Handbook* and *2006–2007 Science Item and Scoring Sampler*.

An extensive description of the science test development activities, field testing, and statistical analyses may be found in the *2008 PSSA Preliminary Technical Report for Science*.

Chapter Two: New Test Development for Science

ASSESSMENT ANCHOR CONTENT STANDARDS AND ELIGIBLE CONTENT

The PSSA science assessment is based on the Assessment Anchor Content Standards (Assessment Anchors) as defined by the Eligible Content. The Assessment Anchors are rooted in the Academic Standards adopted by the State Board of Education in January of 2002, and the standards—under two documents: Science and Technology Standards and Environment and Ecology Standards—cover seventeen major categories describing what students need to know. The purpose of the Assessment Anchors is to articulate essential and assessable elements, and to provide clarity for instruction and for the focus of the state assessment in grades 4, 8, and 11.

Table 2–1. The Pennsylvania Academic Standards for Science

3.1 Unifying Themes	4.1 Watersheds and Wetlands
3.2 Inquiry and Design	4.2 Renewable and Nonrenewable Resources
3.3 Biological Sciences	4.3 Environmental Health
3.4 Physical Science, Chemistry, and Physics	4.4 Agriculture and Society
3.5 Earth Sciences	4.5 Integrated Pest Management
3.6 Technology Education	4.6 Ecosystems and their Interactions
3.7 Technological Devices	4.7 Threatened, Endangered and Extinct Species
3.8 Science, Technology and Human Endeavors	4.8 Humans and the Environment
	4.9 Environmental Laws and Regulations

The Assessment Anchors clarify what is expected across each grade span and focus the content of the standards into what is assessable on a large-scale test. By narrowing the Reporting Categories down to fewer groupings there are more items per Reporting Category making interpretations about what students actually know more reliable. Rather than attempting to report results for all 17 standards, the categories are organized into only four. These categories are similar to those used by the National Assessment of Educational Progress (NAEP) and The Third International Mathematics and Science Study (TIMSS). [However, the PSSA organizes the categories differently.]

Below is a table showing how the four Reporting Categories for the Assessment Anchors for the Pennsylvania System of School Assessment (PSSA) in science are related to the standards.

Table 2–2. The Relationship between the Assessment Anchor Content Standards for Science and the Academic Standards for Science

Reporting Categories		Related Standards																
		3.1	3.2	3.3	3.4	3.5	3.6	3.7	3.8	4.1	4.2	4.3	4.4	4.5	4.6	4.7	4.8	4.9
A.	The Nature of Science	✓	✓				✓	✓	✓				✓		✓	✓	✓	
B.	Biological Sciences	✓		✓							✓	✓			✓	✓		
C.	Physical Sciences		✓		✓		✓											
D.	Earth and Space Sciences		✓		✓	✓		✓		✓	✓						✓	

The Assessment Anchor's coding is read like an outline. The code includes the content, grade level, Reporting Category, Assessment Anchor, descriptor (Sub-Assessment Anchor), and Eligible Content. Thus S.4.A.1.3.1 would be: grade 4 science, Reporting Category A, Assessment Anchor 1, descriptor (Sub-Assessment Anchor) 3, and Eligible Content 1.

Distributed across the four Reporting Categories are a dozen Assessment Anchors. Each of the 12 Assessment Anchors exists at each grade, with the descriptors (Sub-Assessment Anchors) and Eligible Content varying to reflect grade-level appropriateness. There are 21 descriptors (Sub-Assessment Anchors) at grade 4, 23 descriptors (Sub-Assessment Anchors) at grade 8, and 23 descriptors (Sub-Assessment Anchors) at grade 11, and the Assessment Anchor documents form the basis of the test design for the grades undergoing new test development.

Total science scores reported at the student level will be based on the core (common) sections. Also reported will be the student's science performance levels. School and district-level scores will be reported at the Eligible Content level under the Assessment Anchors and based on the core (common) and matrix sections, excluding the embedded field test items.

Achieve conducted a preliminary review of the anchors in 2003, and produced a follow-up report on the anchors in 2005. More information about the Assessment Anchors and the Eligible Content can be found by referencing the Pennsylvania Science Assessment Anchors located on PDE's website at;

http://www.pde.state.pa.us/a_and_t/cwp/view.asp?a=108&q=103127&a_and_tNav=|6309|&a_and_tNav=

OVERVIEW OF THE SPRING 2007 PSSA SCIENCE FIELD TEST

The 2007 PSSA Science Field Test employed two types of test items: multiple-choice, and open-ended. These item types assess different levels of knowledge and provide different kinds of information about science achievement. Psychometrically, multiple-choice items are very useful and efficient tools for collecting information about a student's academic achievement. Open-ended performance tasks are less efficient in the sense that they generally generate fewer scorable points in the same amount of testing time. They do, however, provide tasks that are more realistic and better sample higher-level skills. The design of the operational 2008 PSSA for science will attempt to achieve a reasonable balance between the two item types. Furthermore, well-constructed scoring guides have made it possible to include open-ended tasks in large-scale assessments such as the PSSA. Trained scorers can apply the scoring guides to efficiently score large numbers of student papers in a highly reliable way.

SCIENCE SCENARIOS FOR GRADES 8 AND 11

In addition to standalone multiple-choice and open-ended items, the science assessment will include scenarios at grades 8 and 11. In consideration of the multidisciplinary and interdisciplinary nature of science, science scenarios create stronger connections between the Nature of Science and Science Content and the MC and OE items within the scenario to allow the assessment to efficiently address and utilize the connections between content domains. A science scenario contains text, graphics, charts, and/or tables, and uses these elements to describe the results of a class project, an experiment, or other similar research. Students use the information found in a science scenario as a platform from which to answer both multiple-choice and open-ended questions (grade 11 only). Scenarios and questions reach beyond simple fact recollection; they are designed to challenge students to think and to apply knowledge and skills learned in their classrooms. Scenarios are designed to reflect multi-dimensional classroom

activities that incorporate higher cognitive levels of understanding. Science scenarios challenge students to interpret stimulus content and to apply existing knowledge to new data while using science knowledge and process skills to arrive at their answers.

MULTIPLE-CHOICE ITEMS

The majority of the science items that were included on the 2007 PSSA science field tests were multiple-choice (selected-response items), either as standalone multiple-choice items or as scenario-based multiple-choice items. This item type is especially efficient for measuring a broad range of content. In the PSSA science assessment, each multiple-choice item has four response options, only one of which is correct. The student is awarded one point for choosing the correct response. Distractors typically represent incorrect concepts, incorrect logic, or incorrect application of a scientific principle.

Multiple-choice items are used to assess a variety of skill levels, from short-term recall of facts to the application of science content. PSSA items involving application emphasize the requirement to utilize science content to find an answer, rather than simply recalling information from memory.

OPEN-ENDED ITEMS

Standalone open-ended items (constructed-response tasks) require students to read a description of a scientific problem and to develop an appropriate solution. At grade 11, scenario-based open-ended items are similar, but with scenario-based open-ended items students also have to consider the stimulus material presented in the associated scenario. Open-ended items require about five minutes per task, while the 2 or 3 part scenario-based open-ended items at grade 11 require a total of about 10 minutes. At grade 11 in scenario-based open-ended items, successive components of the open-ended item are designed to measure The Nature of Science and then either Biological Science, Physical Science, or Earth and Space Science.

Open-ended tasks are especially useful for measuring students' skills in science. They offer the opportunity to present real-life situations that require students to solve problems using science abilities learned in the classroom. Students must read the task carefully, identify the necessary information, devise a method of solution and enter the solution directly in the answer document, and when required, offer an explanation. This provides insight into the students' science knowledge, abilities, and reasoning processes.

The open-ended science items are scored on a 0–2 point scale with an item-specific scoring guideline, and each task is carefully constructed with a scoring guide reflecting the task requirements. At grade 11, scenario-based open-ended items combine two 0–2 point scale items into one compound 0–4 point scale item with two of the points associated with The Nature of Science and two of the points associated with Biological Science, Physical Science, or Earth and Space Science. The general guidelines describe a hierarchy of responses, which represent the three score levels. Each item-specific scoring guideline outlines the requirements at each score point, and each item-specific scoring guideline is based on the Science Scoring Guidelines for Open-Ended Items. (See Appendix A or the grade-specific *Science Item and Scoring Sampler*, available on the PDE website.)

Chapter Three: Item Development Process

In 2003, the existing Science, Technology, Environment, and Ecology (STEE) test was put on hold and PDE began efforts to develop a new science assessment. In the winter of 2006 a series of cognitive labs or item pilots were conducted across Pennsylvania with the primary focus of ascertaining language and contextual issues within the draft open-ended test items (grade 4) and scenario-based multiple-choice items (grade 8 and 11) and scenario-based open-ended items (grade 11), the relative difficulty of the test items, the time required to complete the individual tasks, and the opportunity to know factors related to the implementation of the new science Assessment Anchors and Eligible Content by the participating schools.

Following the series of successful cognitive labs or item pilots, DRC developed another set of test items for the proposed voluntary, standalone field test. During the development phase, PDE made the determination to change the designation of the field test from a voluntary assessment to a census-based assessment. Leading up to the administration of the standalone field test both content and bias, fairness, and sensitivity review were conducted in Pennsylvania with Pennsylvania educators. Then in the spring of 2007, the initial standalone field test was administered to the census populations at grades 4, 8, and 11 followed by a rangefinding for the open-ended items. After the scoring was completed, an item review with data was conducted for the field test items administered in 2007.

Table 3–1 provides a timeline of these major activities, which are described in some detail in this chapter as well as in Chapters Four and Five.

Table 3–1. General Timeline Associated with Assessment of Science at Grades 4, 8, and 11 Leading up to the Operational 2008 PSSA

Dates for the 2007 Standalone Field Test and 2008 Operational Test	
Detailed item development plan submitted to PDE from DRC	Aug. 2005
Draft Assessment Anchors, Eligible Content, and Test Blueprints for grades 4, 8, and 11 approved by PDE	Sep. 2005
Item Writer Training and Item Development	Sep. 2005 — June 2006
Cognitive Lab or Item Pilots for scenarios and OE items	Feb/March 2006
PDE and DRC considered Cognitive Lab or Item Pilots results and feedback from Pennsylvania students and educators on the development of future items.	March — June 2006
Item and Bias, Fairness, and Sensitivity Review	July 2006
Revisions to standalone field test items were reviewed by PDE; forms were prepared for field testing	Aug. — Dec. 2006
Item Samplers released on PDE website	Sep./Oct. 2006
Final typeset field test forms were reviewed by PDE and forms were sent to printer	Dec. 2006 — Feb. 2007
Standalone Field Testing, Grades 4, 8, and 11	May 2007
Rangefinding	May/June 2007
Item Data Review	Aug. 2007
Operational and Embedded Field Test Item Selection for 2008 Administration	Sep. — Oct. 2007
Achieve reviews selected Operational items	Oct. — Nov. 2007
Operational Forms Review	Nov. — Dec. 2007
Operational Testing and Embedded Field Testing	May 2008

TEST CONTENT BLUEPRINT FOR THE 2008 OPERATIONAL SCIENCE TEST

The PSSA is based on the Pennsylvania Academic Standards as defined by the Eligible Content. The PSSA science assessment for 2008 reflects the Assessment Anchor Content Standards, which were designed as a means of improving the articulation of curricular, instructional, and assessment practices. The Anchors serve to clarify the Academic Standards assessed on the PSSA and to communicate “assessment limits,” or the range of knowledge and skills from which the PSSA would be designed. Relevant to item development are the refinement and clarification embodied in the Assessment Anchors (PDE, 2004).

The Assessment Anchors are rooted in the Academic Standards adopted by the State Board of Education in January of 2002, and the standards—under two documents: Science and Technology Standards and Environment and Ecology Standards—cover seventeen major categories describing what students need to know. Rather than attempting to report results for all 17 standards, the categories are organized into only four. These categories are similar to those used by the National Assessment of Educational Progress (NEAP) and The Third International Mathematics and Science Study (TIMSS). [However, the PSSA organizes the categories differently.]

Achieve conducted a preliminary review of the anchors in 2003, and produced a follow-up report on the anchors in 2005. More information about the Assessment Anchors and the Eligible Content can be found by referencing the Pennsylvania Science Assessment Anchors located on PDE’s website at;

http://www.pde.state.pa.us/a_and_t/cwp/view.asp?a=108&q=103127&a_and_tNav=|6309|&a_and_tNav=

More information on the Assessment Anchors can be found in Chapter Two.

PLANNED 2008 OPERATIONAL LAYOUT FOR SCIENCE

The first operational administration of the PSSA science test is scheduled to take place in the spring of 2008. Critical to the preparation for this operational assessment, the design of the operational assessment had to be configured to meet NCLB requirements as well as other test development and psychometric requirements. The preliminary science PSSA plan was developed in 2004 through the collaborative efforts of Data Recognition Corporation (DRC) and the Pennsylvania Department of Education (PDE) based on the recommendations of the Pennsylvania Technical Advisory Committee (TAC). At grades 4 and 8, the science assessment is in one test booklet and one separate answer booklet. The test booklet contains multiple-choice items and at grade 8 contains stimulus scenario text. The answer booklet contains scannable pages for multiple-choice (MC) responses (answer grids), open-ended (OE) items with response spaces, and demographic data collection areas. At grade 11, the science assessment is in one integrated test/answer booklet with items and scenario text appearing with scannable multiple-choice answer grids, OE response space, and demographic data collection areas.

All MC items are worth 1 point. Standalone OE items receive a maximum of 2 points (scale of 0–2) and scenario-based OE items (at grade 11 only) receive a maximum of 4 points (scale of 0–4). Each test form contains common items (identical on all forms) along with matrix/embedded field test items. The common items consist of a set of “core” items taken by all students. The matrix items and the embedded field test items are unique, in most instances, to a form. That is, there are several instances in which a matrix or embedded field test OE item appears on more than one form.

At grades 4 and 8, the 2008 PSSA science assessment is comprised of 18 forms per grade. At grade 11, the 2008 PSSA science assessment is comprised of 12 forms. All of the forms contain the common items identical for all students and sets of generally unique (“matrix”) items that fulfill several purposes. These purposes include:

1. Expanding the total pool of items for school-level reporting,
2. Field testing new items,
3. Using items from the previous year’s assessment for the purpose of linking.

The following three tables display the operational test (2008 and beyond) design for science.

Table 3–2. 2008 Science Test Plan per Operational Form for Grade 4

CORE		MATRIX			CORE & MATRIX*	EMBEDDED FIELD TEST	
No. Core Nature of Science Points per Form	No. Core Science Content (Bio, Phy, and E&S) Points per Form	No. Matrix Nature of Science Points per Form	No. Matrix Science Content (Bio, Phy, and E&S) Points per Form	Total No. of Matrix Points per Form	Total No. of Science Points per Form (Core & Matrix) (66 +4) =	Total No. of Embedded FT Points per Form	Total No. of Forms
33	33	0–2	2–4	4	70	6	18
Core items per form (56 MC/5 (2 pt.) OE) = 61 Items Total Core/Matrix item positions per form = 61 Core + 3 Matrix Embedded Field Test items are included on each form (4 MC and 1(2pt) OE). Total item positions per form = 69 item positions Item types will be distributed according to DOK requirements of Assessment Anchors and Eligible Content.							

Table 3–3. 2008 Science Test Plan per Operational Form for Grade 8

CORE		MATRIX*			CORE & MATRIX*	EMBEDDED FIELD TEST	
No. Core Nature of Science Points per Form	No. Core Science Content (Bio, Phy, and E&S) Points per Form	No. Matrix Nature of Science Points per Form	No. Matrix Science Content (Bio, Phy, and E&S) Points per Form	Total No. of Matrix Points per Form	Total No. of Science Points per Form (Core & Matrix) (66 + 4) =	Total No. of Embedded FT Points per Form	Total No. of Forms
33	33	0–2	2–4	4	70	10	18
Core items per form (56 MC / 5(2 pt.) OE) = 61 items Total Core/Matrix item positions per form (61 core + 3 matrix)							
2 Core Nature of Science and 2 Core Science Content MC items will be bundled into a science scenario set.							
Embedded Field Test items are included on each form (4 MC and 1(2pt) OE standalone items and 4 MC scenario-based items). Total (61 core + 3 matrix + 9 FT) = 73 item positions per form. Item types will be distributed according to DOK requirements of Assessment Anchors and Eligible Content.							

Table 3–4. 2008 Science Test Plan per Operational Form for Grade 11

CORE		MATRIX*			CORE & MATRIX*	EMBEDDED FIELD TEST	
No. Core Nature of Science Points per Form	No. Core Science Content (Bio, Phy, and E&S) Points per Form	No. Matrix Nature of Science Points per Form	No. Matrix Science Content (Bio, Phy, and E&S) Points per Form	Total No. of Matrix Points per Form	Total No. of Science Points per Form (Core & Matrix) (72 + 4) =	Total No. of Embedded FT Points per Form	Total No. of Forms
36	36	0–2	2–4	4	76	15	12
Core items per form (48 MC / 6(2 pt.) OE / 3 (4 pt.) OE) = 57 items Total Core/Matrix item positions per form (57 core + 4 matrix)							
2 Core Nature of Science, 2 Core Science Content MC items, and one 4pt OE item will be bundled into a science scenario set. Three Core and one Embedded Field Test Scenario per form.							
Embedded Field Test items are included on each form (5 MC and 1(2pt) OE standalone items and 4 MC and 1(4pt) OE scenario-based items). Total (57 core + 4 matrix + 11 FT) = 72 item positions per form. Matrix will consist of only MC items. Item types will be distributed according to DOK requirements of Assessment Anchors and Eligible Content.							

Since an individual student’s score is based solely on the common (or core) items, the total number of operational points is 66 for grades 4 and 8 and 72 for grade 11. The total score is obtained by combining the points from the core MC and OE portions of the test as follows:

Table 3–5. 2008 Science Core Plan per Grade

Grade	Standalone MC Items	Scenario-based MC Items	Standalone OE Items	Scenario-based OE Items	Total Points
4	56	0	5 items X 2-points =10 points	0 items X 4-points =0 points	66
8	52	4	5 items X 2-points =10 points	0 items X 4-points =0 points	66
11	36	12	6 items X 2-points =12 points	3 items X 4-points =12 points	72

For more information concerning the process used to convert the operational layout into forms (form construction), see Chapter Six in the forthcoming *2008 PSSA Science Technical Report*. For more information about operational layout across forms and across years (form equivalency) see Chapter Ten in the forthcoming *2008 PSSA Science Technical Report*.

TEST SESSIONS AND TIMING

The test window for the 2008 operational assessment will extend from April 28 through May 9, 2008, including make-ups. The science assessments consist of 2 sections at grades 4 and 8, and three sections at grade 11. Test administration recommendations called for each section to be scheduled as one assessment session, although schools will be permitted to combine multiple sections in a single session. Administration guidelines stipulate that the sections be administered

in the sequence in which they are printed in the booklets. The following tables outline the assessment schedule and estimated times for each section (“MC” refers to multiple-choice and “OE” refers to open-ended items). The estimated testing times do not include time for administrative tasks that occur during the pre- and post- administration activities.

Table 3–7. Science – Administration and Testing Times

Grade Level	Test Sections											
	Suggested Times In Minutes											
	1				2				3			
	# of Items	Administration (Total)	Administrative (Pre & Post)	Student Testing	# of Items	Administration (Total)	Administrative (Pre & Post)	Student Testing	# of Items	Administration (Total)	Administrative (Pre & Post)	Student Testing
4	31 MC 4 OE	65-75	15-20	50-55	31 MC 3 OE	60-70	15-20	45-50				
8	33 MC 4 OE	70-80	15-20	55-60	33 MC 3 OE	65-75	15-20	50-55				
11	21 MC 3 OE	70-80	15-20	55-60	20 MC 4 OE	65-75	15-20	50-55	20 MC 4 OE	65-75	15-20	50-55

During the assessment, students may request an extended assessment period if they indicate that they have not completed the task. Such requests are granted if the assessment administrator finds the request to be educationally valid.

REPORTING CATEGORIES AND POINTS DISTRIBUTIONS

The science assessment results will be reported in four categories, coded as A through D:

- A. Nature of Science
- B. Biological Science
- C. Physical Science
- D. Earth and Space Science

The distribution of science items into these four categories is shown in the following table.

Table 3–8. Science Reporting Categories and Proposed 2008 Point Distribution

REPORTING CATEGORY	GRADE		
	4	8	11
Nature of Science	~50% 33 pts	~50% 33 pts	~50% 36 pts
Biological Science	~17% 11 pts	~17% 11 pts	~17% 12 pts
Physical Science	~17% 11 pts	~17% 11 pts	~17% 12 pts
Earth and Space Science	~17% 11 pts	~17% 11 pts	~17% 12 pts
Total	66 pts	66 pts	72 pts

The Reporting Categories are further subdivided for specificity and Eligible Content limits. Each subdivision is coded by adding an additional numeral, e.g., A.1. These subdivisions are called “Assessment Anchors”, “Descriptors (Sub-Assessment Anchors)”, and “Eligible Content.”

ASSESSMENT ANCHOR CONTENT STANDARDS SUBSUMED WITHIN REPORTING CATEGORIES

Distributed across the four Reporting Categories are a dozen Sub-Reporting Categories. Each of the 12 Assessment Anchors exists at each grade, with the Assessment Anchors and Eligible Content varying to reflect grade-level appropriateness. The numbers of Assessment Anchors targeted by grade level are 21 at grade 4, 23 at grade 8, and 23 at grade 11.

Total science scores reported at the student level are based on the core (common) sections. School and district-level scores are reported at the Eligible Content level under the Assessment Anchors and are based on the core (common) and matrix sections, excluding the embedded field test items.

TEST DEVELOPMENT CONSIDERATIONS

Alignment to the PSSA Assessment Anchors and Eligible Content, grade-level appropriateness (interest level, etc.), Depth of Knowledge, cognitive level, item/task level of complexity, estimated difficulty level, relevancy of context, rationale for distractors, style, accuracy, and correct terminology were major considerations in the item development process. *The Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999) and the *Principles of Universal Design* (Thompson, Johnstone, & Thurlow, 2002) guided the development process. In addition, DRC’s *Bias, Fairness, and Sensitivity Guidelines* were used for developing items free of bias, fairness, and sensitivity issues. All items were reviewed for fairness by bias and sensitivity committees and for content by Pennsylvania educators and field-specialists. Items were also reviewed for adherence to the Principles of Universal Design and adherence to the guidelines outlined in the Pennsylvania publication *Principles, Guidelines and Procedures for Developing Fair Assessment Systems: Pennsylvania Assessment Through Themes* (PATT) by test development staff trained by representatives from the National Center for Educational Outcomes

(NCEO). A discussion concerning bias, fairness, and sensitivity can be found in the section below.

Bias, Fairness, and Sensitivity

At every stage of the item and test development process, item development vendor (DRC) employed procedures that are designed to ensure that items and tests meet Standard 7.4 of the *Standards for Educational and Psychological Testing* (AERA, APA, NCME, 1999).

Standard 7.4: Test developers should strive to identify and eliminate language, symbols, words, phrases, and content that are generally regarded as offensive by members of racial, ethnic, gender, or other groups, except when judged to be necessary for adequate representation of the domain.

In meeting Standard 7.4, DRC employed a series of internal quality steps. The steps included providing specific training for item and test developers, item writers, and reviewers on how to write, review, revise, and edit items for issues of bias, fairness, and sensitivity (as well as for technical quality). The training included an awareness of and sensitivity to issues of cultural diversity. In addition to providing *internal* training in reviewing items in order to eliminate potential bias, training was also provided to *external* review panels of minority experts, teachers, and other stakeholders.

DRC's guidelines for bias, fairness, and sensitivity includes instruction concerning how to eliminate language, symbols, words, phrases, and content that might be considered offensive by members of racial, ethnic, gender, or other groups. Areas of bias that are specifically targeted include, but are not limited to the following: stereotyping, gender, regional/geographic, ethnic/cultural, socioeconomic/class, religious, experiential, and biases against a particular age group (ageism) and against persons with disabilities. Topics that should be avoided are also noted, and a balance in gender and ethnic emphasis within the pool of available items was also maintained.

Universal Design

In addition, the Principles of Universal Design were incorporated throughout all phases of the science item development process to allow participation of the widest possible range of students in the PSSA. The following checklist was used by item developers as a guideline:

1. Items are written to measure what they are intended to measure.
2. Items are written to respect the diversity of the assessment population.
3. Items are written to have a clear format for text.
4. Stimuli and items have clear pictures and graphics.
5. Items are written to have concise and readable text.
6. Items are written to allow changes to format, such as Braille, without changing meaning or difficulty.

A more extensive description of the application of Universal Design principles is described in Chapter Four.

Depth of Knowledge

An important element in statewide assessment is the alignment between the overall assessment system and the state's standards. A methodology developed by Norman Webb (1999) offers a comprehensive model that can be applied to a wide variety of contexts. With regard to the alignment between standards statements and the assessment instruments, Webb's criteria include five categories, one dealing with content. Within the content category is a useful set of levels for evaluating depth of knowledge. According to Webb (1999, p.7–8) "depth-of-knowledge consistency between standards and 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." The four levels of cognitive complexity (depth of knowledge) are:

- Level 1: Recall
- Level 2: Skill/Concept
- Level 3: Strategic Thinking
- Level 4: Extended Thinking

Depth-of-knowledge levels were incorporated in the item writing and review process, and items were coded with respect to the level they represented.

Test Item Writers and Item Writer Training

DRC selected and trained item writers. Qualified writers were college graduates with teaching experience and a demonstrated base of knowledge in the content area. Many of the item writers were science content assessment specialists and curriculum specialists. The writers were trained individually and had previous experience in writing multiple-choice and open-ended response items. Writers who created science scenarios had prior experience writing scenarios. Prior to developing items for the PSSA, the cadre of item writers was trained with regard to:

- Pennsylvania Assessment Anchors and Eligible Content
- Webb's Four Levels of Cognitive Complexity: Recall, Basic Application of Skill/Concept, Strategic Thinking, and Extended Thinking
- General scoring guidelines for science
- Specific and General Guidelines for Item Writing
- Bias, Fairness, and Sensitivity
- Principles of Universal Design
- Item Quality Technical Style Guidelines
- Reference Information
- Sample Items

Test Item Readability

Careful attention was given to the readability of the items and scenarios (grade 8 and grade 11) to make certain that the assessment focus of the item and the scenario did not shift based on the

difficulty of reading the item or scenario. The issue of readability was addressed for all items during the final editing of items and at the item content review. Vocabulary was also addressed at the Bias, Fairness, and Sensitivity Review, although the focus was on how certain words or phrases may represent a possible source of bias or issues of fairness or sensitivity.

Process of Item Construction

To ensure that the items produced were sufficient in number and adequately distributed across subcategories and levels of difficulty, item writers were informed of the required quantities of items. As items were written, an item authoring card was completed. It contained information about the item, such as grade level, content Reporting Category, Assessment Anchor, and Eligible Content. Based on the item writer's classroom teaching experience, knowledge of the content-area curriculum, and cognitive demands required by the item, estimates were recorded for level of cognitive complexity and difficulty level. Items were written to provide for a range of difficulty.

As part of the item construction process, each item was reviewed by content specialists and editors at DRC. Content specialists and editors evaluated each item to make sure that it measured the intended Eligible Content and/or Assessment Anchor. They also assessed each item to make certain that it was appropriate to the intended grade and that it provided and cued only one correct answer. In addition, the difficulty level, Depth of Knowledge, graphics, language demand, and distractors were also evaluated. Other elements considered in this process include, but were not limited to the following: Universal Design, bias, source of challenge, grammar/punctuation, and PSSA style.

A flow chart summarizing the item and test development processes used appears in Appendix B.

Cognitive Labs (Item Pilots)

In collaboration with the PDE, DRC conducted a science cognitive lab/item pilots in selected schools throughout the Commonwealth from February 27 through March 17, 2006. A sample of 507 students from urban, suburban, and rural school districts from across the Commonwealth participated in the PSSA Science Item Tryout Project. The impetus for this study was Pennsylvania's response to the mandatory science assessment component of the *No Child Left Behind* legislation to create a rigorous science test for grades 4, 8, and 11 by 2008. The primary purpose of the cognitive lab or item tryout was to pilot the use of the new science scenarios at grade 8 and grade 11, and to pilot the multiple-choice items at grade 4.

The project involved development of science scenarios, refinement of science test items, creation of survey questions, and design of interview protocols to be administered using a cognitive laboratory technique. The cognitive laboratory technique was developed in the early 1980s through an interdisciplinary effort by survey methodologists and psychologists (Willis 1999). Different models of the cognitive process have evolved over the years, but all have four major processes in common: 1) comprehension of the question; 2) retrieval of relevant information; 3) decision process; and 4) response process (Tourangeau, 1984).

In the development and execution of the cognitive laboratory project, DRC customized the techniques employed specifically to meet the goal and expectations of the PDE. The goal of the project was to gather relevant information about the thinking processes of students enrolled in science in grades 4, 8, and 11, in order to create a better science assessment for Pennsylvania students.

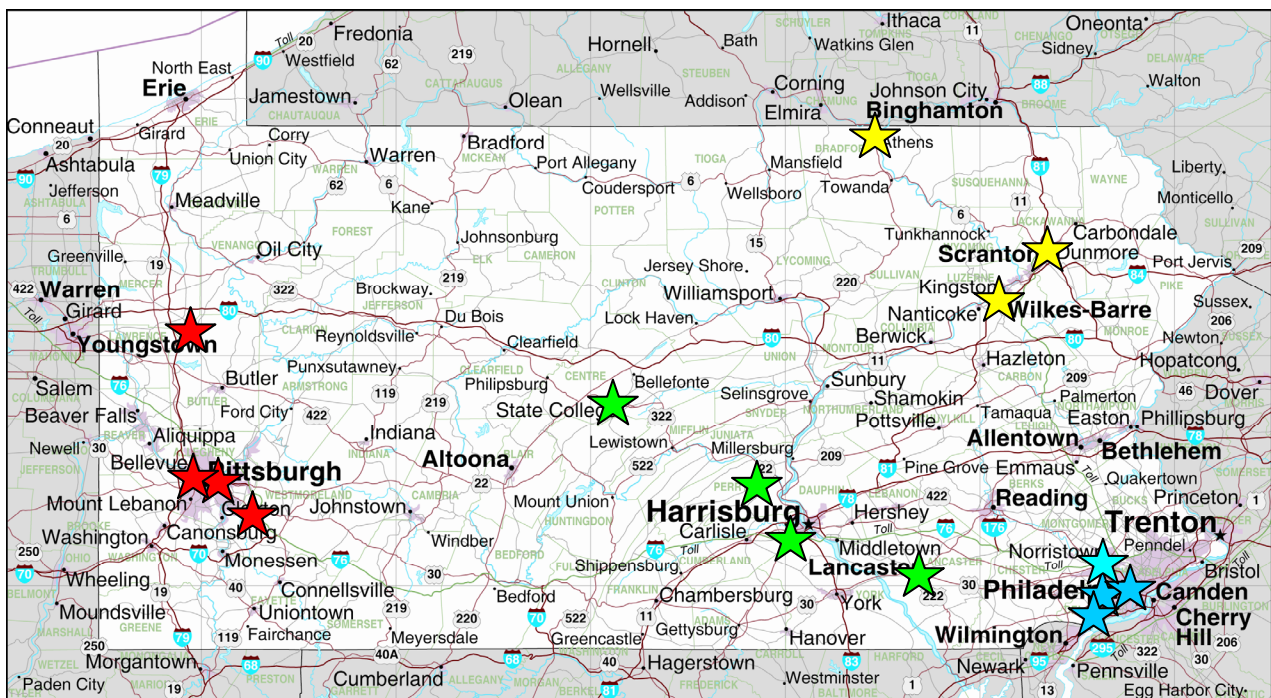
Logistics and Demographics

PDE provided DRC with a list of the Science, Technology, Environment, and Ecology Assessment Advisory Committee (STEEAAC) members who agreed to participate and to facilitate the PSSA Science Item Tryout Project in their respective districts. Disbursed throughout Pennsylvania, participating districts provided a representative sample of students enrolled in science in grades 4, 8, and 11 in urban, suburban, and rural schools. Participating schools are listed in Table 3–9 and graphically displayed in Figure 3–1.

Table 3–9. Participating Districts by Region

REGION OF COMMONWEALTH	SCHOOL DISTRICT
Central	Manheim Township
	Newport
	State College Area
	West Shore Wilkes Barre Area
Western	Athens Area
	Grove City Area
	Penn Hills
	Pittsburgh Public Schools
Eastern	Haverford Township
	Lower Merion
	Mid-Valley
	Philadelphia City SD
	Upper Merion

Figure 3–1. Location of Testing Sites



Process and Procedures—The Pilot Test

Two parallel forms of the science assessment were designed for each grade level, with a designated administration time of thirty minutes. No attempt was made to replicate the design of a PSSA science operational test for the cognitive lab or pilot test, because of testing-time limitations and the objectives of this study. The items were representative of items from each of the proposed PSSA's four reporting strands (i.e., Nature of Science, Biological Science, Physical Science, and Earth and Space Science). All test items were approved by the PDE before inclusion in the PSSA Science Item Tryout Project

In fourth grade, each form of the test consisted of ten multiple-choice items, 70% of which included graphs, graphics, charts, or tables with relevant information associated with the item. All four reporting strands were assessed in each fourth grade test form. In grades eight and eleven, age/grade-appropriate science scenarios were developed. The scenarios included graphics, charts, tables, graphs, and diagrams to support the scenario text. A set of test items associated with each science scenario was developed. In eighth grade, each test form included items from all four reporting strands. In eleventh grade, scenarios in test Form A assessed the biological, earth/space, and nature of science reporting strands, while test Form B assessed the physical, earth/space, and nature of science reporting strands.

Scenarios and questions reached beyond simple fact recollection; they were designed to challenge students to think and to apply knowledge and skills learned in their classrooms. The science scenarios were specifically designed and based on Pennsylvania Assessment Anchors and Eligible Content. Scenarios were designed to reflect multi-dimensional classroom activities that incorporate higher cognitive levels of understanding. Each scenario was stimulus-based having passages with graphics, charts, graphs, or a combination of all three media. Science scenarios challenged students to interpret passage content, while using science knowledge and process skills to arrive at their answers.

Implementation and Test Administration

Two classrooms within one geographic region participated in the project each day. At least two test development specialists were present at all but one school district during the pilot study project sessions; in addition, representatives from PDE attended most sessions. The Pennsylvania PSSA Science Item Tryout Project field work occurred during a three-week window, beginning on February 27 and concluding on March 16.

Results

Based on the information gathered at the cognitive labs or item pilots, the construction of the science scenarios were further refined. As the development process on the science scenarios continued, PDE provided additional approvals on the content and format of the science scenarios before the scenarios were reviewed by committees of Pennsylvania Educators in summer 2006.

Item Content Review in July 2006

Prior to field testing, all newly developed test items were submitted to content committees for review. The content committees consisted of Pennsylvania teachers and subject-area supervisors from school districts throughout the Commonwealth of Pennsylvania, some with postsecondary university affiliations. The primary responsibility of the content committee was to evaluate items with regard to quality and content classification, including grade-level appropriateness, estimated difficulty, Depth of Knowledge, and source of challenge. They also suggested

revisions and made recommendations for reclassification of items. In some cases when an item was deleted, the committee suggested a replacement item and/or reviewed a suggested replacement item provided by the facilitators. The committee also reviewed the items for adherence to the Principles of Universal Design, including language demand and issues of bias, fairness, and sensitivity.

The content review was held July 11–13, 2006 in Grantville, Pennsylvania. Committee members were selected and approved by PDE, and PDE-approved invitations were sent to participants by DRC. PDE also selected internal PDE staff members for attendance. The meeting commenced with a welcome by PDE and DRC. This was followed by an overview of the test development process by DRC. DRC also provided training on the procedures and forms to be used for item content review.

DRC science assessment specialists facilitated the reviews and were assisted by representatives of PDE. Committee members, grouped by grade level, worked through and reviewed the items for quality and content, as well as for the following categories:

1. Anchor Alignment (classified as Full, Partial, or No)
2. Content Limits (classified as Yes or No)
3. Grade-Level Appropriateness (classified as at grade level, below, or above grade level)
4. Difficulty Level (classified as Easy, Medium, or Hard)
5. Depth of Knowledge (classified as Recall, Application, Strategic Thinking)
6. Appropriate Source of Challenge (classified as Yes or No)
7. Correct Answer (classified as Yes or No)
8. Quality of Distractors (classified as Yes or No)
9. Graphics (classified as Yes or No)
10. Appropriate Language Demand (classified as Yes or No)
11. Freedom from Bias (classified as Yes or No)

The members then came to consensus and assigned a status to each item as a group: Approved, Accepted with Revision, Move to Another Assessment Anchor or Grade, or Rejected. All comments were recorded, and a master rating sheet was completed. Committee facilitators recorded the committee consensus on the Item Review Tally Form. The form may be found in Appendix C.

Security was addressed by adhering to a strict set of procedures. Items in binders were distributed for committee review by number and signed for by each member on a daily basis. All attendees, with the exception of PDE staff, were required to sign a Confidentiality Agreement. All materials not in use at any time were stored in a locked room. Secure materials that did not need to be retained after the meetings were deposited in secure barrels and their contents were shredded.

Bias, Fairness, and Sensitivity Reviews

Prior to field testing, all newly developed test items were also submitted to a Bias, Fairness, and Sensitivity Committee for review. This took place on July 10–14, 2006. The committee's

primary responsibility was to evaluate items as to acceptability with regard to bias, fairness, and sensitivity issues. They also made recommendations for changes or deletion of items in order to remove the potential for issues of bias, fairness, and/or sensitivity. An expert, multi-ethnic committee composed of men and women was trained by DRC to review items for bias, fairness, and sensitivity issues. Table 3–9 shows the gender and race/ethnicity composition of the bias committee that reviewed the science items and scenarios for bias, fairness, and sensitivity.

Table 3–9. Demographic Composition of the 2006 Bias, Fairness, and Sensitivity Committee for Science

Committee Member	Gender	Race/Ethnicity
1	Female	American Indian or Alaskan Native
2	Female	White Non-Hispanic /Caucasian American
3	Male	Black/African American non-Hispanic
4	Female	Black/African American non-Hispanic
5	Male	White Non-Hispanic /Caucasian American
6	Male	Asian or Pacific Islander
7	Female	White Non-Hispanic /Caucasian American
8	Female	Black/African American non-Hispanic
9	Female	Latino/Hispanic American
Totals	6 Females 3 Males	3 African American 1 Asian American 3 Caucasian American 1 Hispanic American 1 Native American

Training materials included a manual developed by DRC (DRC, 2003–2007). Members of the committee also had expertise with special needs students and English Language Learners. PDE staff members were also trained and participated in the review. All items were read by a cross-section of committee members. Each member noted bias, fairness, and/or sensitivity comments on tracking sheets and on the item, if needed, for clarification. The committee then discussed each of the issues as a group and came to consensus as to which issues should represent the view of the committee. All consensus comments were then compiled, and the actions taken on these items were recorded and submitted to PDE. This review followed the same security procedures as outlined above, except that the materials were locked up and stored at the DRC offices in Harrisburg.

The results from the Bias, Fairness, and Sensitivity committee review of science are summarized in Table 3–10.

Table 3–10. Number of Items—2006 Bias, Fairness, and Sensitivity Committee Review for Science

Grade	Scenarios			Items		
	Accepted As Is	Accepted With Revision	Rejected	Accepted As Is	Accepted With Revision	Rejected
4				335	24	1
8	4	0	0	359	10	0
11	7	1	0	340	10	0
Total	11	1	0	1034	44	1

ITEM AUTHORIZING AND TRACKING

Initially, items were prepared on PSSA Item Cards and used for preliminary sorting and review. Although very similar, the PSSA Item Card for Multiple-Choice Items differs from the PSSA Item Card for Open-Ended Items in that the former has a location at the bottom of the card for comments regarding the distractors. Blank examples of these two cards are shown in Appendix E. In both instances a column next to the right margin provides for codes to identify the subject area, grade, content categories, passage information (in the case of reading), item type, Depth of Knowledge (cognitive complexity), estimated difficulty, answer key (MC items), and calculator use (mathematics).

All items undergoing field testing were entered into the DRC Item Viewer and Authoring Network™ (IVAN), which is a comprehensive, secure, online item banking system. It accommodates item writing, item viewing and reviewing, and item tracking and versioning. IVAN manages the transition of an item from its developmental stage to its approval for use within a test form. The system supports an extensive item history that includes item usage within a form, item-level notes, content categories and subcategories, item statistics from both classical and Rasch item analyses, and classifications derived from analyses of differential item functioning (DIF). A sample IVAN Item Card is presented in Appendix E.

Chapter Four: Universal Design Procedures Applied in the 2007 PSSA Test Development Process

Universally designed assessments allow participation of the widest possible range of students and contribute to valid inferences about participating students. Principles of Universal Design are based on the premise that each child in school is a part of the population to be tested, and that testing results should not be affected by disability, gender, race, or English language ability (Thompson, Johnstone & Thurlow, 2002). At every stage of the item and test development process, including the 2007 field test, procedures were employed to ensure that items and subsequent tests were designed and developed using the elements of universally designed assessments developed by the National Center for Educational Outcomes (NCEO).

Federal legislation addresses the need for universally designed assessments. The *No Child Left Behind* Act (Elementary and Secondary Education Act) requires that each state must “provide for the participation in [statewide] assessments of all students” [Section 1111(b)(3)(C)(ix)(I)]. Both Title 1 and IDEA regulations call for universally designed assessments that are accessible and valid for all students, including students with disabilities and students with limited English proficiency. The benefits of universally designed assessments not only apply to these groups of students, but to all individuals with wide-ranging characteristics.

DRC’s test development team was trained by the National Center for Educational Outcomes (NCEO) in the elements of Universal Design as it relates to developing large-scale statewide assessments. Pennsylvania committees involved in content review included some members who were familiar with the unique needs of students with disabilities and students with limited English proficiency. Likewise some members of the Bias, Fairness, and Sensitivity Committee were conversant with these issues. What follows are the Universal Design guidelines followed during all stages of the item development process for the 2007 PSSA Science Field Test.

ELEMENTS OF UNIVERSALLY DESIGNED ASSESSMENTS

After a review of research relevant to the assessment development process and the Principles of Universal Design (Center for Universal Design, 1997), NCEO has produced seven elements of Universal Design as they apply to assessments (Thompson, Johnstone & Thurlow, 2002). These elements served to guide PSSA science item development.

- **Inclusive Assessment Population**
The PSSA target population includes all students at the assessed grades attending Commonwealth schools. For state, district, and school accountability purposes, the target population includes every student except those who will participate in accountability through an alternate assessment.
- **Precisely Defined Constructs**
An important function of well-designed assessments is that they actually measure what they are intended to measure. The Pennsylvania Assessment Anchor Content Standards (Assessment Anchors) provided clear descriptions of the constructs to be measured by the PSSA at the assessed grade levels. Universally designed assessments must remove all non-construct-oriented cognitive, sensory, emotional, and physical barriers.
- **Accessible, Non-biased Items**
DRC conducted both internal and external reviews of items and test specifications to ensure that they did not create barriers because of lack of sensitivity to disability, culture,

or other subgroups. Items and test specifications were developed by a team of individuals who understand the varied characteristics of items that might create difficulties for any group of students. Accessibility is incorporated as a primary dimension of test specifications, so that accessibility was woven into the fabric of the test rather than being added after the fact.

- **Amenable to Accommodations**

Even though items on universally designed assessments are accessible for most students, there are some students who continue to need accommodations. This essential element of universally designed assessment requires that the test is compatible with accommodations and a variety of widely-used adaptive equipment and assistive technology. (See the section on Assessment Accommodations later in Chapter Four.)

- **Simple, Clear, and Intuitive Instructions and Procedures**

Assessment instructions should be easy to understand, regardless of a student's experience, knowledge, language skills, or current concentration level. Knowledge questions that are posed within complex language can invalidate the test if students cannot understand how they are expected to respond to a question. To meet this guideline, directions and questions were prepared in simple, clear, and understandable language that underwent multiple reviews.

- **Maximum Readability and Comprehensibility**

A variety of guidelines exist to ensure that text is maximally readable and comprehensible. Readability and comprehensibility are affected by many characteristics, including student background, sentence difficulty, text organization, and others. All of these features were considered as item text was developed.

Plain language is a concept now being highlighted in research on assessments. Plain language has been defined as language that is straightforward and concise. The following strategies for editing text to produce plain language were used during the editing process of the new PSSA items.

- Reduction of excessive length
- Use of common words
- Avoidance of ambiguous words
- Avoidance of irregularly spelled words
- Avoidance of proper names
- Avoidance of inconsistent naming and graphic conventions
- Avoidance of unclear signals about how to direct attention

- **Maximum Legibility**

Legibility is the physical appearance of text, the way that the shapes of letters and numbers enable people to read text easily. Bias results when tests contain physical features that interfere with a student's focus on or understanding of the constructs that test items are intended to assess. A style guide developed and updated annually (DRC, 2004–2007) was utilized, with PDE approval, which included dimensions of style consistent with Universal Design.

GUIDELINES FOR UNIVERSALLY DESIGNED ITEMS

All test items written and reviewed adhered closely to the following guidelines for Universal Design. Item writers and reviewers used a checklist during the item development process to ensure that each aspect was attended to.

1. **Items measure what they are intended to measure.** Item writing training included assuring that writers and reviewers had a clear understanding of Pennsylvania's Assessment Anchors and Eligible Content. During all phases of test development, items were presented with content standard information to ensure that each item reflected the intended Assessment Anchor as defined by the Eligible Content. Careful consideration of the content standards was important in determining which skills involved in responding to an item were extraneous and which were relevant to what was being tested. (Necessary to the items is the requirement that students utilize reading skills.)
2. **Items respect the diversity of the assessment population.** As stated earlier, to develop items that avoid content that might unfairly advantage or disadvantage any student subgroup, item writers, test developers, and reviewers were trained to write and review items for issues of bias, fairness, and sensitivity. Training also included an awareness of, and sensitivity to, issues of cultural and regional diversity.
3. **Items have a clear format for text.** Decisions about how items are presented to students must allow for maximum readability for all students. Appropriate fonts and point sizes were employed with minimal use of italics, which is far less legible and is read considerably more slowly than standard typeface. Captions, footnotes, keys, and legends were at least a 12-point size (11pt for grade 11). Legibility was enhanced by sufficient spacing between letters, words, and lines. Blank space around paragraphs and between columns and staggered right margins were used.
4. **Stimuli and items have clear pictures and graphics.** When pictures and graphics were used, they were designed to provide essential information in a clear and uncluttered manner. Illustrations were placed directly next to the information to which they referred, and labels were used where possible. Sufficient contrast between background and text, with minimal use of shading, increased readability for students with visual difficulties. Color was not used to convey important information.
5. **Items have concise and readable text.** Linguistic demands of stimuli and items can interfere with a student's ability to demonstrate knowledge of the construct being assessed. During item writing and review, the following guidelines were used.
 - Simple, clear, commonly-used words were used whenever possible.
 - Extraneous text was omitted.
 - Vocabulary and sentence complexity were appropriate for the grade level assessed.
 - Technical terms and abbreviations were used only if related to the content being measured.
 - Definitions and examples were clear and understandable.
 - Idioms were avoided unless idiomatic speech was being assessed.

– The questions to be answered were clearly identifiable.

6. **Items allow changes to format without changing meaning or difficulty.** In case large-print and/or Braille versions of the assessment will be produced, attention was given to using items that allow for Braille. If appropriate, specific accommodations will be permitted such as signing to a student, the use of oral presentation under specified conditions, and the use of various assistive technologies.
7. **The test has an overall appearance that is clean and organized.** Images, pictures, and text that may not be necessary (e.g., sidebars, overlays, callout boxes, visual crowding, shading) and that could be potentially distracting to students were avoided. Also avoided were purely decorative features that did not serve a purpose. Information was organized in a manner consistent with an academic English framework with a left-right, top-bottom flow.

Item Formatting

The PSSA field test booklets were formatted to maximize accessibility for all students by using text that is in a point size and font style that is easily readable. Shading, spacing, graphics, charts, and number of items were limited per page so that there is sufficient white space on each page. Whenever possible, graphics, pictures, diagrams, charts, and tables were positioned on the page with the associated test items. High contrast for text and background was used where possible to convey pertinent information. Field test forms were published on dull-finish paper to avoid the glare encountered on glossy paper. Close attention was paid to the binding of the PSSA test booklets to ensure that they would lay flat for two-page viewing and ease of reading and handling.

Consistency across PSSA assessments was maintained on the field test forms as follows:

- High contrast and clarity was used to convey detailed information.
- Typically, shading was avoided; when necessary for content purposes, 10% screens were used as the standard.
- Overlaid print on diagrams, charts, and graphs were avoided.
- Charts, graphs, diagrams, and tables were clearly labeled with titles and with short descriptions where applicable.
- Only relevant information was included in diagrams, pictures, and graphics.
- Symbols used in keys and legends were meaningful and provided reasonable representations of the topic they depicted.
- Pictures that required physical measurement were true to size.

Chapter Five: Field Test Procedures

The purpose of administering field test items is to obtain statistics for them so they can be reviewed before becoming operational. Based on this statistical review, many of the field test items in the 2007 PSSA Science Field Test were selected for use as common or matrix items in the 2008 PSSA.

EMBEDDED FIELD TEST ITEMS FOR 2008

The operational 2008 PSSA science forms will contain common items (identical on all forms) along with matrix/embedded field test items. The common items will consist of a set of “core” items taken by all students. The matrix and field test items will be embedded and will be unique, in most instances, to a form; however, there will be instances in which a matrix or embedded field test item will appear on more than one form. More information will be provided in the forthcoming *2008 PSSA Science Technical Report*.

STANDALONE FIELD TEST ITEMS FOR 2007

In 2007, the PSSA science test for grade 4, 8, and 11 consisted of 12 standalone field test forms per grade. Construction of the field test forms took place from October 2006 through January 2007, following the Item Content Review consisting of Pennsylvania educators, and the Bias, Fairness, and Sensitivity review consisting of national as well as Pennsylvania review experts. All items and graphics without an “Accepted” status were revised according to committee recommendation and PDE approval. DRC designed the field test format and received PDE approval. Twelve forms, labeled 01–12, were then constructed for each grade with items distributed across the Reporting Categories and, as reasonably possible, across the Assessment Anchors.

Grade 4 Science Test Plan: Standalone Field Test

Each student taking the grade 4 standalone field test was administered 25 multiple-choice items and four open-ended items. In both sections, the multiple-choice items were administered before the open-ended items. The estimated testing time for the grade 4 standalone field test was approximately 45–50 minutes. Table 5–1 provides a summary of the spring 2007 grade 4 standalone science field tests.

Table 5–1. Grades 4 2007 Science Field Test Plan by Section

Section	No. of Standalone MC Items per Form	No. of Scenario-based MC Items per Form	No. of Standalone OE Items per Form	No. of Scenario-based OE Items per Form	Total No. of MC Items per Form	Total No. of OE Items per Form	No. of Field Test Forms
1	12	0	2	0	25	4	12
2	13	0	2	0			

Grade 8 Science Test Plan: Standalone Field Test

Each student taking the grade 8 standalone field test was administered one scenario, 24 multiple-choice items and four open-ended items. In both sections, the multiple-choice items were administered before the open-ended items. The estimated testing time for the grade 8 standalone

field test was approximately 45–50 minutes. Table 5–2 provides a summary of the spring 2007 grade 8 standalone science field tests.

Table 5–2. Grades 8 2007 Science Field Test Plan by Section

Section	No. of Standalone MC Items per Form	No. of Scenario-based MC Items per Form	No. of Standalone OE Items per Form	No. of Scenario-based OE Items per Form	Total No. of MC Items per Form	Total No. of OE Items per Form	No. of Field Test Forms
1	8	4	2	0	24	4	12
2	12	0	2	0			

Grade 11 Science Test Plan: Standalone Field Test

Each student taking the grade 11 standalone field test was administered one scenario, 24 multiple-choice items and two open-ended items. In both sections, the multiple-choice items were administered before the open-ended items. The estimated testing time for the grade 11 standalone field test was approximately 45–50 minutes. Table 5–3 provides a summary of the spring 2007 grade 8 standalone science field tests.

Table 5–3. Grades 11 2007 Science Field Test Plan by Section

Section	No. of Standalone MC Items per Form	No. of Scenario-based MC Items per Form	No. of Standalone OE Items per Form	No. of Scenario-based OE Items per Form	Total No. of MC Items per Form	Total No. of OE Items per Form	No. of Field Test Forms
1	8	4	1	0	24	2	12
2	12	0	1	0			

One *Directions for Administration Manual* for each grade was written and printed for the administrators. The forms were then printed, and packets of forms were spiraled and shipped according to the sampling plan described later in this chapter. At grades 4 and 8, each student received a test booklet and one separate answer booklet. The answer booklet was used to respond to the multiple-choice and open-ended items and to collect demographic information. The multiple-choice items and scenario stimulus-text were placed within the test booklets. At grade 11, the contents of the answer booklet and the test booklet were combined into one integrated science booklet. This configuration was utilized to mirror the plans for the operational assessment.

Student Questionnaire

A 5-item student questionnaire was included on the back of each student answer booklet, and students were given approximately 5 minutes to answer the questions following the completion of the last section of the field testing event. The purpose of the questionnaire was to gain further feedback on the field test from the student’s perspective. The completed student questionnaires were returned to DRC and the results were summarized. A summary of the results can be found in Appendix D.

EMBEDDED FIELD TEST ITEMS

The 2007 PSSA science forms consisted of field test items only, with no common core. Future administrations, like other PSSA subjects, will be built on core, matrix, and embedded field test items.

STATISTICAL ANALYSIS OF ITEM DATA

All field tested items were analyzed statistically following conventional item analysis methods. This analysis was useful to evaluate the overall performance of the pool of field test items. For MC items, traditional or classical item statistics included the point-biserial correlation (Pt Bis) for the correct and incorrect responses, percent correct (P-Value), and the percent responding to incorrect responses (distractors). For OE items the statistical indices included the item-test correlation, the point-biserial correlation for each score level, percent in each score category or level, and the percent of non-scorable responses.

In general, more capable students are expected to respond correctly to easy items and less capable students are expected to respond incorrectly to difficult items. If either of these situations does *not* occur, the item will be reviewed by DRC test development staff and committees of Pennsylvania educators to determine the nature of the problem and the characteristics of the students affected. The primary way of detecting such conditions is through the point-biserial correlation coefficient for dichotomous (MC) items and the item-total correlation for polytomous (OE) items. In each case the statistic will be positive if the total test mean score is higher for the students who respond correctly to MC items (or attain a higher OE item score) and negative when the reverse is true.

Item statistics are used as a means of detecting items that deserve closer scrutiny, rather than being a mechanism for automatic retention or rejection. For a MC item to be flagged as needing further internal review, the criteria included any of the following:

- Point-biserial correlation for the correct response of less than 0.25
- Point-biserial correlation for any incorrect response greater than 0.0
- Percent correct less than 30% or greater than 90%
- Percent responding to any incorrect responses greater than the percent correct

For an OE item to be flagged as needing further internal review, the criteria included any of the following:

- Item-test correlation less than 0.40
- Percent in any score category less than 10% or greater than 40%
- Non-scorable responses greater than 10 percent

Item analysis results for multiple-choice and open-ended field test items are presented in Appendices F through K.

REVIEW OF ITEMS WITH DATA

In the preceding section on Statistical Analysis of Item Data, it was stated that test development content-area specialists used certain statistics from item and DIF analyses of the 2006 field test to identify items for further internal review. Specific flagging criteria for this purpose were

specified in the previous section. Generally, items not identified were those that had good statistical characteristics and, consequently, were regarded as statistically acceptable. Following the internal review, a committee of Pennsylvania educators was convened to review the entire pool of field test items using the same criteria.

The review of the items with data by Pennsylvania educators was conducted by committees composed of PDE staff and grade-level classroom teachers and administrators. The review took place on August 20–21, 2007. In this session, committee members were first trained by DRC staff, with regard to a historical perspective on the science assessment and the statistical indices used in item evaluation. This was followed by a discussion with examples concerning reasons why a committee might recommend that an item might be retained or rejected regardless of the statistics. The committee review process involved a brief exploration of possible reasons for the statistical profile of an item (e.g., possible bias, grade appropriateness, instructional issues) and a decision regarding acceptance. DRC content-area test development specialists facilitated the review of the items by grade level. Each grade-level committee reviewed the pool of field test items and made recommendations on each item and scenario (grade 8 and grade 11). Further discussion on how this information was used is covered in Chapter Six.

Chapter Six: Operational Forms Construction for 2008

This chapter is to be completed in the forthcoming 2008 PSSA Science Technical Report.

Chapter Seven: Test Administration Procedures

TEST SESSIONS, TIMING, AND LAYOUT

The test window for the 2007 science field test was from April 23 through May 4, 2007, including make-ups. The assessment consisted of two sections. Additional information concerning testing time and test layouts for the field test can be found in Chapter Five.

SHIPPING, PACKAGING, AND DELIVERY OF MATERIALS

Data Recognition Corporation (DRC) shipped administration materials and secure assessment materials for the 2007 PSSA Science Field Test in a single shipment. The shipment was delivered by April 16, 2007, and contained the Handbook for Assessment Coordinators and Administrators, Directions for Administration Manuals for each grade tested at a school, administrative materials (e.g., return shipping labels and Student Precode Labels), and secure materials (e.g., test booklets and answer booklets). The assessments for grades 4, 8, and 11 were shipped together. DRC packed 820,325 assessment booklets, approximately 58,097 manuals, and 98,130 non-secure materials for 2,109 testing sites. DRC used UPS to deliver 5,902 boxes of materials to the testing sites.

There will be two shipments for the 2008 Science PSSA; Shipment 1 will contain the Handbook for Assessment Coordinators and Administrators and Directions for Administration Manuals, and Shipment 2 will contain the secure materials, Student Precode Labels, and the remainder of the materials needed to administer the tests.

For the 2007 PSSA Science Field Test, DRC ensured that all assessment materials were assembled correctly prior to shipping. DRC Operations staff used the automated Operations Materials Management System (Ops MMS) to assign secure materials to a district at the time of ship out. This system used barcode technology to provide an automated quality check between items requested for a site and items shipped to a site. A shipment box manifest was produced for and placed in each box shipped. DRC Operations staff double checked all box contents with the box manifest prior to the box being sealed for shipment to ensure accurate delivery of materials. DRC Operations staff performed lot acceptance sampling on both shipments. Districts and schools were selected at random and examined for correct and complete packaging and labeling. This sampling represented a minimum of 10 percent of all shipping sites.

DRC's materials management system, along with the systems of shippers, allowed DRC to track the items from the point of shipment from DRC's warehouse facility to receipt at the district, school, or testing site. All DRC shipping facilities, materials processing facilities, and storage facilities are secure. Access is restricted by security code. Non-DRC personnel are escorted by a DRC employee at all times. Only DRC inventory control personnel have access to stored secure materials. DRC employees are trained in and made aware of the high level of security that is required.

MATERIALS RETURN

The materials return window for the 2007 PSSA Science Field Test was May 9, 2007–May 15, 2007. DRC used UPS for all returns.

TEST SECURITY MEASURES

Test security is essential to obtaining reliable and valid scores for accountability purposes. The 2007 PSSA Science Field Test included a Test Security Affidavit that was to be signed and returned by every principal or director where testing materials were shipped. DRC received 2,381 signed Test Security Affidavits of the 3,150 affidavits sent to the testing sites participating in the 2007 PSSA Science Field Test. The purpose of the affidavit was to serve as a tool to document that the individuals responsible for administering the assessments both understood and acknowledged the importance of test security and accountability. The affidavit attested that all security measures were followed concerning the handling of secure materials. Some of the security measures included:

- The contents of the test were not discussed, disseminated, described, or otherwise revealed to anyone.
- The contents of the test were not kept, copied, or reproduced.
- All booklets were kept in a locked, secure storage area at both the district and school levels.

SAMPLE MANUALS

Copies of the *Handbook for Assessment Coordinators and Administrators* and the *Directions for Administration Manuals* can be found on the Pennsylvania Department of Education website at www.pde.state.pa.us.

ASSESSMENT ACCOMMODATIONS

An accommodations manual entitled *2007 Accommodations Guideline for Students with IEPs, Students with 504 Plans, English Language Learners, and All Students* (PDE, January 2007) was developed for use with the 2007 PSSA. For the 2007 PSSA Science Field Test, as a general rule, administrators were instructed to use accommodations identified for the mathematics assessment. Additional information regarding assessment accommodations can be found in Chapter Four of this report.

Chapter Eight: Processing and Scoring

RECEIPT OF MATERIALS

Receipt of 2007 PSSA Science Field Test materials began on May 9, 2007, and concluded on May 15, 2007. DRC's Operations Material Management System (Ops MMS) was utilized to receive assessment materials securely, accurately, and efficiently. This system features advanced automation and cutting-edge barcode scanners. Captured data were organized into reports, which provided timely information with respect to suspected missing material.

The first step in the Ops MMS was the Box Receipt System. When a shipment arrived at DRC, the boxes were removed from the carrier's truck and passed under a barcode reader, which read the barcode contained on the return label and identified the district and school. If the label could not be read automatically, a floor operator entered the information into the system manually. The data collected in this process were stored in the Ops MMS database. After the barcode data were captured, the boxes were placed on a pallet and assigned a corresponding pallet number. A "three way match" among the district box count, the carrier box count, and the DRC return box count was conducted to verify a box return accuracy rate of 100%.

Once the box receipt process was completed, the materials separation phase began. Warehouse personnel opened the district boxes and sorted the contents by material type (test booklet or answer booklet), grade, and status (used or unused answer booklet) into new boxes. Once filled, a sorted box's documents were loaded into an automated counter, which recorded a booklet count for each box. An on-demand DRC box label was produced that contained a description of each box's contents and quantity in both barcode and human-readable format. This count remained correlated to the box as an essential quality control step throughout secure booklet processing and provided a target number for all steps of the check-in process.

Once labeled, the sorted and counted boxes proceeded to booklet check-in. This system used streamfeeder automation to carry documents past oscillating scanners that captured data from up to two representative barcodes and stored it in the Ops MMS database.

The secure booklet check-in operator used a hand scanner to scan the counted box label. This procedure input material type and quantity parameters for what the Ops MMS should expect within a box. It then loaded the box's contents into the streamfeeder.

The documents were fed past oscillating scanners that captured either a security code or both a security code and a pre-code, depending upon material type. A human operator monitored an Ops MMS screen, which displayed scan errors, an ordered accounting of what was successfully scanned, and the document count for each box.

When all materials were scanned and the correct document count was reached, the box was sealed and placed on a pallet. If the correct document count was not reached, or if the operator encountered difficulties with material scanning, the box and its contents were delivered to an exception handling station for resolution.

This check-in process occurred immediately upon receipt of materials; therefore, DRC provided immediate feedback to districts and schools regarding any missing materials based on actual receipts versus expected receipts.

Upon completion of secure booklet check-in, DRC produced a Missing Materials Report that listed all schools in each participating district and any booklets not returned to DRC listed by

school and security number.

After scannable materials (used answer booklets) were processed through booklet check-in, the materials became available to the DRC Document Processing Center Log-in staff for document log-in. Based on a pre-determined sampling and calibration plan, the staff prioritized answer documents using the following process:

- A DRC scannable barcode batch header was scanned, and a batch number was assigned to each box of answer documents.
- The DRC box label barcode was scanned into the system to link the box and answer documents to the newly created batch and to create a Batch Control Sheet.
- The DRC box label barcode number, along with the number of answer documents in the box, was printed on the Batch Control Sheet for document tracking purposes. All documents that were linked to the box barcode were assigned to the batch number and tracked through all processing steps. As documents were processed, DRC staff dated and initialed the Batch Control Sheet to indicate that proper processing and controls were observed.

Before the answer documents were scanned, all batches went through a quality inspection to ensure batch integrity and correct document placement.

After a quality check in the DRC Document Processing Log-in area, the spines were cut off the scannable documents, and the pages were sent to DRC's Imaging and Scoring System.

SCANNING OF MATERIALS

DRC used its image scanning system to capture constructed-response items as images. These were then loaded into the image scoring system for both the handscoring of constructed-response items and for the capture of multiple-choice and demographic data.

DRC's image scanners were calibrated using a standard deck of scannable pages with 16 known levels of gray. On a predefined page location, the average pixel darkness was compared to the standard calibration to determine the level of gray. Marks with an average darkness level of 4 or above on a scale of 16 (0 through F) were determined to be valid responses, per industry standard. If multiple marks were read for a single item and the difference of the grayscale reads was greater than four levels, the lighter mark was discarded. If the multiple marks had fewer than four levels of grayscale difference, the response was flagged systematically and forwarded to an editor for resolution.

Customized scanning programs for all scannable documents were prepared to read the answer documents and to electronically format the scanned information. Before materials arrived, all image scanning programs went through a quality review process that included scanning of mock data from production booklets to ensure proper data collection.

DRC's image scanners read selected-response, demographic, and identification information. The image scanners also used barcode readers to read pre-printed barcodes from a label on the booklet.

The scannable documents were automatically fed into the image scanners where pre-defined processing criteria determined which fields were to be captured electronically. Constructed-response images were separated out for image-based scoring.

During scanning, a unique serial number was printed on each sheet of paper. This serial number was used for document integrity and to maintain sequencing within a batch of answer documents.

A monitor randomly displayed images, and the human operator adjusted or cleaned the scanner when the scanned image did not meet DRC's strict quality standards for image clarity.

All images passed through a process and a software clean-up program that despeckled, deskewed, and desmeared the images. A random sample of images was reviewed for image quality approval. If any document failed to meet image quality standards, the document was returned for rescanning.

Page scan verification was performed to ensure that all pre-defined portions of the answer documents were represented in their entirety in the image files. If a page was missing, the entire answer document was flagged for resolution.

After each batch was scanned, answer documents were processed through a computer-based edit program to detect potential errors as a result of smudges, multiple marks, and omits in predetermined fields. Marks that did not meet the pre-defined editing standards were routed to editors for resolution.

Experienced DRC Document Processing Center Editing staff reviewed all potential errors detected during scanning and made necessary corrections to the data file. The imaging system displayed each suspected error. The editing staff then inspected the image and made any needed corrections using the unique serial number printed on the document during scanning.

Upon completion of editing, quality control reports were run to ensure that all detected potential errors were reviewed again and a final disposition was determined.

Before batches of answer documents were extracted for scoring, a final edit was performed to ensure that all requirements for final processing were met. If a batch contained errors, it was flagged for further review before being extracted for scoring and reporting.

During this processing step, the actual number of documents scanned was compared to the number of answer documents assigned to the box during book receipt. Count discrepancies between book receipt and answer documents scanned were resolved at this time.

Once all requirements for final processing were met, the batch was released for scoring and student level processing.

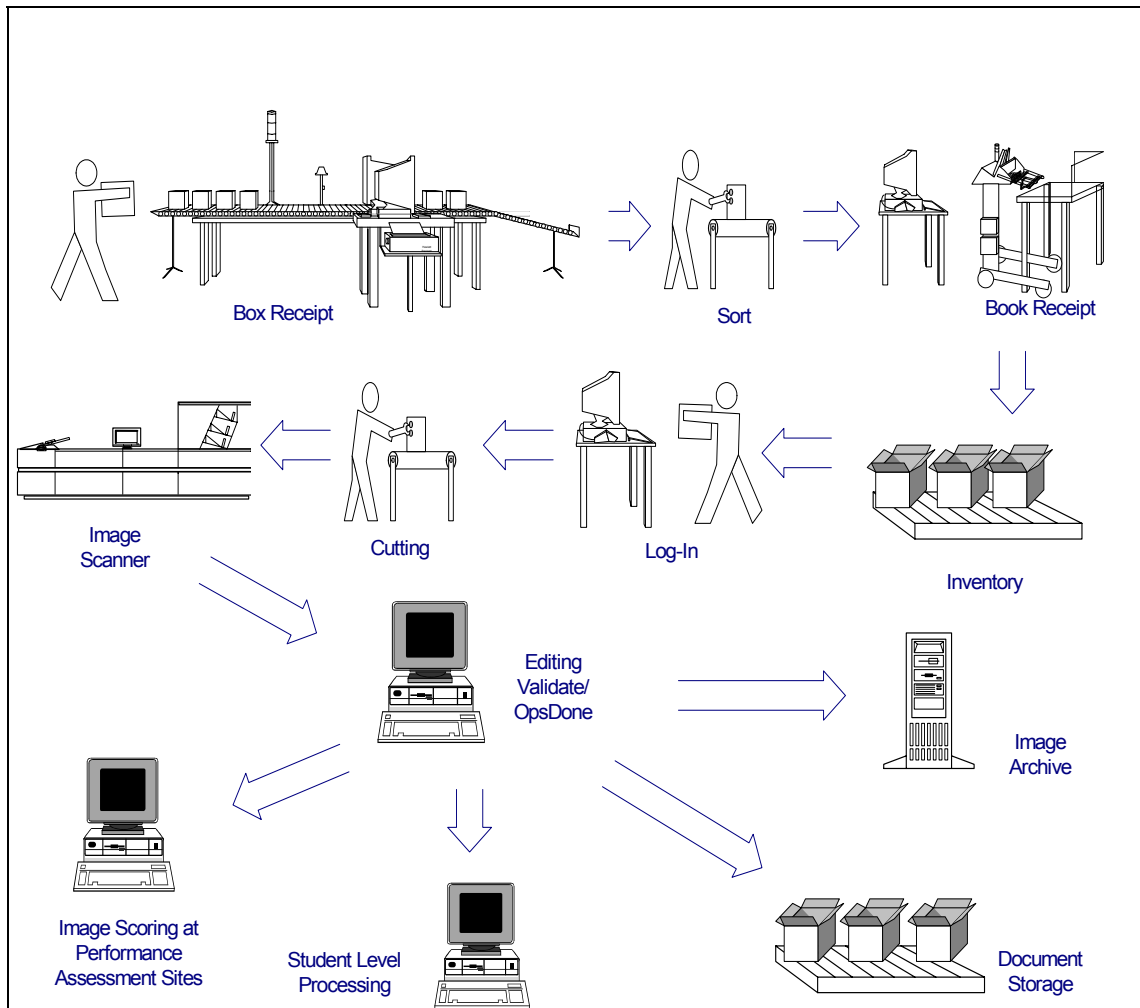
Table 8–1 shows the number of answer booklets received through booklet check in, the number of booklets that contained student responses that were scanned and scored, the number of test booklets received, and the total number of booklets received.

Table 8–1. 2007 PSSA Science Field Test Materials Received – Grades 4, 8, and 11

	Answer Booklets Received	Used Answer Booklets Scanned	Test Booklets Received	Total Booklets Received
Grade 4	155,401	127,007	155,349	310,750
Grade 8	170,064	142,119	169,917	339,981
Grade 11	169,500	135,014	n/a	169,500

Figure 8–1 illustrates the production workflow for DRC’s Ops MMS and Image Scanning and Scoring System from receipt of materials through all processing of materials and the presentation of scanned images for scoring.

Figure 8–1. Workflow System



MATERIALS STORAGE

Upon completion of processing, student answer materials are boxed for security purposes and final storage:

- Project-specific box labels were created containing unique customer and project information, materials type, batch number, pallet/box number, and the number of boxes for a given batch.
- Boxes were stacked on project-specific pallets that were labeled with a list of its contents and delivered to the Materials Distribution Center for final secure storage.
- Materials will be destroyed one year after contract year ends with PDE written approval.

SCORING MULTIPLE-CHOICE ITEMS

The scoring process included the scoring of multiple-choice items against the answer key and the aggregation of raw scores from the constructed responses. A student's raw score is the actual number of points achieved by the student for tested elements of an assessment. From the raw scores, the scale scores were calculated.

The student file was scored against the finalized and approved multiple-choice answer key. Items were scored as right, wrong, omitted, or double-gridded (more than one answer was bubbled for an item). Sections of the test were evaluated as a whole and an attempt status was determined for each student for each subject. The score program defined all data elements at the student level for reporting.

RANGEFINDING

After student field test answer documents were received and processed, DRC's Performance Assessment Services (PAS) staff began to assemble groups of responses that exemplified the different score points represented in the 0–2 item-specific scoring guidelines for the short responses and the Part A & B, 0–2, item-specific scoring guidelines for the scenario responses. Papers were pulled for the grades 4, 8, and 11 field test items.

Once examples for all the score points were identified, sets were assembled for each item. These sets were copied for use at rangefinding, held May 30–June 1, 2007, at the Sheraton Harrisburg-Hershey in Harrisburg. The rangefinding committees consisted of Pennsylvania educators, PDE staff members, DRC Test Development staff, and DRC Performance Assessment Services staff.

The joint session began with a review of the history of the 2007 field test assessment and then broke into grade level groups. Copies of the student example sets were presented to the committees, one item at a time. The committees reviewed and scored the student samples together to ensure that everyone was interpreting the scoring guidelines consistently. Committee members then went on to score responses independently and those scores were discussed until a consensus was reached. Only responses for which a good agreement rate was attained were used in training the readers. Discussions of the responses used the language of the scoring guidelines, assuring PDE and all involved that the score point examples clearly illustrated the specific requirements of each score level. DRC PAS staff made notes of how and why the committees made these score point decisions, and this information was used by the individual scoring directors in reader training.

DRC and PDE discussed scoring guideline edits that the committees suggested. Changes

approved by PDE were then made by DRC Test Development and the scoring guidelines were used by PAS staff in the preparation of materials and training of readers.

READER RECRUITMENT/QUALIFICATIONS

DRC retains a number of experienced readers from year to year, and those readers made up approximately 85% of the reader pool (N=45) for this project. To complete the reader staff for this project, DRC placed advertisements in local papers, minority publications, teacher newsletters, and at regional colleges and universities. Open houses were held and applications for reader positions were screened by the DRC recruiting staff. Candidates were personally interviewed and a mandatory, on-demand writing sample was collected, along with references and proof of a four-year college degree. In this screening process, preference was given to candidates with previous experience scoring large-scale assessments and with degrees emphasizing expertise in science. Since readers had to have a strong content-specific background, the reader pool consisted of educators and other professionals who were valued for their experience, but who were also required to set aside their own biases about student performance and accept the scoring standards. All readers on this assessment held at least a four-year degree.

LEADERSHIP RECRUITMENT/QUALIFICATIONS

Scoring directors and team leaders were chosen by the project director from a pool consisting of experienced individuals who were successful readers and leaders on other DRC contracts and had strong backgrounds in scoring science. Those selected demonstrated organization, leadership, and management skills. The scoring directors and a majority of the team leaders had at least five years of leadership experience on the PSSA. All scoring directors, team leaders, and readers were required to sign confidentiality forms before any training or handling of secure materials began.

Each room of readers was assigned a scoring director. This individual was monitored by the project manager and project content coordinator and led the hand scoring for the duration of the project. The scoring director assisted in rangefinding, worked with supervisors to create training materials, conducted the team leader training, and was responsible for training the readers. The scoring director also made sure that reports were available and interpreted reports for the readers. The scoring director supervised the team leaders.

Team leaders assisted the scoring director with reader training and monitoring by working with their teams in small group discussions and answering individual questions that readers may not have felt comfortable asking in a large group. Once readers had qualified, the team leaders were responsible for maintaining the accuracy and workload of team members. The ongoing monitoring identified those readers who were having difficulty scoring accurately and resulted in the reader receiving one-on-one retraining or in pairing that reader with a stronger reader. This process corrected any inaccuracies in scoring and, if not, that reader was released from the project.

TRAINING

After rangefinding was completed, DRC's PAS staff compiled the approved scoring guidelines and the scored student examples from the committees into packets used for training the readers. Responses that were relevant in terms of the scoring concepts they illustrated were used in a scoring guide. The item-specific scoring guidelines served as the reader's constant reference. Readers were instructed how to apply the guidelines and were required to demonstrate a clear

comprehension of each anchor set by performing well on the training materials that were presented for each grade and item. These sets consisted entirely of examples of student responses reviewed by the rangefinding committee.

Team leaders assisted the scoring directors with the training and monitoring of readers. During their training, all materials were reviewed and discussed, and anticipated reader questions and concerns were addressed. Team leaders were required to annotate all of their training responses with the official annotations received from the content committee members at the rangefinding meetings. To facilitate scoring consistency, it was imperative that each team leader imparted the same rationale for each response that other team leaders used. A ratio of one team leader for each 8–10 readers ensured adequate monitoring of the readers.

Reader training consisted of the scoring director providing a review of the scoring guidelines and anchor papers assembled for each item. Readers were instructed how to apply the item-specific scoring guides and were required to demonstrate a clear comprehension of each item's anchor set by performing well on the training sets that were presented for each item (48 short response in grade 4; 48 short response in grade 8; 12 short response and 12 scenario in grade 11).

HANDSCORING PROCESS

Student responses were scored independently and by multiple readers with a 10% double read, plus team leader read behind, to ensure reliability. The 10% double reads were randomly chosen by the imaging system at the item level. The PDE determined the required number of reads. Approximately 1,200 student responses were scored for each item. These responses were identified from a wide demographic range to reflect a statewide sampling.

Readers scored the imaged student responses on PC monitors at the Minnetonka, Minnesota, and Woodbury, Minnesota, Scoring Centers. Readers were seated at tables with two imaging stations at each table. Image distribution was controlled, thus ensuring that they were sent to designated readers qualified to score those items. Readers read each response and keyed the scores.

To handle possible alerts (i.e., student responses indicating potential issues related to the student's safety and well-being that may require attention at the state or local level), the imaging system allowed readers to forward responses needing attention to the scoring director. These alerts were reviewed by the project director, who then notified that student's school and the PDE of this occurrence. However, PDE did not receive the student's responses or other identifying information on that student. Readers, also, had no information on the student's personal identity.

Once handscoring was completed, PAS compiled anecdotal item reviews of the field test prompts for all grade levels. This information was handed on to DRC Test Development.

QUALITY CONTROL

Reader accuracy was monitored throughout the scoring session by producing both daily and on-demand reports, ensuring that an acceptable level of scoring accuracy was maintained. Inter-reader reliability was tracked and monitored with multiple quality control reports that were reviewed by quality assurance analysts. These reports were generated at the handscoring center and were reviewed by the scoring directors, team leaders, project coordinators, and project directors. The following reports were used during the scoring of the constructed responses:

The Reader Monitor Report monitored how often readers were in exact agreement and ensured that an acceptable agreement rate was maintained. This report provided daily and cumulative exact and adjacent inter-reader agreement and the percentage of responses requiring resolution.

The Score Point Distribution Report monitored the percentage of responses given each of the score points. For example, this daily and cumulative report showed how many 0s, 1s, and 2s, a reader had given to all the responses he or she had scored at the time the report was produced. It also indicated the number of responses read by each reader so that production rates could be monitored.

The Item Status Report monitored the progress of handscoring. This report tracked each response and indicated the status of each item (i.e., “needs second reading,” “complete”). This report ensured that all discrepancies were resolved by the end of the project.

The Response Read by Reader Report identified all responses scored by an individual reader. This report was useful if any responses needed rescoring because of reader drift.

The Read-Behind Log was used by the team leader/scoring director to monitor reader reliability. Student responses were randomly selected and team leaders read scored items from each team member. If the team leader disagreed with the reader’s score, remediation occurred. This proved to be a very effective type of feedback because it was done with “live” items scored by a particular reader.

Chapter Nine: Summary Demographic, Program, and Accommodation Data for the 2008 Science PSSA

While information on student demographics, program participation, and accommodations was collected for the 2007 PSSA Science Field Test, the information was primarily used to ensure that a representative sample of students took each of the field test items. This chapter is to be completed in the forthcoming *2008 PSSA Science Technical Report*.

Chapter Ten: Form Analysis and Item Calibration

TEST FORM STATISTICS

Because the forms consisted only of field test with no common items, form-level statistics would not be directly comparable among forms. Form-level statistics will be provided in future technical reports.

TRADITIONAL ITEM STATISTICS

Item-level statistics, including P-values, point-biserials, and distractor analyses, are presented in Appendices F through K.

RASCH ITEM STATISTICS AND EQUATING

As the science field test item forms had neither common items nor common subjects, no equating was performed. Equating procedures will be reported in the 2008 technical report.

Chapter Eleven: Linking

Because the science assessment was new this year, no prior-year linking took place. Linking procedures will be reported in the 2008 technical report after the next operational administration.

Chapter Twelve: Scaled Scores and Performance Levels

Prior to 2000, when the PSSA design was heavily matrix sampling, estimating school-level scaled scores presented some statistical and psychometric challenges. The statistically correct method to compute the school-level scaled score often gave an answer different from what would be obtained by averaging student ability estimates. To avoid this source of misunderstanding, the school-level scores were made to equal the average of the appropriate students. The matrix sampling component of the design, together with items from the common section, was used at the Academic Standard category level to estimate relative strengths and weaknesses for the school.

The adoption of the Pennsylvania Academic Standards in 1999 brought structural changes to the PSSA that were fully implemented in 2000. Beginning with the new reporting design in 2000, content area total scores for students and for schools were based exclusively on the common sections. Thus, greater emphasis was placed on the common sections possessing optimal balance at the content standard level and yielding reliable estimates of student-level abilities, as indicated by the standard errors. It was then possible to aggregate all scaled scores at the school, district, and state levels without resorting to any complex algorithms, making the results simpler to understand.

Because the original design of the PSSA was intended to produce school-level estimates only, the reporting metric was defined at the school level. For the 1996 base year, the mean of all schools in the *norming* sample was set at 1300 and the standard deviation at 100. The distribution to which these parameters applied was the content area scaled score with all schools weighted equally. Consequently, the expectation in the base year was for state-level means near 1300 and standard deviations near 100. The state mean of student level scaled scores was, in general, somewhat different. This difference occurred because the mean of the school-level scores counted schools equally, regardless of size, while the mean of the student-level scores counted students equally.

A minimum scale score of 700 was implemented for all PSSA reading, mathematics, and writing exams beginning in 2002. This minimum is applied to all PSSA scales except grade 3. At the PDE's request, the grade 3 scales were assigned minimum scale scores of 750 for mathematics and 1000 for reading in order to preserve the percentages in category recommended by standard setting participants while preventing students from achieving Proficient level through random response.

Performance level cutpoints will be set for science in August of 2008.

Chapter Thirteen: Test Validity and Reliability

Reliability and validity information for the PSSA are based on the core items. Because the 2007 PSSA Science Field Test had no core items (i.e., field test items were designed to be evaluated individually, and field test forms were not intended to be similar), no reliability or validity checks were performed. Checks in both areas will be reported in the 2008 technical report.

Chapter Fourteen: Standard Setting Report

Standard Setting for the PSSA science assessment will take place in August, 2008.

References

- Achieve, Inc. (2005). *Measuring Up 2005: A Report on Assessment Anchors and Tests in Reading and Mathematics for Pennsylvania*. Washington, DC: Achieve, Inc.
- AERA, APA, NCME (American Educational Research Association, American Psychological Association, & National Council on Measurement in Education). (1999). *Standards for Educational and Psychological Tests*. Washington, DC: American Educational Research Association.
- Allman, C. (2004). *Test access: Making tests accessible for students with visual impairments – A guide for test publishers, test developers, and state assessment personnel* (2nd edition). Louisville, KY: American Printing House for the Blind. Available from <http://www.aph.org>.
- Center for Universal Design (1997). *Principles of Universal Design*. North Carolina State University: Raleigh, NC.
- Data Recognition Corporation. (2000). *Item Viewer and Authoring Network (IVAN): Informational Guide*. Maple Grove, MN: DRC.
- Data Recognition Corporation. (2003–2007). *Fairness in Testing: Training Manual for Issues of Bias, Fairness, and Sensitivity*. Maple Grove, MN: DRC.
- Data Recognition Corporation. (2004–2007). *Pennsylvania System of School Assessment (PSSA) Style Guide*. Maple Grove, MN: DRC.
- Data Recognition Corporation. (2005, December). *Technical Report for the PSSA 2005 Reading and Mathematics*. Maple Grove, MN: DRC.
- Data Recognition Corporation. (2007, May). *Technical Report for the PSSA 2006 Writing: Grades 5, 8, and 11*. Maple Grove, MN: DRC.
- Data Recognition Corporation. (2007, May). *Technical Report for the PSSA 2006 Reading and Mathematics: Grades 4, 6 and 7*. Maple Grove, MN: DRC.
- Data Recognition Corporation (2007) *Preliminary Technical Report for 2008 PSSA Science*, Maple Grove, MN: DRC.
- National Assessment of Educational Progress Science Assessment. Neidorf, T., Binkley, M., and Stephens, M. (2006, March). *Comparing Science Content in the National Assessment of Educational Progress (NAEP) 2000 and Trends in International Mathematics and Science Study (TIMSS) 2003 Assessments*. National Center for Educational Statistics.
- Third International Mathematics and Science Study. (TIMSS) Schmidt, W., Mcknight, C., Cogan, L., Jakwerth, P., and Houang, P. (1999) *Facing the Consequences: Using TIMSS for a Closer Look at United States Mathematics and Science Education*, Dordrecht; Boston: Kluwer Academic Publishing.
- No Child Left Behind Act of 2001, Pub. L. No. 107–110, 115 Stat. 1425 (2002).
- Pennsylvania State Board of Education. (1999, January). *Chapter 4. Academic Standards and Assessment*. Harrisburg, PA: Pennsylvania State Board of Education. Retrieved November 8, 2004, from <http://www.pde.state.pa.us>. Also available from <http://www.pacode.com/secure/data/022/Chapter4/s4.51.html>.

- Pennsylvania Department of Education. (1999). *Principles, Guidelines and Procedures for Developing Fair Assessment Systems: Pennsylvania Assessment Through Themes (PATT)*. Harrisburg, PA: PDE.
- Pennsylvania State Board of Education. (2002, January). *Academic Standards for Science and Technology and Environment and Ecology*, PA: Pennsylvania State Board of Education. Retrieved October 3, 2007, from <http://www.pde.state.pa.us>.
- Pennsylvania Department of Education. (2006). *2006–2007 Science Item and Scoring Sampler*. Harrisburg, PA: PDE. Posted separately by grade level. Retrieved March 15, 2007 from <http://www.pde.state.pa>.
- Pennsylvania Department of Education. (2006, November). *Science Assessment Handbook*. Harrisburg, PA: PDE. Retrieved March 15, 2007 from <http://www.pde.state.pa>.
- Pennsylvania Department of Education. (2007, January). *2007 Accommodations Guidelines for Students with IEPs, Students with 504 Plans, English Language Learners, and all Students*. Harrisburg, PA: PDE. Retrieved January 30, 2007, from <http://www.pde.state.pa.us>.
- Pennsylvania Department of Education. (2007). *PSSA 2007 Handbook for Assessment Coordinators and Administrators: Grades 4, 8, and 11 Science Field Test*. Harrisburg, PA: Retrieved March 28, 2007, from <http://www.pde.state.pa.us>.
- Pennsylvania Department of Education. (2007, February). *PSSA Science Field Test Directions for Administration Manual*. Harrisburg, PA: PDE. Posted separately by grade level. Retrieved March 28, 2007 from <http://www.pde.state.pa>.
- Thompson, S., Johnstone, C. J. & Thurlow, M. L. (2002). *Universal Design Applied to Large Scale Assessments* (Synthesis Report 44), Minneapolis, MN: University of Minnesota, National Center on Educational Outcomes.
- Tourangearm, R. (1984). Cognitive science and survey methods. In T. Jabine, M. Straf, J. Tanur, and R. Tourangearu (eds.), Cognitive Aspects of Survey Methodology: Building a Bridge Between Disciplines, 73–100. Washington, DC: National Academy Press.
- Webb, N. L. (1999). *Research Monograph No. 18: Alignment of Science and Mathematics Standards and Assessments in Four States*. Madison, WI: National Institute for Science Education.
- Willis, G.B. (1999). *Cognitive Interviewing: A “How To” Guide*. Short course presented at the 1999 meeting of the American Statistical Association. Research Triangle Institute.

Appendix A:
2006-2007 Science Scoring Guidelines

DESCRIPTION OF SCORING GUIDELINES FOR 4-POINT OPEN-ENDED ITEMS:

General Description of Science Scoring Guidelines:

4 – The response demonstrates a *thorough* understanding of the scientific content, concepts, and procedures required by the task/s.

The response provides a clear, complete, and correct response as required by the task/s. Response may contain a minor blemish (e.g., misspelled words) or omission in work or explanation that does not detract from demonstrating a thorough understanding.

3 – The response demonstrates a general understanding of the scientific content, concepts, and procedures required by the task/s.

The responses, as required by the task, are mostly complete and correct. The response may have minor errors or omissions that do not detract from demonstrating a general understanding.

2 – The response demonstrates a partial understanding of the scientific content, concepts, and procedures required by the task/s.

The response is somewhat correct with partial understanding of the required scientific content, concepts, and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

1 – The response demonstrates a *minimal* understanding of the scientific content, concepts, and procedures as required by the task/s.

0 – The response provides insufficient evidence to demonstrate any understanding of the scientific content, concepts, and procedures as required by the task/s for that grade level.

Response may show only information copied or rephrased from the question or insufficient correct information to receive a score of 1.

Special Categories within zero reported separately:

BLK – Blank, entirely erased or written refusal to respond

OT – Off Task

IL – Illegible

LOE – Response in a language other than English

DESCRIPTION OF SCORING GUIDELINES FOR 2-POINT OPEN-ENDED ITEMS:

General Description of Science Scoring Guidelines:

- 2 – The response demonstrates a *thorough* understanding of the scientific content, concepts, and procedures required by the task/s.**

The response provides a clear, complete, and correct response as required by the task/s. Response may contain a minor blemish (e.g., misspelled words) or omission in work or explanation that does not detract from demonstrating a thorough understanding.

- 1 – The response demonstrates a *partial* understanding of the scientific content, concepts, and procedures required by the task/s.**

The response is somewhat correct with partial understanding of the required scientific content, concepts, and/or procedures demonstrated and/or explained. The response may contain some work that is incomplete or unclear.

- 0 – The response provides *insufficient* evidence to demonstrate any understanding of the scientific content, concepts, and procedures as required by the task/s for that grade level.**

Response may show only information copied or rephrased from the question or insufficient correct information to receive a score of 1.

Special Categories within zero reported separately:

BLK – Blank, entirely erased or written refusal to respond

OT – Off Task

IL – Illegible

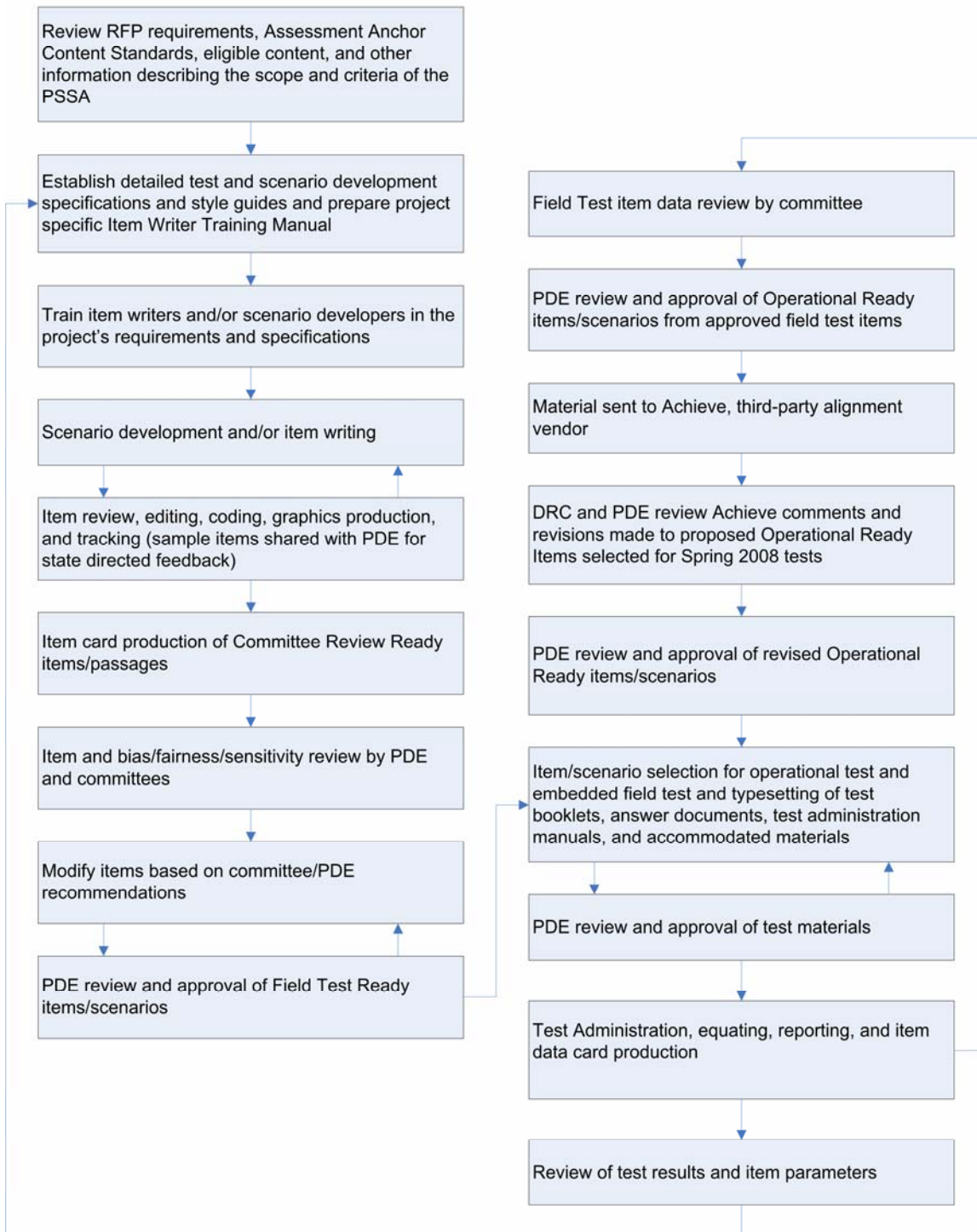
LOE – Response in a language other than English

Appendix B:

Item and Test Development Process

Appendix B: Item and Test Development Process

DRC Item and Test Development Process
Science



Appendix C:
Item Review Tally Form

Item Rating Sheet

Reviewer Signature: _____

Content Area: _____

Grade: _____

July 2006 Committee

Grantville, PA

Unique ID number

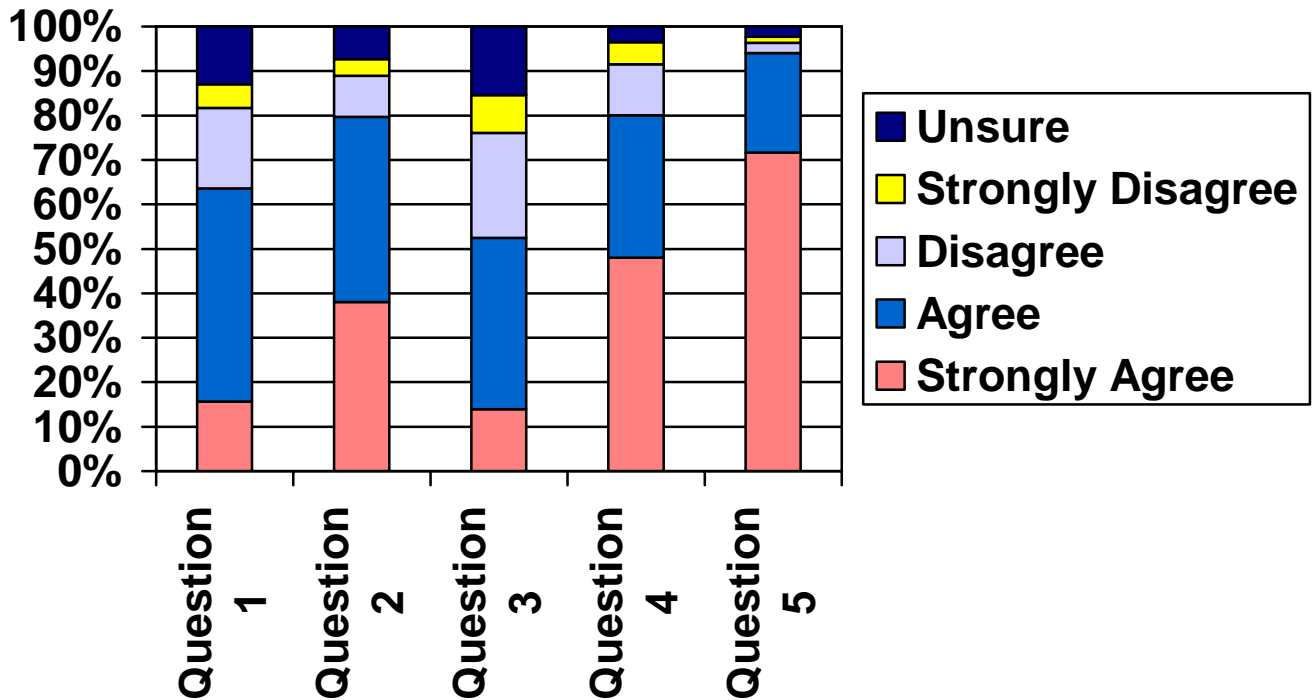
Content Alignment	Rigor Level Alignment				Technical Design			Universal Design		STATUS	
	Standards	Grade	Difficulty	Depth of Knowledge	Source of Challenge	Correct Answer	Distracters	Graphics	Language Demand	Bias	Acceptance Status
	—Lower	—At	—Medium	—Application	—No	—No	—No	—No	—No	—No	—Accepted with suggested revisions.
	—None	—Below	—Hard	—Strategic Thinking							

Appendix D:
2007 Student Survey Summary

PSSA Science — Student Survey Results — 2007 Stand-Alone Field Test

Grade 4 Statements	Number of Valid Survey Responses*	Percent				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure
1. Most of the test questions were easy to answer.	105206	15.66	47.94	18.08	5.33	12.99
2. The drawings, figures, and diagrams helped me to answer most questions.	104980	38.05	41.66	9.25	3.71	7.33
3. The science content knowledge and skills required on the test were familiar to me.	104515	13.93	38.56	23.61	8.44	15.47
4. There was enough space for me to write my answers to the open-ended questions.	104641	48.05	31.99	11.51	4.93	3.51
5. I had enough time to answer all of the science questions during the test.	105128	71.67	22.39	2.3	1.37	2.27

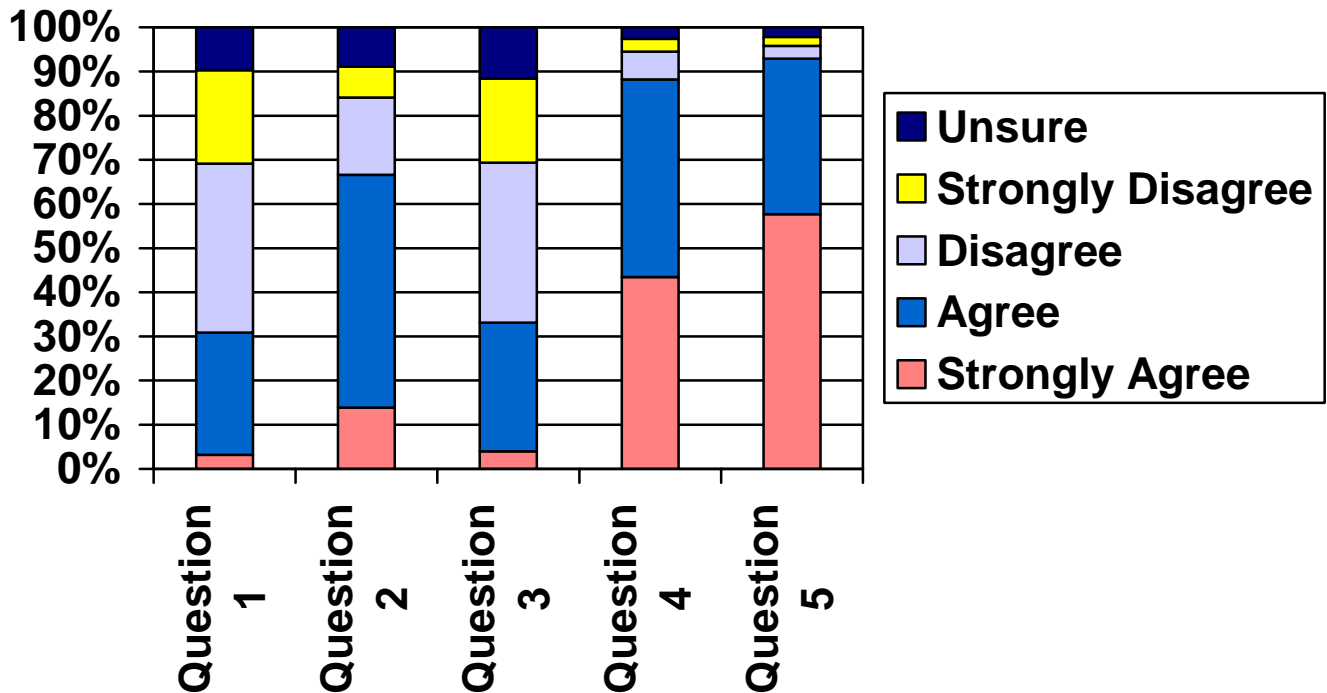
* A survey response is defined as valid if the student selected one answer option for that question. Questions left blank or questions with more than one answer are considered invalid responses.



PSSA Science — Student Survey Results — 2007 Stand-Alone Field Test

Grade 8 Statements	Number of Valid Survey Responses*	Percent				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure
1. Most of the test questions were easy to answer.	115505	3.18	27.67	38.29	21.19	9.67
2. The drawings, figures, and diagrams helped me to answer most questions.	115312	13.86	52.74	17.52	7.02	8.86
3. The science content knowledge and skills required on the test were familiar to me.	114714	3.98	29.16	36.22	19.04	11.6
4. There was enough space for me to write my answers to the open-ended questions.	115141	43.46	44.71	6.33	2.86	2.63
5. I had enough time to answer all of the science questions during the test.	115398	57.73	35.2	2.89	1.98	2.2

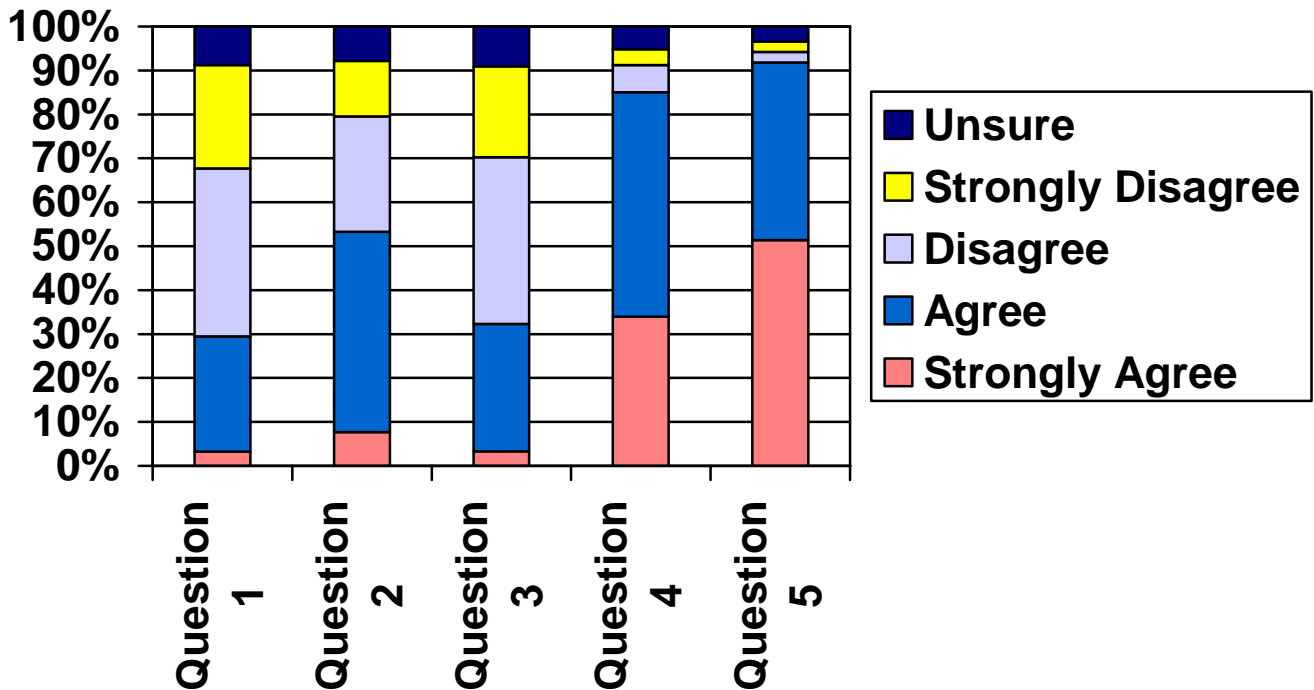
* A survey response is defined as valid if the student selected one answer option for that question. Questions left blank or questions with more than one answer are considered invalid responses.



PSSA Science — Student Survey Results — 2007 Stand-Alone Field Test

Grade 11 Statements	Number of Valid Survey Responses*	Percent				
		Strongly Agree	Agree	Disagree	Strongly Disagree	Unsure
1. Most of the test questions were easy to answer.	107594	3.27	26.19	38.24	23.53	8.78
2. The drawings, figures, and diagrams helped me to answer most questions.	104980	7.91	46.62	26.85	12.92	8.05
3. The science content knowledge and skills required on the test were familiar to me.	104515	3.4	29.66	38.84	21.22	9.25
4. There was enough space for me to write my answers to the open-ended questions.	104641	34.84	52.38	6.28	3.74	5.29
5. I had enough time to answer all of the science questions during the test.	105128	52.51	41.33	2.46	2.41	3.49

* A survey response is defined as valid if the student selected one answer option for that question. Questions left blank or questions with more than one answer are considered invalid responses.



Appendix E:

PSSA New Item Review Cards and IVAN Card

PSSA New Item Review	
	Item
	51-3174
	Content Area
	Grade Level
	Rpt Category
	Asmt Anchor
	Sub-Anchor
	Eligible Content
	Primary Code
	Passage Title
	Passage ID
	Focus
	Item Type
	Points
	Depth of Knldg
	Est Difficulty
	Answer Key
	Calculator Use
Distractor Analysis-A:	
Distractor Analysis-B:	
Distractor Analysis-C:	
Distractor Analysis-D:	

Appendix E: PSSA New Item Review Cards and IVAN Card

PSSA New Item Review	
	Item
	51-3173
	Content Area
	Grade Level
	Rpt Category
	Asmt Anchor
	Sub-Anchor
	Eligible Content
	Primary Code
	Passage Title
	Passage ID
	Focus
	Item Type
	Points
	Depth of Knldg
	Est Difficulty
	Answer Key
	Calculator Use

IVAN Item Card

Item content copyright Pennsylvania



Released: No

Item Status: accepted

Item Name	Item Type	Key	Grade	Subject	Report Category	Asmt Anchor	Sub Anchor	Eligible Content	Content Difficulty	DRP	Item Calculator
	MC	1	08	Math	A	3	3	1			No

Depth of Knowledge: 1

2. A list of numbers is shown below.

-5 -2 -1 0

What is the sum of the numbers shown above?

A -5
B -2
C -1
D 0

Administration

Form Grade	Form Subject	Form Name	Sequence	Form Type	Month	Year	Report Category	Asmt Anchor	Sub-Anchor	Eligible Content	Day	Session	Calculator
08	Math	A		Field Test	May	2004	A	3	3	1	0		No

Statistics Detail

Label	P-Value	Pt. Bis. Corr.	Label	Value	DIF Analysis	Value
A*	0.696	0.449	N	928	White/Black	A-
B	0.145	-0.375	Outfit t	-3.900	Eco Disad	A-
C	0.084	-0.315	Logit	-1.260	Male/Female	B-
D	0.069	-0.259	Logit SE	0.079		
Omits	0.005					

Notes:

Accepted by Data Review Committee, August 04

Appendix F:

**Grade 4 Multiple-Choice Statistics for the
2007 Science Field Test**

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5794	0001	1	1	F	C	C	11241	0.6746	0.0252	0.0718	0.6746	0.1933	0.0349	0.0003	0.4119	-0.2591	-0.2696	0.4119	-0.2534	-0.2183	0.0226	-4.5000
6365	0002	2	1	F	D	D	11241	0.4390	0.1769	0.2839	0.0645	0.4390	0.0351	0.0006	0.3877	-0.4301	-0.3026	-0.3356	0.3877	0.9878	0.0209	-9.9000
5840	0003	3	1	F	C	C	11241	0.8695	0.0302	0.0368	0.8695	0.0285	0.0348	0.0003	0.4535	-0.2017	-0.1446	0.4535	-0.1377	-1.7552	0.0332	-2.4000
5984	0004	4	1	F	D	D	11241	0.3021	0.3305	0.2313	0.1002	0.3021	0.0353	0.0006	0.1255	-0.0646	-0.0735	-0.0752	0.1255	1.6964	0.0223	9.9000
6412	0005	5	1	F	B	A	11241	0.6746	0.1511	0.6746	0.0720	0.0666	0.0351	0.0006	0.4334	-0.2678	0.4334	-0.2548	-0.3006	-0.2183	0.0226	-7.0000
6415	0006	6	1	F	A	A	11241	0.8628	0.8628	0.0402	0.0365	0.0246	0.0350	0.0010	0.5452	0.5452	-0.2889	-0.2213	-0.2433	-1.6744	0.0323	-9.9000
6332	0007	7	1	F	C	A	11241	0.8661	0.0267	0.0414	0.8661	0.0300	0.0355	0.0004	0.5171	-0.1781	-0.2394	0.5171	-0.2411	-1.7137	0.0327	-6.6000
5884	0008	8	1	F	D	C	11241	0.3595	0.2132	0.2856	0.1055	0.3595	0.0359	0.0004	0.1441	-0.1003	0.0029	-0.2140	0.1441	1.3882	0.0215	9.9000
6302	0009	9	1	F	B	B	11241	0.7374	0.0761	0.7374	0.1046	0.0455	0.0360	0.0004	0.3970	-0.1943	0.3970	-0.1827	-0.2328	-0.6044	0.0242	-1.7000
5737	0010	10	1	F	A	B	11241	0.4072	0.4072	0.0923	0.4215	0.0425	0.0359	0.0005	0.2220	0.2220	-0.1164	-0.1330	-0.3315	1.1457	0.0211	9.9000
5900	0011	11	1	F	C	D	11241	0.6858	0.0679	0.0425	0.6858	0.1675	0.0361	0.0002	0.3823	-0.2712	-0.2196	0.3823	-0.1835	-0.2835	0.0228	-1.7000
6537	0012	12	1	F	C	A	11241	0.3520	0.2179	0.0371	0.3520	0.3541	0.0387	0.0003	0.1524	-0.0982	-0.2799	0.1524	-0.0450	1.4270	0.0215	9.9000
6259	0013	15	1	F	A	A	11241	0.5057	0.5057	0.1932	0.1080	0.1534	0.0397	0.0000	0.2119	0.2119	-0.0224	-0.2261	-0.0893	0.6606	0.0209	9.9000
6243	0014	16	1	F	B	C	11241	0.7460	0.0837	0.7460	0.0423	0.0884	0.0395	0.0001	0.5040	-0.3040	0.5040	-0.3089	-0.2689	-0.6623	0.0245	-9.9000
6013	0015	17	1	F	D	A	11241	0.4640	0.0224	0.2785	0.1942	0.4640	0.0404	0.0004	0.3620	-0.3175	-0.3148	-0.2742	0.3620	0.8651	0.0208	-4.8000
5532	0016	18	1	F	B	B	11241	0.7700	0.0330	0.7700	0.0949	0.0616	0.0398	0.0006	0.3999	-0.1822	0.3999	-0.1325	-0.2120	-0.8314	0.0255	0.3000
5831	0017	19	1	F	C	D	11241	0.6210	0.0932	0.0719	0.6210	0.1734	0.0400	0.0004	0.3624	-0.2165	-0.2091	0.3624	-0.2166	0.0772	0.0217	-0.6000
6553	0018	20	1	F	C	A	11241	0.5775	0.1036	0.2027	0.5775	0.0754	0.0406	0.0002	0.3391	-0.2117	-0.2250	0.3391	-0.1813	0.3030	0.0212	1.5000
5951	0019	21	1	F	B	A	11241	0.6828	0.0892	0.6828	0.1083	0.0782	0.0410	0.0005	0.4722	-0.3336	0.4722	-0.2375	-0.3322	-0.2657	0.0228	-8.9000
6331	0020	22	1	F	D	A	11241	0.8983	0.0146	0.0142	0.0315	0.8983	0.0403	0.0011	0.5370	-0.2084	-0.2100	-0.1496	0.5370	-2.1661	0.0383	-6.3000
6289	0021	23	1	F	A	A	11241	0.3774	0.3774	0.1904	0.2322	0.1585	0.0409	0.0006	0.1901	0.1901	-0.1176	-0.1022	-0.1364	1.2961	0.0213	9.9000
6267	0022	24	1	F	B	A	11241	0.8238	0.0345	0.8238	0.0676	0.0326	0.0412	0.0003	0.5556	-0.2619	0.5556	-0.3251	-0.2454	-1.2699	0.0286	-9.9000
5783	0023	25	1	F	D	D	11241	0.7873	0.1236	0.0213	0.0256	0.7873	0.0417	0.0005	0.4170	-0.1377	-0.2461	-0.2461	0.4170	-0.9616	0.0263	1.9000
6301	0024	26	1	F	A	B	11241	0.7273	0.7273	0.0753	0.0678	0.0879	0.0416	0.0000	0.4624	0.4624	-0.2475	-0.2905	-0.2439	-0.5387	0.0239	-6.8000
5864	0025	27	1	F	A	C	11241	0.6362	0.6362	0.1144	0.1491	0.0563	0.0438	0.0003	0.3162	0.3162	-0.1571	-0.1418	-0.1920	-0.0041	0.0219	4.6000
6893	0026	1	2	F	C	B	11256	0.7512	0.0360	0.0328	0.7512	0.1467	0.0331	0.0002	0.4501	-0.2755	-0.1776	0.4501	-0.2887	-0.7616	0.0249	-4.4000
5957	0027	2	2	F	A	C	11256	0.8739	0.8739	0.0338	0.0224	0.0365	0.0331	0.0003	0.4620	0.4620	-0.1582	-0.2018	-0.1876	-1.8885	0.0339	-3.0000
6014	0028	3	2	F	D	A	11256	0.5027	0.0110	0.0276	0.4253	0.5027	0.0332	0.0002	0.3357	-0.2683	-0.2845	-0.2579	0.3357	0.6428	0.0211	5.1000
6480	0029	4	2	F	D	B	11256	0.6012	0.2235	0.0715	0.0697	0.6012	0.0336	0.0004	0.3580	-0.1724	-0.3612	-0.2483	0.3580	0.1368	0.0217	3.0000
6269	0030	5	2	F	C	A	11256	0.6134	0.1256	0.1341	0.6134	0.0928	0.0339	0.0003	0.4160	-0.1992	-0.3455	0.4160	-0.3240	0.0717	0.0218	-5.2000
5744	0031	6	2	F	B	A	11256	0.8394	0.0269	0.8394	0.0389	0.0609	0.0338	0.0001	0.5415	-0.2951	0.5415	-0.2699	-0.2844	-1.4943	0.0300	-9.9000
6512	0032	7	2	F	B	D	11256	0.6604	0.0925	0.6604	0.1429	0.0697	0.0343	0.0002	0.4350	-0.2797	0.4350	-0.2878	-0.2911	-1.1893	0.0225	-5.4000
5936	0033	8	2	F	B	B	11256	0.1412	0.4463	0.1412	0.3034	0.0744	0.0346	0.0001	0.1033	-0.0764	0.1033	-0.0664	-0.2758	2.8134	0.0288	9.9000
5819	0034	9	2	F	B	A	11256	0.6334	0.1149	0.6334	0.1865	0.0304	0.0346	0.0003	0.4441	-0.2871	0.4441	-0.3645	-0.2044	-0.0374	0.0221	-7.6000
5538	0035	10	2	F	A	D	11256	0.5010	0.5010	0.3034	0.0827	0.0782	0.0344	0.0004	0.1977	0.1977	-0.0998	-0.0902	-0.1159	0.6513	0.0211	9.9000
6264	0036	11	2	F	C	A	11256	0.7003	0.0448	0.0432	0.7003	0.1767	0.0348	0.0002	0.4645	-0.3081	-0.3279	0.4645	-0.2857	-0.4273	0.0234	-7.6000
5785	0037	12	2	F	C	A	11256	0.7290	0.0587	0.0622	0.7290	0.1138	0.0362	0.0000	0.4716	-0.2440	-0.3152	0.4716	-0.2975	-0.6103	0.0242	-4.8000
6333	0038	15	2	F	A	A	11256	0.8172	0.8172	0.0162	0.0219	0.1065	0.0382	0.0000	0.4956	0.4956	-0.2174	-0.2303	-0.2777	-1.2821	0.0283	-7.4000
6261	0039	16	2	F	B	A	11256	0.8379	0.0434	0.8379	0.0545	0.0260	0.0381	0.0002	0.4959	-0.1582	0.4959	-0.2712	-0.2496	-1.4792	0.0299	-4.7000
6303	0040	17	2	F	C	A	11256	0.4264	0.2452	0.1857	0.4264	0.1031	0.0393	0.0003	0.2713	-0.3266	-0.0145	0.2713	-0.2626	1.0254	0.0211	9.8000
6551	0041	18	2	F	C	A	11256	0.4090	0.4389	0.0319	0.4090	0.0808	0.0389	0.0005	0.2283	-0.1051	-0.3264	0.2283	-0.2519	1.1139	0.0212	9.9000
5529	0042	19	2	F	C	B	11256	0.4315	0.1555	0.2019	0.4315	0.1711	0.0394	0.0005	0.3485	-0.3101	-0.2102	0.3485	-0.3691	0.9999	0.0211	0.6000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5632	0043	20	2	F	B	C	11256	0.3177	0.0840	0.3177	0.3558	0.2036	0.0389	0.0000	0.2337	-0.2868	0.2337	-0.2113	-0.1488	1.5971	0.0222	9.8000
6457	0044	21	2	F	C	A	11256	0.8695	0.0195	0.0357	0.8695	0.0359	0.0391	0.0004	0.5437	-0.2125	-0.2628	0.5437	-0.2450	-1.8320	0.0333	-9.0000
6448	0045	22	2	F	B	C	11256	0.7494	0.1065	0.7494	0.0320	0.0729	0.0389	0.0004	0.4997	-0.3027	0.4997	-0.2578	-0.3051	-0.7485	0.0249	-8.9000
6441	0046	23	2	F	A	A	11256	0.6299	0.6299	0.0514	0.1268	0.1518	0.0400	0.0002	0.4600	0.4600	-0.3440	-0.3605	-0.2739	-0.0183	0.0221	-8.8000
5853	0047	24	2	F	D	D	11256	0.2936	0.1676	0.2838	0.2122	0.2936	0.0423	0.0004	0.1305	-0.1358	-0.0401	-0.0767	0.1305	1.7334	0.0226	9.9000
6317	0048	25	2	F	C	A	11256	0.8900	0.0183	0.0332	0.8900	0.0178	0.0404	0.0003	0.5335	-0.1811	-0.2437	0.5335	-0.1991	-2.1126	0.0365	-7.7000
6419	0049	26	2	F	C	D	11256	0.3787	0.2299	0.1700	0.3787	0.1789	0.0421	0.0003	0.1468	-0.1152	-0.0951	0.1468	0.0003	1.2699	0.0214	9.9000
6275	0050	27	2	F	B	A	11256	0.7574	0.1022	0.7574	0.0480	0.0479	0.0442	0.0004	0.4677	-0.2269	0.4677	-0.2595	-0.2940	-0.8051	0.0252	-5.6000
5841	0051	1	3	F	A	B	11237	0.8058	0.8058	0.0903	0.0391	0.0308	0.0340	0.0000	0.3665	0.3665	-0.1486	-0.0912	-0.2057	-1.1671	0.0277	3.9000
5859	0052	2	3	F	D	C	11237	0.6950	0.0735	0.0509	0.1462	0.6950	0.0343	0.0001	0.3920	-0.1730	-0.2372	-0.2544	0.3920	-0.3708	0.0234	1.7000
6271	0053	3	3	F	C	A	11237	0.9032	0.0232	0.0173	0.9032	0.0214	0.0346	0.0003	0.4610	-0.1590	-0.1160	0.4610	-0.1690	-2.3190	0.0395	-1.4000
6413	0054	4	3	F	C	A	11237	0.7144	0.0708	0.1559	0.7144	0.0240	0.0343	0.0005	0.4628	-0.2994	-0.2941	0.4628	-0.2724	-0.4933	0.0239	-4.9000
6291	0055	5	3	F	B	D	11237	0.4520	0.1833	0.4520	0.2115	0.1183	0.0349	0.0000	0.2632	-0.1740	0.2632	-0.0937	-0.3537	0.9404	0.0213	9.9000
5812	0056	6	3	F	B	C	11237	0.4602	0.1741	0.4602	0.1745	0.1556	0.0351	0.0006	0.3341	-0.2373	0.3341	-0.2629	-0.3055	0.8987	0.0213	5.7000
6249	0057	7	3	F	C	A	11237	0.2816	0.2215	0.0351	0.2816	0.4260	0.0351	0.0008	0.0789	-0.1053	-0.2851	0.0789	0.0638	1.8643	0.0231	9.9000
6554	0058	8	3	F	C	A	11237	0.7274	0.0590	0.0702	0.7274	0.1082	0.0347	0.0004	0.4364	-0.2710	-0.2810	0.4364	-0.2110	-0.5784	0.0243	-2.9000
6455	0059	9	3	F	D	A	11237	0.3765	0.1661	0.1842	0.2370	0.3765	0.0355	0.0006	0.2770	-0.2238	-0.1962	-0.2753	0.2770	1.3319	0.0217	9.9000
6328	0060	10	3	F	C	B	11237	0.6062	0.1307	0.1369	0.6062	0.0903	0.0356	0.0003	0.3983	-0.2532	-0.2624	0.3983	-0.3064	0.1408	0.0219	-1.0000
5745	0061	11	3	F	B	A	11237	0.8125	0.0541	0.8125	0.0413	0.0563	0.0354	0.0004	0.5549	-0.3215	0.5549	-0.2792	-0.3268	-1.2256	0.0281	-9.9000
6542	0062	12	3	F	A	A	11237	0.7210	0.7210	0.0318	0.0990	0.1114	0.0366	0.0003	0.4928	0.4928	-0.3018	-0.2879	-0.3435	-0.5359	0.0241	-8.5000
5998	0063	15	3	F	C	B	11237	0.6841	0.0831	0.0799	0.6841	0.1131	0.0397	0.0001	0.4704	-0.3588	-0.3444	0.4704	-0.2054	-0.3035	0.0232	-6.8000
5530	0064	16	3	F	B	B	11237	0.6042	0.0488	0.6042	0.0909	0.2161	0.0398	0.0003	0.4261	-0.3835	0.4261	-0.4118	-0.2026	0.1519	0.0219	-4.5000
5571	0065	17	3	F	B	C	11237	0.8476	0.0450	0.8476	0.0309	0.0367	0.0398	0.0001	0.4985	-0.2340	0.4985	-0.2057	-0.2094	-1.5674	0.0309	-5.3000
5986	0066	18	3	F	A	A	11237	0.7926	0.7926	0.0759	0.0474	0.0431	0.0406	0.0004	0.5011	0.5011	-0.2263	-0.3017	-0.2647	-1.0559	0.0269	-5.2000
5828	0067	19	3	F	B	A	11237	0.7557	0.0903	0.7557	0.0400	0.0732	0.0403	0.0004	0.5147	-0.2753	0.5147	-0.3459	-0.2975	-0.7740	0.0253	-8.3000
5883	0068	20	3	F	B	C	11237	0.4114	0.2798	0.4114	0.0883	0.1798	0.0404	0.0004	0.2836	-0.1800	0.2836	-0.3714	-0.1981	1.1490	0.0214	9.9000
6322	0069	21	3	F	C	A	11237	0.7040	0.0518	0.0627	0.7040	0.1408	0.0404	0.0004	0.4657	-0.2433	-0.2050	0.4657	-0.3527	-0.4267	0.0237	-4.0000
5906	0070	22	3	F	A	D	11237	0.3795	0.3795	0.3111	0.0812	0.1871	0.0406	0.0004	0.3182	0.3182	-0.2263	-0.3817	-0.3103	1.3163	0.0217	4.9000
5789	0071	23	3	F	D	C	11237	0.7555	0.0617	0.0812	0.0598	0.7555	0.0408	0.0011	0.4692	-0.2656	-0.2233	-0.2765	0.4692	-0.7722	0.0253	-4.5000
6252	0072	24	3	F	B	A	11237	0.7885	0.0627	0.7885	0.0577	0.0487	0.0418	0.0006	0.5015	-0.2404	0.5015	-0.2853	-0.2649	-1.0228	0.0267	-5.8000
5537	0073	25	3	F	C	D	11237	0.7581	0.0813	0.0646	0.7581	0.0540	0.0414	0.0005	0.4516	-0.1868	-0.2889	0.4516	-0.2272	-0.7912	0.0254	-2.3000
6742	0074	26	3	F	A	B	11237	0.2704	0.2704	0.0814	0.0716	0.5345	0.0416	0.0005	0.2392	0.2392	-0.4118	-0.4869	-0.1354	1.9324	0.0233	9.3000
5782	0075	27	3	F	C	D	11237	0.1606	0.4937	0.1863	0.1606	0.1153	0.0440	0.0001	0.1425	-0.1331	0.0331	0.1425	-0.4062	2.7180	0.0277	9.9000
6559	0076	1	4	F	C	B	11232	0.2041	0.2194	0.0972	0.2041	0.4441	0.0351	0.0002	0.2054	-0.2923	-0.2309	0.2054	-0.1791	2.4612	0.0255	9.9000
6314	0077	2	4	F	D	D	11232	0.5282	0.0749	0.1383	0.2236	0.5282	0.0348	0.0003	0.3175	-0.2526	-0.3442	-0.1229	0.3175	0.6250	0.0214	9.9000
5830	0078	3	4	F	B	D	11232	0.6676	0.1165	0.6676	0.0555	0.1252	0.0350	0.0002	0.4166	-0.2257	0.4166	-0.2736	-0.2913	-0.1401	0.0230	0.9000
6557	0079	4	4	F	A	A	11232	0.7156	0.7156	0.0437	0.1441	0.0615	0.0349	0.0002	0.3901	0.3901	-0.3017	-0.1534	-0.2395	-0.4395	0.0241	3.8000
6442	0080	5	4	F	B	A	11232	0.8066	0.0640	0.8066	0.0505	0.0437	0.0350	0.0002	0.4735	-0.1929	0.4735	-0.2199	-0.3026	-1.1225	0.0280	-2.3000
6541	0081	6	4	F	A	A	11232	0.5520	0.5520	0.0617	0.2339	0.1171	0.0353	0.0001	0.4100	0.4100	-0.3913	-0.3322	-0.2306	0.5008	0.0216	-2.4000
6451	0082	7	4	F	A	B	11232	0.6995	0.6995	0.0812	0.0576	0.1260	0.0354	0.0003	0.3995	0.3995	-0.1622	-0.2956	-0.2346	-0.3358	0.0237	2.1000
6401	0083	8	4	F	D	A	11232	0.8960	0.0166	0.0321	0.0191	0.8960	0.0356	0.0005	0.5132	-0.2050	-0.1808	-0.1929	0.5132	-2.1651	0.0383	-4.2000
5691	0084	9	4	F	D	C	11232	0.8564	0.0329	0.0339	0.0409	0.8564	0.0356	0.0004	0.5728	-0.2837	-0.3030	-0.2754	0.5728	-1.6219	0.0321	-9.9000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6434	0085	10	4	F	A	A	11232	0.8044	0.8044	0.0223	0.0165	0.1206	0.0360	0.0002	0.4373	0.4373	-0.1701	-0.2529	-0.2157	-1.1028	0.0278	-0.6000
6241	0086	11	4	F	B	C	11232	0.4121	0.1392	0.4121	0.0802	0.3313	0.0369	0.0003	0.3089	-0.1769	0.3089	-0.3839	-0.2577	1.2247	0.0215	7.4000
5960	0087	12	4	F	A	C	11232	0.8308	0.8308	0.0197	0.0313	0.0805	0.0373	0.0004	0.5236	0.5236	-0.2021	-0.2551	-0.3080	-1.3482	0.0297	-7.5000
6561	0088	15	4	F	C	A	11232	0.5960	0.1978	0.0461	0.5960	0.1212	0.0389	0.0000	0.4062	-0.3539	-0.3718	0.4062	-0.1302	0.2661	0.0219	-0.6000
5922	0089	16	4	F	B	D	11232	0.2302	0.1270	0.2302	0.0786	0.5245	0.0394	0.0004	0.0454	-0.2388	0.0454	-0.2583	0.1427	2.2769	0.0245	9.9000
6447	0090	17	4	F	A	C	11232	0.9003	0.9003	0.0290	0.0140	0.0170	0.0394	0.0004	0.5482	0.5482	-0.2151	-0.2081	-0.1982	-2.2370	0.0393	-6.9000
5993	0091	18	4	F	B	B	11232	0.8530	0.0378	0.8530	0.0438	0.0256	0.0394	0.0004	0.5200	-0.2070	0.5200	-0.2255	-0.2646	-1.5830	0.0317	-4.6000
7651	0092	19	4	F	B	C	11232	0.7831	0.0396	0.7831	0.0381	0.0996	0.0394	0.0002	0.4885	-0.2247	0.4885	-0.2843	-0.2608	-0.9255	0.0266	-4.8000
5738	0093	20	4	F	B	B	11232	0.5250	0.0355	0.5250	0.3064	0.0928	0.0395	0.0008	0.3245	-0.2688	0.3245	-0.2142	-0.2247	0.6416	0.0214	7.4000
6311	0094	21	4	F	C	D	11232	0.4437	0.2675	0.1536	0.4437	0.0949	0.0398	0.0004	0.3524	-0.2838	-0.2467	0.3524	-0.3703	1.0604	0.0214	4.7000
5816	0095	22	4	F	D	A	11232	0.6275	0.0267	0.2469	0.0590	0.6275	0.0395	0.0004	0.4350	-0.3444	-0.2747	-0.3579	0.4350	0.0920	0.0223	-5.1000
6411	0096	23	4	F	C	A	11232	0.7055	0.0339	0.0971	0.7055	0.1231	0.0402	0.0002	0.4862	-0.3201	-0.2610	0.4862	-0.3382	-0.3737	0.0238	-8.2000
6347	0097	24	4	F	C	A	11232	0.8596	0.0312	0.0407	0.8596	0.0283	0.0401	0.0002	0.5323	-0.2645	-0.2057	0.5323	-0.2412	-1.6594	0.0325	-4.2000
6436	0098	25	4	F	A	A	11232	0.2668	0.2668	0.0613	0.2310	0.3999	0.0401	0.0009	0.1633	0.1633	-0.4351	-0.0011	-0.1344	2.0394	0.0235	9.9000
6274	0099	26	4	F	B	A	11232	0.7228	0.0676	0.7228	0.1241	0.0441	0.0408	0.0006	0.5119	-0.3392	0.5119	-0.3320	-0.2791	-0.4871	0.0243	-9.4000
5827	0100	27	4	F	C	A	11232	0.5837	0.1232	0.1592	0.5837	0.0902	0.0435	0.0002	0.4589	-0.3420	-0.3253	0.4589	-0.3804	0.3325	0.0218	-8.6000
6534	0101	1	5	F	A	D	10492	0.6681	0.6681	0.0777	0.1157	0.1058	0.0326	0.0001	0.2345	0.2345	-0.0778	-0.1291	-0.0492	-0.2827	0.0232	9.9000
5952	0102	2	5	F	B	A	10492	0.8627	0.0239	0.8627	0.0229	0.0580	0.0325	0.0000	0.3947	-0.1111	0.3947	-0.1665	-0.1208	-1.7574	0.0331	0.3000
5981	0103	3	5	F	D	B	10492	0.7987	0.0864	0.0495	0.0324	0.7987	0.0329	0.0002	0.4538	-0.2235	-0.2171	-0.2544	0.4538	-1.1478	0.0277	-5.8000
5569	0104	4	5	F	C	C	10492	0.9095	0.0240	0.0175	0.9095	0.0160	0.0327	0.0003	0.5106	-0.1848	-0.1834	0.5106	-0.1761	-2.4276	0.0419	-6.9000
6250	0105	5	5	F	A	A	10492	0.3222	0.3222	0.0464	0.2199	0.3775	0.0335	0.0004	0.2664	0.2664	-0.3620	-0.2170	-0.2445	1.4851	0.0227	4.8000
5733	0106	6	5	F	C	B	10492	0.6125	0.2080	0.0605	0.6125	0.0854	0.0335	0.0002	0.3728	-0.2491	-0.2095	0.3728	-0.2686	0.0203	0.0223	-2.6000
5748	0107	7	5	F	B	A	10492	0.5254	0.1157	0.5254	0.1164	0.2087	0.0335	0.0002	0.3247	-0.2052	0.3247	-0.2934	-0.2037	0.4615	0.0217	1.8000
6513	0108	8	5	F	B	D	10492	0.5212	0.2042	0.5212	0.1352	0.1053	0.0337	0.0004	0.2512	-0.1117	0.2512	-0.2073	-0.1567	0.4826	0.0216	9.9000
5917	0109	9	5	F	B	A	10492	0.4042	0.3033	0.4042	0.0777	0.1813	0.0332	0.0004	0.3240	-0.3858	0.3240	-0.2689	-0.1313	1.0593	0.0218	0.1000
6570	0110	10	5	F	C	A	10492	0.4434	0.1297	0.1522	0.4434	0.2404	0.0341	0.0002	0.3298	-0.2677	-0.3317	0.3298	-0.2316	0.8646	0.0216	0.4000
6420	0111	11	5	F	C	C	10492	0.8868	0.0199	0.0332	0.8868	0.0267	0.0333	0.0002	0.4718	-0.1729	-0.2035	0.4718	-0.1369	-2.0635	0.0367	-4.6000
5857	0112	12	5	F	D	A	10492	0.1697	0.4380	0.1836	0.1734	0.1697	0.0352	0.0002	0.0722	0.0212	-0.1720	-0.0487	0.0722	2.4653	0.0277	9.9000
6550	0113	15	5	F	A	A	10492	0.6457	0.6457	0.0295	0.0987	0.1899	0.0361	0.0000	0.3684	0.3684	-0.2786	-0.2976	-0.1520	-0.1578	0.0228	-2.4000
5916	0114	16	5	F	D	A	10492	0.9127	0.0096	0.0172	0.0236	0.9127	0.0362	0.0007	0.5079	-0.1496	-0.1350	-0.1751	0.5079	-2.4884	0.0428	-5.2000
5905	0115	17	5	F	D	D	10492	0.4479	0.0803	0.2200	0.2142	0.4479	0.0372	0.0006	0.2823	-0.2152	-0.2037	-0.2174	0.2823	0.8426	0.0216	4.6000
5962	0116	18	5	F	A	A	10492	0.3571	0.3571	0.0897	0.1705	0.3456	0.0364	0.0007	0.1922	0.1922	-0.2819	-0.3821	0.0500	1.2996	0.0222	9.9000
6446	0117	19	5	F	D	B	10492	0.1715	0.2863	0.2029	0.3016	0.1715	0.0375	0.0003	0.1580	-0.2049	-0.1569	-0.1333	0.1580	2.4508	0.0275	9.9000
5551	0118	20	5	F	B	C	10492	0.6925	0.1019	0.6925	0.0778	0.0904	0.0372	0.0002	0.4264	-0.2596	0.4264	-0.2280	-0.2627	-0.4240	0.0237	-4.5000
6511	0119	21	5	F	A	D	10492	0.3036	0.3036	0.2707	0.2183	0.1679	0.0392	0.0004	0.1789	0.1789	-0.0670	-0.1534	-0.2389	1.5881	0.0230	9.9000
6414	0120	22	5	F	B	A	10492	0.7582	0.0580	0.7582	0.0471	0.0994	0.0369	0.0004	0.4795	-0.2714	0.4795	-0.2611	-0.2625	-0.8443	0.0257	-9.0000
5863	0121	23	5	F	D	C	10492	0.7972	0.0435	0.0578	0.0632	0.7972	0.0376	0.0008	0.5099	-0.2566	-0.2802	-0.2617	0.5099	-1.1354	0.0276	-9.9000
6348	0122	24	5	F	A	A	10492	0.8987	0.8987	0.0196	0.0240	0.0203	0.0372	0.0002	0.5354	0.5354	-0.1999	-0.2137	-0.1814	-2.2428	0.0391	-9.1000
6293	0123	25	5	F	D	A	10492	0.5548	0.1819	0.1082	0.1172	0.5548	0.0376	0.0004	0.3556	-0.2116	-0.2704	-0.2645	0.3556	0.3154	0.0218	-3.1000
5956	0124	26	5	F	A	B	10492	0.6678	0.6678	0.0544	0.1469	0.0914	0.0384	0.0010	0.3576	0.3576	-0.2653	-0.1541	-0.1974	-0.2809	0.0232	1.0000
6578	0125	27	5	F	C	A	10492	0.7528	0.0500	0.1394	0.7528	0.0170	0.0403	0.0005	0.4369	-0.2343	-0.2540	0.4369	-0.1751	-0.8066	0.0255	-5.8000
6433	0126	1	6	F	D	A	10508	0.7214	0.0348	0.1596	0.0522	0.7214	0.0320	0.0000	0.2343	-0.2449	0.0291	-0.1563	0.2343	-0.6021	0.0244	9.9000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5795	0127	2	6	F	C	C	10508	0.7430	0.1282	0.0729	0.7430	0.0227	0.0329	0.0003	0.4015	-0.2373	-0.2172	0.4015	-0.1679	-0.7409	0.0250	-4.3000
5528	0128	3	6	F	A	B	10508	0.7483	0.7483	0.0177	0.0166	0.1843	0.0321	0.0010	0.3773	0.3773	-0.2007	-0.1932	-0.2127	-0.7764	0.0252	-1.8000
5825	0129	4	6	F	C	A	10508	0.4303	0.1146	0.3342	0.4303	0.0877	0.0329	0.0002	0.2850	-0.2523	-0.2372	0.2850	-0.1439	0.9196	0.0217	6.5000
5949	0130	5	6	F	B	B	10508	0.5683	0.1228	0.5683	0.0492	0.2265	0.0325	0.0007	0.4130	-0.3926	0.4130	-0.2323	-0.2770	0.2396	0.0218	-8.7000
6048	0131	6	6	F	A	C	10508	0.5392	0.5392	0.3125	0.0584	0.0572	0.0323	0.0004	0.2447	0.2447	-0.0717	-0.2748	-0.2684	0.3849	0.0217	9.9000
6320	0132	7	6	F	D	A	10508	0.7923	0.0412	0.0748	0.0593	0.7923	0.0322	0.0002	0.5518	-0.3085	-0.3539	-0.3081	0.5518	-1.0936	0.0272	-9.9000
5749	0133	8	6	F	B	A	10508	0.5068	0.1294	0.5068	0.1732	0.1576	0.0326	0.0004	0.3669	-0.3249	0.3669	-0.2351	-0.2951	0.5448	0.0216	-2.9000
5751	0134	9	6	F	B	C	10508	0.5223	0.0871	0.5223	0.1629	0.1949	0.0326	0.0002	0.2989	-0.2835	0.2989	-0.1185	-0.2389	0.4686	0.0216	4.2000
5746	0135	10	6	F	C	A	10508	0.4837	0.1678	0.1591	0.4837	0.1564	0.0329	0.0001	0.2995	-0.2283	-0.2067	0.2995	-0.2218	0.6575	0.0215	4.4000
6376	0136	11	6	F	D	D	10508	0.5161	0.0674	0.0837	0.2997	0.5161	0.0328	0.0004	0.3473	-0.2533	-0.1570	-0.3054	0.3473	0.4989	0.0216	-0.9000
6432	0137	12	6	F	C	A	10508	0.5542	0.1858	0.0901	0.5542	0.1354	0.0344	0.0001	0.3774	-0.2499	-0.3164	0.3774	-0.2753	0.3102	0.0218	-4.4000
5788	0138	15	6	F	C	C	10508	0.8562	0.0325	0.0448	0.8562	0.0292	0.0371	0.0001	0.4319	-0.1702	-0.1335	0.4319	-0.1847	-1.6742	0.0321	-3.6000
5747	0139	16	6	F	C	A	10508	0.6835	0.0587	0.0780	0.6835	0.1418	0.0376	0.0004	0.4647	-0.3068	-0.3514	0.4647	-0.2511	-0.3748	0.0234	-9.8000
5980	0140	17	6	F	B	B	10508	0.6511	0.0401	0.6511	0.0484	0.2214	0.0388	0.0002	0.4071	-0.3040	0.4071	-0.2903	-0.2347	-0.1929	0.0228	-5.0000
5995	0141	18	6	F	B	D	10508	0.7694	0.0736	0.7694	0.0704	0.0492	0.0373	0.0001	0.4126	-0.1828	0.4126	-0.1983	-0.2219	-0.9227	0.0261	-2.4000
6435	0142	19	6	F	C	A	10508	0.7635	0.0852	0.0666	0.7635	0.0464	0.0379	0.0004	0.5427	-0.3206	-0.3621	0.5427	-0.2825	-0.8809	0.0258	-9.9000
6540	0143	20	6	F	D	A	10508	0.2624	0.3366	0.1934	0.1684	0.2624	0.0389	0.0003	0.0910	0.0444	-0.1167	-0.1053	0.0910	1.8167	0.0239	9.9000
5856	0144	21	6	F	D	A	10508	0.7751	0.0306	0.1036	0.0519	0.7751	0.0384	0.0004	0.4243	-0.2185	-0.2433	-0.1529	0.4243	-0.9639	0.0263	-2.1000
5947	0145	22	6	F	D	D	10508	0.2382	0.2083	0.2553	0.2569	0.2382	0.0404	0.0008	0.0905	-0.0613	-0.0565	-0.0173	0.0905	1.9667	0.0246	9.9000
6247	0146	23	6	F	B	A	10508	0.7413	0.0828	0.7413	0.0771	0.0598	0.0387	0.0003	0.4940	-0.3100	0.4940	-0.2897	-0.2590	-0.7303	0.0250	-9.9000
6543	0147	24	6	F	B	A	10508	0.4732	0.2838	0.4732	0.0901	0.1136	0.0387	0.0006	0.3529	-0.2391	0.3529	-0.3388	-0.2997	0.7091	0.0215	-2.4000
6515	0148	25	6	F	C	A	10508	0.2662	0.1245	0.4808	0.2662	0.0893	0.0390	0.0003	0.1290	-0.2702	0.0264	0.1290	-0.3227	1.7938	0.0238	9.9000
6039	0149	26	6	F	C	C	10508	0.7379	0.0487	0.0524	0.7379	0.1205	0.0401	0.0004	0.4594	-0.2890	-0.2902	0.4594	-0.2287	-0.7078	0.0249	-7.7000
6338	0150	27	6	F	D	B	10508	0.4286	0.1937	0.1186	0.2152	0.4286	0.0439	0.0001	0.2156	-0.1649	-0.1587	-0.1044	0.2156	0.9280	0.0217	9.9000
5817	0151	1	7	F	A	A	10507	0.7360	0.7360	0.0113	0.1810	0.0406	0.0308	0.0002	0.3915	0.3915	-0.1627	-0.2416	-0.2125	-0.8396	0.0244	-8.0000
6335	0152	2	7	F	A	B	10507	0.5641	0.5641	0.0715	0.0569	0.2760	0.0312	0.0003	0.2165	0.2165	-0.1950	-0.1643	-0.0612	0.0784	0.0214	8.4000
5987	0153	3	7	F	C	A	10507	0.7391	0.0583	0.0589	0.7391	0.1119	0.0312	0.0005	0.3501	-0.2459	-0.1242	0.3501	-0.1512	-0.8592	0.0245	-2.3000
6831	0154	4	7	F	B	D	10507	0.3065	0.0778	0.3065	0.1682	0.4160	0.0313	0.0003	0.2472	-0.1579	0.2472	-0.3075	-0.2120	1.3205	0.0225	1.3000
6410	0155	5	7	F	A	A	10507	0.7307	0.7307	0.0800	0.0831	0.0744	0.0315	0.0003	0.3745	0.3745	-0.2558	-0.1486	-0.1764	-0.8066	0.0242	-5.5000
5829	0156	6	7	F	C	D	10507	0.3515	0.1486	0.3273	0.3515	0.1398	0.0325	0.0004	0.2155	-0.2045	-0.1155	0.2155	-0.2592	1.0888	0.0218	5.2000
5504	0157	7	7	F	B	C	10507	0.7501	0.1091	0.7501	0.0312	0.0775	0.0316	0.0006	0.3613	-0.1161	0.3613	-0.2066	-0.2344	-0.9294	0.0248	-3.4000
5796	0158	8	7	F	D	C	10507	0.1560	0.0470	0.1262	0.6383	0.1560	0.0321	0.0004	0.0508	-0.3594	-0.1921	0.0442	0.0508	2.2833	0.0279	9.9000
6829	0159	9	7	F	D	D	10507	0.1936	0.2264	0.0930	0.4546	0.1936	0.0322	0.0002	0.0724	-0.1420	-0.2533	0.0629	0.0724	1.9988	0.0258	9.9000
6268	0160	10	7	F	A	A	10507	0.7892	0.7892	0.0399	0.0499	0.0885	0.0317	0.0009	0.4642	0.4642	-0.2066	-0.2328	-0.2855	-1.2004	0.0265	-9.9000
6343	0161	11	7	F	B	B	10507	0.3643	0.4439	0.3643	0.0756	0.0835	0.0326	0.0001	0.1643	-0.0273	0.1643	-0.2765	-0.2624	1.0251	0.0216	9.8000
5689	0162	12	7	F	B	C	10507	0.8902	0.0167	0.8902	0.0385	0.0206	0.0339	0.0002	0.4109	-0.1102	0.4109	-0.1367	-0.1416	-2.1949	0.0364	-2.6000
5572	0163	15	7	F	A	C	10507	0.7196	0.7196	0.0833	0.0204	0.1411	0.0355	0.0001	0.3307	0.3307	-0.1684	-0.1834	-0.1361	-0.7394	0.0239	-1.9000
7650	0164	16	7	F	C	C	10507	0.2985	0.1234	0.1058	0.2985	0.4349	0.0369	0.0004	0.0951	-0.2609	-0.2587	0.0951	0.1057	1.3632	0.0226	9.9000
6260	0165	17	7	F	A	A	10507	0.3156	0.3156	0.3571	0.1458	0.1432	0.0379	0.0004	0.1528	0.1528	-0.0418	-0.1585	-0.1919	1.2722	0.0223	7.4000
5887	0166	18	7	F	B	C	10507	0.4144	0.2811	0.4144	0.0694	0.1981	0.0367	0.0004	0.2874	-0.1460	0.2874	-0.3856	-0.2673	0.7831	0.0212	-2.4000
6517	0167	19	7	F	C	A	10507	0.5237	0.0939	0.1190	0.5237	0.2253	0.0371	0.0010	0.3054	-0.2878	-0.2107	0.3054	-0.1580	0.2704	0.0211	-3.2000
5948	0168	20	7	F	A	D	10507	0.2443	0.2443	0.2764	0.1632	0.2778	0.0379	0.0004	0.1579	0.1579	-0.1061	-0.1641	-0.1459	1.6704	0.0239	6.6000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions								Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6319	0169	21	7	F	B	A	10507	0.7933	0.0770	0.7933	0.0518	0.0397	0.0376	0.0007	0.4707	-0.2121	0.4707	-0.2587	-0.2553	-1.2312	0.0268	-9.9000
5627	0170	22	7	F	C	D	10507	0.3138	0.0841	0.0992	0.3138	0.4645	0.0377	0.0008	0.0200	-0.0844	-0.1778	0.0200	0.1600	1.2817	0.0223	9.9000
6398	0171	23	7	F	C	A	10507	0.5002	0.1324	0.2061	0.5002	0.1224	0.0385	0.0004	0.3154	-0.2498	-0.1944	0.3154	-0.2264	0.3802	0.0211	-4.5000
5997	0172	24	7	F	C	B	10507	0.8293	0.0400	0.0531	0.8293	0.0391	0.0380	0.0006	0.5068	-0.2486	-0.2581	0.5068	-0.2254	-1.5255	0.0291	-9.9000
6832	0173	25	7	F	D	A	10507	0.5082	0.0887	0.1201	0.2424	0.5082	0.0397	0.0009	0.2732	-0.2280	-0.1826	-0.1436	0.2732	0.3428	0.0211	0.0000
5793	0174	26	7	F	D	C	10507	0.5118	0.0981	0.1345	0.2172	0.5118	0.0380	0.0005	0.2991	-0.2429	-0.1566	-0.2108	0.2991	0.3263	0.0211	-2.1000
5692	0175	27	7	F	A	D	10507	0.8180	0.8180	0.0904	0.0177	0.0312	0.0422	0.0005	0.3639	0.3639	-0.0968	-0.1599	-0.1753	-1.4282	0.0283	-0.6000
6349	0176	1	8	F	C	A	10521	0.8038	0.0248	0.0899	0.8038	0.0515	0.0298	0.0002	0.3697	-0.1468	-0.2673	0.3697	-0.0554	-1.2451	0.0276	-0.2000
5924	0177	2	8	F	A	A	10521	0.8334	0.8334	0.0292	0.0550	0.0528	0.0293	0.0003	0.4721	0.4721	-0.1944	-0.2526	-0.2599	-1.4996	0.0296	-9.3000
6397	0178	3	8	F	C	A	10521	0.2941	0.1139	0.3434	0.2941	0.2182	0.0298	0.0007	0.2108	-0.2823	-0.1142	0.2108	-0.2494	1.5626	0.0232	9.9000
5935	0179	4	8	F	C	B	10521	0.6555	0.1308	0.0937	0.6555	0.0902	0.0298	0.0001	0.4151	-0.2881	-0.2520	0.4151	-0.2649	-0.2853	0.0228	-6.7000
5531	0180	5	8	F	C	B	10521	0.5983	0.1284	0.1383	0.5983	0.1046	0.0302	0.0002	0.4716	-0.3315	-0.3528	0.4716	-0.3764	0.0172	0.0221	-9.9000
5982	0181	6	8	F	B	B	10521	0.7405	0.1225	0.7405	0.0206	0.0858	0.0298	0.0007	0.3296	-0.1853	0.3296	-0.1241	-0.1621	-0.7900	0.0248	2.3000
6556	0182	7	8	F	D	A	10521	0.5440	0.2776	0.0829	0.0647	0.5440	0.0300	0.0008	0.3510	-0.1897	-0.3194	-0.3654	0.3510	0.2910	0.0217	-1.3000
5832	0183	8	8	F	A	D	10521	0.5609	0.5609	0.2390	0.0854	0.0837	0.0305	0.0005	0.3947	0.3947	-0.2461	-0.3427	-0.3493	0.2068	0.0218	-5.9000
5862	0184	9	8	F	C	C	10521	0.7017	0.0902	0.0711	0.7017	0.1061	0.0308	0.0001	0.3332	-0.2141	-0.1661	0.3332	-0.1553	-0.5493	0.0237	2.0000
5953	0185	10	8	F	D	A	10521	0.7472	0.1333	0.0386	0.0498	0.7472	0.0309	0.0003	0.4662	-0.2950	-0.2533	-0.2809	0.4662	-0.8336	0.0251	-9.6000
6514	0186	11	8	F	C	D	10521	0.5379	0.2747	0.0627	0.5379	0.0936	0.0310	0.0001	0.4250	-0.3502	-0.3389	0.4250	-0.2925	0.3210	0.0216	-9.9000
5964	0187	12	8	F	A	A	10521	0.2449	0.2449	0.1545	0.2153	0.3527	0.0324	0.0001	0.0717	0.0717	-0.0934	-0.0307	-0.0038	1.8566	0.0244	9.9000
6443	0188	15	8	F	C	A	10521	0.7851	0.0894	0.0361	0.7851	0.0528	0.0363	0.0003	0.4034	-0.1589	-0.1828	0.4034	-0.2490	-1.0999	0.0266	-2.6000
6558	0189	16	8	F	A	B	10521	0.7544	0.7544	0.0585	0.0721	0.0778	0.0369	0.0002	0.4410	0.4410	-0.2593	-0.2080	-0.2488	-0.8821	0.0253	-6.7000
6406	0190	17	8	F	A	B	10521	0.7955	0.7955	0.0313	0.0322	0.1032	0.0371	0.0008	0.4914	0.4914	-0.2861	-0.2738	-0.2579	-1.1789	0.0271	-9.9000
6418	0191	18	8	F	B	D	10521	0.3398	0.2719	0.3398	0.2161	0.1343	0.0374	0.0005	0.2003	-0.0502	0.2003	-0.2142	-0.2572	1.3112	0.0225	9.9000
5983	0192	19	8	F	B	D	10521	0.4768	0.2642	0.4768	0.1194	0.1016	0.0374	0.0006	0.3068	-0.1804	0.3068	-0.2507	-0.2733	0.6209	0.0215	3.8000
5550	0193	20	8	F	D	C	10521	0.5057	0.2545	0.0484	0.1534	0.5057	0.0377	0.0003	0.3296	-0.1885	-0.3223	-0.2771	0.3296	0.4794	0.0215	0.9000
5811	0194	21	8	F	D	B	10521	0.5722	0.0629	0.0782	0.2480	0.5722	0.0377	0.0010	0.4011	-0.3141	-0.3369	-0.2526	0.4011	0.1500	0.0218	-6.1000
5631	0195	22	8	F	A	C	10521	0.3205	0.3205	0.0903	0.3009	0.2497	0.0379	0.0007	0.1978	0.1978	-0.2432	-0.1670	-0.1079	1.4153	0.0227	9.9000
5855	0196	23	8	F	B	A	10521	0.6027	0.1682	0.6027	0.1236	0.0661	0.0389	0.0006	0.3425	-0.1962	0.3425	-0.2031	-0.2518	-0.0054	0.0221	0.5000
6516	0197	24	8	F	B	A	10521	0.6078	0.0785	0.6078	0.1206	0.1529	0.0394	0.0007	0.4341	-0.2944	0.4341	-0.3043	-0.2950	-0.0319	0.0222	-9.9000
5809	0198	25	8	F	C	B	10521	0.5466	0.1169	0.2194	0.5466	0.0779	0.0389	0.0003	0.4301	-0.4148	-0.3003	0.4301	-0.2628	0.2778	0.0217	-9.9000
6437	0199	26	8	F	B	D	10521	0.3654	0.3198	0.3654	0.1346	0.1396	0.0400	0.0006	0.0947	0.1003	0.0947	-0.1669	-0.1296	1.1770	0.0221	9.9000
6452	0200	27	8	F	D	B	10521	0.2757	0.1803	0.3411	0.1608	0.2757	0.0419	0.0001	0.1109	-0.0444	-0.0465	-0.1228	0.1109	1.6689	0.0236	9.9000
6421	0201	1	9	F	D	C	9989	0.7720	0.0433	0.1038	0.0472	0.7720	0.0334	0.0002	0.3834	-0.1632	-0.1553	-0.2396	0.3834	-0.8247	0.0273	1.9000
5954	0202	2	9	F	B	A	9989	0.6294	0.2370	0.6294	0.0391	0.0602	0.0341	0.0002	0.2938	-0.1230	0.2938	-0.2673	-0.1832	0.0731	0.0235	9.9000
6357	0203	3	9	F	C	D	9989	0.4916	0.2990	0.0351	0.4916	0.1391	0.0340	0.0011	0.4176	-0.3560	-0.3661	0.4176	-0.3330	0.7973	0.0226	-5.8000
5750	0204	4	9	F	C	C	9989	0.0690	0.2397	0.5612	0.0690	0.0950	0.0348	0.0003	0.0616	-0.0591	-0.0463	0.0616	-0.1242	3.8808	0.0418	9.9000
5821	0205	5	9	F	B	A	9989	0.7712	0.0667	0.7712	0.0682	0.0593	0.0340	0.0006	0.4156	-0.2594	0.4156	-0.1636	-0.1929	-0.8187	0.0272	-0.2000
6372	0206	6	9	F	A	C	9989	0.8857	0.8857	0.0252	0.0247	0.0301	0.0340	0.0002	0.4875	0.4875	-0.1857	-0.2034	-0.1874	-1.9463	0.0376	-5.5000
6324	0207	7	9	F	B	A	9989	0.4759	0.1908	0.4759	0.1741	0.1239	0.0349	0.0003	0.2886	-0.1548	0.2886	-0.2461	-0.2297	0.8776	0.0226	9.9000
5734	0208	8	9	F	D	B	9989	0.5036	0.1533	0.1021	0.2056	0.5036	0.0351	0.0003	0.3444	-0.3250	-0.2570	-0.2082	0.3444	0.7363	0.0226	4.0000
6400	0209	9	9	F	A	A	9989	0.7670	0.7670	0.0219	0.0308	0.1447	0.0346	0.0009	0.4559	0.4559	-0.2260	-0.2769	-0.2645	-0.7877	0.0270	-4.5000
5923	0210	10	9	F	D	D	9989	0.5396	0.1028	0.1826	0.1392	0.5396	0.0355	0.0003	0.3549	-0.2502	-0.2896	-0.2249	0.3549	0.5511	0.0227	4.1000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5815	0211	11	9	F	D	A	9989	0.7190	0.1530	0.0508	0.0413	0.7190	0.0354	0.0005	0.5227	-0.3956	-0.2677	-0.3068	0.5227	-0.4584	0.0253	-9.9000
5570	0212	12	9	F	C	C	9989	0.7719	0.0258	0.0699	0.7719	0.0967	0.0354	0.0002	0.4274	-0.2687	-0.1886	0.4274	-0.2284	-0.8241	0.0273	0.8000
5886	0213	15	9	F	A	C	9989	0.3874	0.3874	0.3073	0.0822	0.1877	0.0351	0.0002	0.2337	0.2337	-0.1616	-0.2699	-0.1556	1.3361	0.0230	9.9000
6431	0214	16	9	F	D	A	9989	0.6700	0.0859	0.0757	0.1325	0.6700	0.0355	0.0003	0.5038	-0.3579	-0.3092	-0.3585	0.5038	-0.1581	0.0242	-9.9000
6290	0215	17	9	F	A	D	9989	0.8805	0.8805	0.0284	0.0300	0.0248	0.0358	0.0004	0.5242	0.5242	-0.1873	-0.2586	-0.2300	-1.8741	0.0367	-6.5000
5843	0216	18	9	F	C	B	9989	0.5127	0.1504	0.0429	0.5127	0.2580	0.0358	0.0002	0.3802	-0.2821	-0.3762	0.3802	-0.2853	0.6896	0.0226	-0.9000
5736	0217	19	9	F	A	B	9989	0.4966	0.4966	0.2572	0.0802	0.1302	0.0354	0.0003	0.3598	0.3598	-0.2422	-0.3964	-0.2467	0.7716	0.0226	1.1000
5506	0218	20	9	F	D	B	9989	0.3908	0.4235	0.0940	0.0552	0.3908	0.0360	0.0005	0.1422	0.0184	-0.2727	-0.2068	0.1422	1.3181	0.0230	9.9000
6892	0219	21	9	F	A	A	9989	0.5593	0.5593	0.1653	0.1179	0.1215	0.0356	0.0003	0.4500	0.4500	-0.3381	-0.3780	-0.3165	0.4487	0.0228	-8.5000
5690	0220	22	9	F	A	C	9989	0.8091	0.8091	0.0630	0.0491	0.0426	0.0359	0.0003	0.5250	0.5250	-0.2876	-0.2911	-0.2615	-1.1204	0.0293	-9.3000
5798	0221	23	9	F	B	C	9989	0.7018	0.0878	0.7018	0.0915	0.0823	0.0363	0.0003	0.4656	-0.3073	0.4656	-0.3071	-0.2437	-0.3496	0.0249	-5.8000
6399	0222	24	9	F	C	A	9989	0.4899	0.1406	0.1436	0.4899	0.1882	0.0374	0.0003	0.3648	-0.2813	-0.3248	0.3648	-0.2504	0.8059	0.0226	0.5000
6325	0223	25	9	F	A	B	9989	0.8089	0.8089	0.0645	0.0402	0.0497	0.0365	0.0002	0.4223	0.4223	-0.1639	-0.2025	-0.1950	-1.1188	0.0293	-1.7000
5739	0224	26	9	F	A	C	9989	0.7951	0.7951	0.0750	0.0540	0.0378	0.0366	0.0015	0.4596	0.4596	-0.2581	-0.1880	-0.2395	-1.0036	0.0284	-3.4000
6265	0225	27	9	F	C	B	9989	0.7435	0.0652	0.0286	0.7435	0.1227	0.0397	0.0002	0.4310	-0.2629	-0.1948	0.4310	-0.2376	-0.6212	0.0261	-1.3000
6449	0226	1	10	F	D	C	9984	0.5108	0.0362	0.0533	0.3681	0.5108	0.0317	0.0000	0.3757	-0.2606	-0.3462	-0.2961	0.3757	0.5861	0.0225	-0.2000
5820	0227	2	10	F	C	A	9984	0.8052	0.0385	0.0218	0.8052	0.1026	0.0320	0.0000	0.4025	-0.2067	-0.1901	0.4025	-0.1900	-1.1888	0.0290	-0.2000
6547	0228	3	10	F	D	B	9984	0.5525	0.1854	0.0652	0.1639	0.5525	0.0322	0.0009	0.4042	-0.3490	-0.3361	-0.2525	0.4042	0.3737	0.0227	-3.0000
6330	0229	4	10	F	B	A	9984	0.7950	0.0876	0.7950	0.0439	0.0416	0.0318	0.0002	0.4662	-0.2766	0.4662	-0.2126	-0.2524	-1.1047	0.0284	-6.2000
5932	0230	5	10	F	B	C	9984	0.5500	0.2630	0.5500	0.0704	0.0842	0.0320	0.0004	0.3250	-0.1552	0.3250	-0.3096	-0.3082	0.3866	0.0226	5.4000
6326	0231	6	10	F	A	B	9984	0.8526	0.8526	0.0504	0.0326	0.0320	0.0320	0.0006	0.5309	0.5309	-0.2710	-0.2871	-0.2641	-1.6369	0.0328	-9.9000
5685	0232	7	10	F	B	C	9984	0.4575	0.1510	0.4575	0.1455	0.2122	0.0334	0.0003	0.1813	-0.0864	0.1813	-0.1987	-0.0499	0.8549	0.0224	9.9000
6510	0233	8	10	F	B	D	9984	0.7533	0.1096	0.7533	0.0234	0.0812	0.0319	0.0006	0.3884	-0.1746	0.3884	-0.2901	-0.2080	-0.7924	0.0265	2.4000
5818	0234	9	10	F	C	A	9984	0.7223	0.1543	0.0476	0.7223	0.0434	0.0321	0.0004	0.5581	-0.4174	-0.3596	0.5581	-0.3425	-0.5835	0.0254	-9.9000
5846	0235	10	10	F	A	B	9984	0.4090	0.4090	0.3277	0.1189	0.1114	0.0326	0.0005	0.2590	0.2590	-0.1507	-0.2819	-0.2522	1.1018	0.0226	9.9000
5790	0236	11	10	F	A	C	9984	0.3562	0.3562	0.2631	0.1382	0.2091	0.0330	0.0004	0.2046	0.2046	-0.0371	-0.3284	-0.1987	1.3777	0.0231	9.9000
6329	0237	12	10	F	B	A	9984	0.6584	0.0924	0.6584	0.1654	0.0490	0.0348	0.0001	0.5201	-0.4134	0.5201	-0.3570	-0.3843	-0.1962	0.0239	-9.9000
5505	0238	15	10	F	C	C	9984	0.8917	0.0283	0.0255	0.8917	0.0212	0.0331	0.0001	0.4494	-0.1984	-0.1373	0.4494	-0.1514	-2.1274	0.0384	-4.0000
5683	0239	16	10	F	C	C	9984	0.6012	0.0973	0.0811	0.6012	0.1865	0.0339	0.0001	0.4595	-0.3449	-0.4329	0.4595	-0.2903	0.1191	0.0231	-8.3000
6450	0240	17	10	F	C	B	9984	0.6593	0.1794	0.0833	0.6593	0.0434	0.0344	0.0003	0.4662	-0.2924	-0.3737	0.4662	-0.3146	-0.2014	0.0239	-7.1000
5959	0241	18	10	F	A	C	9984	0.3187	0.3187	0.1384	0.0949	0.4131	0.0344	0.0006	0.2344	0.2344	-0.2630	-0.3568	-0.1379	1.5822	0.0236	9.9000
5686	0242	19	10	F	C	D	9984	0.1637	0.3285	0.2168	0.1637	0.2541	0.0364	0.0005	-0.0388	0.1015	0.1052	-0.0388	0.1495	2.6109	0.0289	9.9000
5740	0243	20	10	F	C	D	9984	0.8602	0.0275	0.0444	0.8602	0.0335	0.0343	0.0002	0.5153	-0.2258	-0.2471	0.5153	-0.2658	-1.7210	0.0337	-8.4000
6242	0244	21	10	F	B	C	9984	0.6307	0.0942	0.6307	0.0508	0.1889	0.0352	0.0003	0.4246	-0.3368	0.4246	-0.2833	-0.2639	-0.0411	0.0235	-4.4000
6503	0245	22	10	F	A	B	9984	0.6405	0.6405	0.1638	0.1079	0.0523	0.0347	0.0009	0.4397	0.4397	-0.3630	-0.2288	-0.2767	-0.0955	0.0236	-6.4000
6336	0246	23	10	F	C	B	9984	0.7900	0.0553	0.0852	0.7900	0.0345	0.0348	0.0003	0.4883	-0.3033	-0.2445	0.4883	-0.2630	-1.0648	0.0281	-7.6000
6358	0247	24	10	F	A	D	9984	0.4450	0.4450	0.2462	0.2042	0.0696	0.0348	0.0002	0.2843	0.2843	-0.1382	-0.2725	-0.3075	0.9181	0.0225	8.5000
5996	0248	25	10	F	C	D	9984	0.4665	0.0359	0.2711	0.4665	0.1907	0.0356	0.0002	0.3285	-0.4021	-0.2361	0.3285	-0.2551	0.8094	0.0224	3.3000
5955	0249	26	10	F	D	B	9984	0.7739	0.0258	0.0602	0.1038	0.7739	0.0358	0.0005	0.5215	-0.2964	-0.2878	-0.3387	0.5215	-0.9416	0.0273	-9.9000
6535	0250	27	10	F	D	D	9984	0.5595	0.1540	0.1829	0.0653	0.5595	0.0383	0.0000	0.3237	-0.2955	-0.1004	-0.3102	0.3237	0.3376	0.0227	6.3000
6454	0251	1	11	F	C	A	10045	0.5274	0.2327	0.0504	0.5274	0.1589	0.0306	0.0001	0.2942	-0.2669	-0.3050	0.2942	-0.0656	0.2558	0.0219	2.8000
6304	0252	2	11	F	B	A	10045	0.5156	0.3190	0.5156	0.0926	0.0419	0.0306	0.0004	0.3750	-0.2798	0.3750	-0.3138	-0.2939	0.3130	0.0219	-5.6000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions								Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5784	0253	3	11	F	A	A	10045	0.5297	0.5297	0.0447	0.1621	0.2328	0.0306	0.0002	0.3389	0.3389	-0.2830	-0.3224	-0.1730	0.2446	0.0219	-1.9000
6404	0254	4	11	F	A	C	10045	0.7745	0.7745	0.0470	0.0213	0.1262	0.0308	0.0002	0.3426	0.3426	-0.2106	-0.1934	-0.1246	-1.1171	0.0266	-0.8000
6251	0255	5	11	F	A	A	10045	0.6705	0.6705	0.0639	0.1297	0.1047	0.0309	0.0003	0.4542	0.4542	-0.2809	-0.3033	-0.2997	-0.4732	0.0234	-9.9000
5915	0256	6	11	F	C	B	10045	0.4945	0.0924	0.1231	0.4945	0.2578	0.0315	0.0007	0.3143	-0.1562	-0.2750	0.3143	-0.2449	0.4146	0.0218	0.4000
5799	0257	7	11	F	C	C	10045	0.3178	0.3345	0.1666	0.3178	0.1490	0.0319	0.0003	0.1892	-0.1772	-0.2027	0.1892	-0.0702	1.2967	0.0231	9.9000
6546	0258	8	11	F	D	B	10045	0.7725	0.0789	0.0609	0.0560	0.7725	0.0310	0.0006	0.4462	-0.2226	-0.2542	-0.2625	0.4462	-1.1030	0.0265	-8.0000
6305	0259	9	11	F	A	A	10045	0.3812	0.3812	0.2104	0.0909	0.2861	0.0311	0.0004	0.3721	0.3721	-0.3259	-0.3711	-0.3375	0.9671	0.0223	-6.0000
6246	0260	10	11	F	C	B	10045	0.6786	0.1036	0.1158	0.6786	0.0697	0.0322	0.0001	0.2960	-0.1890	-0.0664	0.2960	-0.2233	-0.5185	0.0236	5.3000
6453	0261	11	11	F	C	B	10045	0.7849	0.0449	0.0877	0.7849	0.0503	0.0320	0.0003	0.4142	-0.2419	-0.2124	0.4142	-0.1843	-1.1920	0.0271	-4.8000
5852	0262	12	11	F	A	D	10045	0.3452	0.3452	0.1120	0.2923	0.2168	0.0333	0.0003	0.1643	0.1643	-0.1893	-0.0939	-0.1059	1.1509	0.0227	9.9000
6041	0263	15	11	F	C	C	10045	0.4599	0.2112	0.1922	0.4599	0.1002	0.0363	0.0000	0.2717	-0.1954	-0.2170	0.2717	-0.1438	0.5809	0.0219	4.3000
5797	0264	16	11	F	B	C	10045	0.6775	0.0567	0.6775	0.0864	0.1430	0.0362	0.0002	0.4845	-0.2906	-0.4845	-0.3234	-0.3237	-0.5119	0.0235	-9.9000
6344	0265	17	11	F	A	B	10045	0.5577	0.5577	0.1059	0.1667	0.1315	0.0377	0.0005	0.2827	0.2827	-0.2016	-0.1476	-0.1789	0.1084	0.0220	4.7000
5684	0266	18	11	F	A	C	10045	0.5929	0.5929	0.2111	0.0613	0.0976	0.0364	0.0006	0.3018	0.3018	-0.1556	-0.2435	-0.1760	-0.0664	0.0223	2.8000
6830	0267	19	11	F	A	D	10045	0.5497	0.5497	0.2011	0.0580	0.1535	0.0370	0.0006	0.3909	0.3909	-0.2805	-0.3195	-0.2599	0.1474	0.0220	-8.6000
5565	0268	20	11	F	D	D	10045	0.3761	0.0537	0.1379	0.3955	0.3761	0.0365	0.0003	0.1777	-0.1629	-0.0880	-0.1186	0.1777	0.9926	0.0224	9.9000
5950	0269	21	11	F	D	B	10045	0.7184	0.0433	0.0782	0.1234	0.7184	0.0366	0.0000	0.4543	-0.2742	-0.2615	-0.2754	0.4543	-0.7499	0.0245	-9.9000
6240	0270	22	11	F	B	C	10045	0.2612	0.4041	0.2612	0.1444	0.1527	0.0371	0.0005	0.1658	-0.1047	0.1658	-0.1726	-0.1750	1.6178	0.0244	9.9000
5929	0271	23	11	F	C	B	10045	0.2323	0.2726	0.2560	0.2323	0.2013	0.0375	0.0003	0.2413	-0.2436	-0.2583	0.2413	-0.2364	1.7979	0.0253	5.2000
6266	0272	24	11	F	B	B	10045	0.6881	0.1046	0.6881	0.0972	0.0723	0.0375	0.0003	0.4060	-0.1934	0.4060	-0.2894	-0.2237	-0.5720	0.0238	-6.7000
6504	0273	25	11	F	B	B	10045	0.7540	0.0855	0.7540	0.0339	0.0886	0.0376	0.0003	0.4331	-0.1789	0.4331	-0.2152	-0.2962	-0.9760	0.0257	-8.6000
5992	0274	26	11	F	D	B	10045	0.1381	0.4032	0.0696	0.3497	0.1381	0.0388	0.0006	0.0186	0.0232	-0.2205	0.0827	0.0186	2.5170	0.0305	9.9000
6509	0275	27	11	F	D	D	10045	0.3219	0.1208	0.1735	0.3432	0.3219	0.0405	0.0002	0.1495	-0.2490	-0.1235	-0.0226	0.1495	1.2747	0.0231	9.9000
6323	0276	1	12	F	B	A	9985	0.7006	0.0436	0.7006	0.0679	0.1538	0.0342	0.0000	0.3499	-0.1649	0.3499	-0.1515	-0.2067	-0.4751	0.0248	3.7000
6355	0277	2	12	F	D	A	9985	0.7675	0.0887	0.0392	0.0697	0.7675	0.0347	0.0003	0.4897	-0.2576	-0.2792	-0.2980	0.4897	-0.9235	0.0271	-8.0000
6538	0278	3	12	F	C	A	9985	0.8064	0.0852	0.0293	0.8064	0.0443	0.0346	0.0002	0.3662	-0.1456	-0.1771	0.3662	-0.1055	-1.2321	0.0292	3.8000
5823	0279	4	12	F	C	A	9985	0.3275	0.0544	0.1948	0.3275	0.3877	0.0350	0.0007	0.2728	-0.2907	-0.3447	0.2728	-0.1914	1.4948	0.0234	6.7000
5902	0280	5	12	F	B	D	9985	0.2800	0.3972	0.2800	0.1474	0.1398	0.0354	0.0002	0.1169	-0.0361	0.1169	-0.1275	-0.0874	1.7640	0.0243	9.9000
5791	0281	6	12	F	B	C	9985	0.3445	0.0401	0.3445	0.2399	0.3407	0.0345	0.0004	0.2327	-0.3454	0.2327	-0.2653	-0.1102	1.4026	0.0231	9.9000
6244	0282	7	12	F	C	A	9985	0.5809	0.1215	0.1122	0.5809	0.1493	0.0359	0.0003	0.4290	-0.3214	-0.3610	0.4290	-0.2671	0.1966	0.0228	-7.3000
6366	0283	8	12	F	B	D	9985	0.8909	0.0281	0.8909	0.0312	0.0146	0.0351	0.0000	0.4085	-0.1371	0.4085	-0.0900	-0.0982	-2.1697	0.0390	2.8000
5958	0284	9	12	F	A	C	9985	0.8359	0.8359	0.0469	0.0578	0.0241	0.0348	0.0006	0.4257	0.4257	-0.0922	-0.2247	-0.2031	-1.5028	0.0315	-0.4000
6337	0285	10	12	F	C	B	9985	0.2727	0.1766	0.1842	0.2727	0.3305	0.0355	0.0006	0.0990	-0.0533	-0.0846	0.0990	-0.0233	1.8074	0.0244	9.9000
6439	0286	11	12	F	D	D	9985	0.2539	0.0816	0.3194	0.3086	0.2539	0.0362	0.0004	0.0532	-0.0710	0.0039	0.0411	0.0532	1.9221	0.0249	9.9000
5851	0287	12	12	F	B	D	9985	0.2844	0.2498	0.2844	0.2508	0.1766	0.0383	0.0002	0.0956	-0.0331	0.0956	0.0055	-0.1109	1.7381	0.0242	9.9000
5640	0288	15	12	F	D	D	9985	0.8093	0.0499	0.0824	0.0192	0.8093	0.0391	0.0001	0.4960	-0.2602	-0.2641	-0.1859	0.4960	-1.2570	0.0294	-5.6000
6312	0289	16	12	F	C	D	9985	0.4144	0.3309	0.1713	0.4144	0.0428	0.0406	0.0001	0.2866	-0.2282	-0.2092	0.2866	-0.2367	1.0389	0.0225	8.1000
6438	0290	17	12	F	D	D	9985	0.4998	0.1847	0.0822	0.1928	0.4998	0.0399	0.0006	0.4464	-0.3114	-0.3998	-0.4197	0.4464	0.6095	0.0224	-9.9000
6440	0291	18	12	F	A	D	9985	0.7269	0.7269	0.0763	0.1053	0.0511	0.0401	0.0004	0.4902	0.4902	-0.3075	-0.2916	-0.2598	-0.6425	0.0256	-8.9000
5934	0292	19	12	F	C	B	9985	0.7995	0.0341	0.0853	0.7995	0.0412	0.0398	0.0002	0.5434	-0.2968	-0.2957	0.5434	-0.2896	-1.1737	0.0288	-9.9000
5735	0293	20	12	F	C	B	9985	0.7919	0.0503	0.0469	0.7919	0.0706	0.0404	0.0000	0.5172	-0.2594	-0.2818	0.5172	-0.2747	-1.1115	0.0284	-8.8000
6342	0294	21	12	F	D	B	9985	0.8240	0.0675	0.0256	0.0422	0.8240	0.0400	0.0007	0.5355	-0.2751	-0.2809	-0.2490	0.5355	-1.3891	0.0305	-9.9000

Appendix F: Grade 4 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6464	0295	22	12	F	A	D	9985	0.5399	0.5399	0.0519	0.2618	0.1059	0.0405	0.0001	0.4142	0.4142	-0.3616	-0.3369	-0.2351	0.4074	0.0225	-7.4000
6339	0296	23	12	F	A	B	9985	0.7983	0.7983	0.0585	0.0677	0.0348	0.0403	0.0005	0.5040	0.5040	-0.2475	-0.2536	-0.2589	-1.1639	0.0287	-8.5000
5822	0297	24	12	F	A	A	9985	0.5838	0.5838	0.0536	0.2017	0.1204	0.0402	0.0004	0.4196	0.4196	-0.3119	-0.2674	-0.3289	0.1814	0.0228	-6.6000
5937	0298	25	12	F	C	B	9985	0.3714	0.1241	0.3264	0.3714	0.1371	0.0407	0.0004	0.3138	-0.3728	-0.2230	0.3138	-0.2974	1.2605	0.0228	2.7000
6292	0299	26	12	F	A	A	9985	0.8712	0.8712	0.0173	0.0292	0.0414	0.0404	0.0005	0.4817	0.4817	-0.1600	-0.1590	-0.1936	-1.8966	0.0355	-4.0000
5552	0300	27	12	F	B	C	9985	0.7258	0.0927	0.7258	0.0710	0.0671	0.0432	0.0002	0.5093	-0.3120	0.5093	-0.3026	-0.3135	-0.6352	0.0255	-9.9000

Appendix G:

**Grade 4 Constructed-Response Statistics for the
2007 Science Field Test**

Appendix G: Grade 4 Constructed-Response Statistics for the 2007 Science Field Test

Information								Proportions							Correlations			Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Maximum	Subscale	n	Average	P-Value	0	1	2	B	F	Item Total Corr.	0	1	2	Measure	Measure SE	Fit
6614	0001	13	1	F	2	B	1202	1.1406	0.5703	0.2812	0.2105	0.4651	0.0424	0.0008	0.4922	-0.4740	0.0294	0.4209	0.5000	0.0405	-1.4000
7271	0002	14	1	F	2	D	1202	1.0116	0.5058	0.1140	0.6622	0.1747	0.0491		0.3687	-0.3516	0.0962	0.2222	0.6672	0.0567	1.1000
6584	0003	28	1	F	2	C	1202	0.7779	0.3889	0.2920	0.5416	0.1181	0.0483		0.4007	-0.3950	0.2370	0.2141	1.4312	0.0515	-0.2000
7195	0004	29	1	F	2	A	1202	0.5632	0.2816	0.4917	0.3369	0.1131	0.0582		0.4299	-0.4202	0.2596	0.2726	1.8408	0.0482	-2.7000
6476	0005	13	2	F	2	C	1196	1.4055	0.7028	0.1547	0.2099	0.5978	0.0376		0.4084	-0.4178	0.0151	0.3231	-0.1009	0.0454	3.3000
6579	0006	14	2	F	2	A	1195	0.6728	0.3364	0.4368	0.3146	0.1791	0.0695		0.3889	-0.3546	0.1265	0.3090	1.4941	0.0445	0.4000
6736	0007	28	2	F	2	D	1197	1.0794	0.5397	0.1512	0.5096	0.2849	0.0543		0.4026	-0.4192	0.1168	0.2456	0.5082	0.0489	1.4000
6407	0008	29	2	F	2	A	1196	0.6413	0.3207	0.4732	0.2600	0.1906	0.0761		0.3603	-0.3308	0.1081	0.2981	1.5230	0.0435	0.9000
6613	0009	13	3	F	2	A	1189	1.2405	0.6203	0.1573	0.3776	0.4315	0.0336		0.5290	-0.4857	-0.0324	0.4171	0.1577	0.0478	-1.5000
6477	0010	14	3	F	2	C	1189	0.2960	0.1480	0.7384	0.1177	0.0892	0.0547		0.1170	-0.0971	0.0183	0.1174	2.3977	0.0528	8.7000
6618	0011	28	3	F	2	B	1189	1.6123	0.8061	0.0664	0.1505	0.7309	0.0521		0.5690	-0.5405	-0.1187	0.4898	-0.7269	0.0548	-1.4000
6731	0012	29	3	F	2	D	1189	0.1766	0.0883	0.7485	0.1177	0.0294	0.1043		0.2055	-0.2022	0.1562	0.1258	3.0876	0.0693	1.0000
6838	0013	13	4	F	2	A	1193	0.7393	0.3697	0.3579	0.4694	0.1350	0.0377		0.3689	-0.3740	0.2303	0.1990	1.5691	0.0496	1.5000
7272	0014	14	4	F	2	D	1193	0.4585	0.2293	0.4987	0.4267	0.0159	0.0587		0.2357	-0.2315	0.2128	0.0778	3.0278	0.0607	4.5000
6740	0015	28	4	F	2	B	1193	1.1475	0.5738	0.1744	0.4099	0.3688	0.0469		0.5069	-0.4867	0.0447	0.3732	0.4587	0.0469	-0.4000
6870	0016	29	4	F	2	C	1193	1.2221	0.6111	0.2883	0.0922	0.5650	0.0545		0.3998	-0.4012	0.0361	0.3631	0.4704	0.0404	4.9000
6739	0017	13	5	F	2	A	1132	1.2041	0.6020	0.1696	0.3913	0.4064	0.0327		0.4595	-0.4141	-0.0273	0.3659	0.0114	0.0469	-0.9000
7273	0018	14	5	F	2	D	1132	1.0751	0.5375	0.1599	0.4938	0.2906	0.0557		0.2633	-0.2983	0.1181	0.1401	0.2896	0.0490	6.2000
6626	0019	28	5	F	2	B	1132	1.5300	0.7650	0.0742	0.2509	0.6396	0.0353		0.4953	-0.4393	-0.1488	0.4201	-0.7958	0.0526	-0.2000
6497	0020	29	5	F	2	C	1132	1.0998	0.5499	0.1890	0.3843	0.3578	0.0689		0.4039	-0.3687	0.0170	0.3193	0.2752	0.0453	0.7000
6741	0021	13	6	F	2	B	1161	0.9750	0.4875	0.2171	0.5357	0.2196	0.0276		0.4557	-0.4283	0.1162	0.3047	0.5948	0.0497	-1.9000
6499	0022	14	6	F	2	C	1161	0.3764	0.1882	0.6124	0.2696	0.0534	0.0646		0.3199	-0.3093	0.2306	0.1883	2.2208	0.0560	-0.1000
6474	0023	28	6	F	2	C	1161	0.5297	0.2649	0.5185	0.3661	0.0818	0.0336		0.3805	-0.3512	0.2176	0.2547	1.7983	0.0516	-1.2000
7277	0024	29	6	F	2	D	1161	0.5228	0.2614	0.4505	0.4281	0.0474	0.0741		0.2670	-0.2503	0.1887	0.1490	2.0588	0.0557	2.3000
6732	0025	13	7	F	2	D	1150	0.7757	0.3878	0.3600	0.4348	0.1704	0.0348		0.5209	-0.4942	0.2206	0.3516	0.8172	0.0469	-5.3000
6581	0026	14	7	F	2	A	1150	0.9026	0.4513	0.3035	0.3948	0.2539	0.0478		0.4534	-0.4308	0.1256	0.3315	0.4901	0.0444	-2.1000
6610	0027	28	7	F	2	A	1150	0.9400	0.4700	0.3087	0.3452	0.2974	0.0487		0.4892	-0.4636	0.1043	0.3775	0.4029	0.0428	-3.8000
6615	0028	29	7	F	2	B	1150	1.0617	0.5309	0.3061	0.1626	0.4496	0.0817		0.4296	-0.4033	0.0021	0.3934	0.1862	0.0390	0.7000
6520	0029	13	8	F	2	A	1142	1.2592	0.6296	0.2356	0.2014	0.5289	0.0342		0.4435	-0.4514	0.0533	0.3585	-0.0123	0.0423	0.4000
7274	0030	14	8	F	2	D	1142	0.5412	0.2706	0.4553	0.4361	0.0525	0.0560		0.3628	-0.3612	0.2932	0.1575	1.9203	0.0555	-0.6000
6733	0031	28	8	F	2	B	1142	0.9299	0.4650	0.2776	0.4501	0.2399	0.0324		0.4539	-0.4438	0.1517	0.3039	0.6525	0.0468	-1.2000
7037	0032	29	8	F	2	A	1142	0.5464	0.2732	0.5578	0.1436	0.2014	0.0972		0.3759	-0.3758	0.1542	0.3107	1.3595	0.0434	-0.1000
6498	0033	13	9	F	2	C	1207	0.9287	0.4644	0.2809	0.4217	0.2535	0.0439		0.4206	-0.3904	0.0956	0.3117	0.9091	0.0462	2.6000
6611	0034	14	9	F	2	A	1207	1.1276	0.5638	0.1591	0.3935	0.3670	0.0804		0.3747	-0.3252	-0.0210	0.3092	0.4033	0.0462	5.7000
7270	0035	28	9	F	2	D	1207	0.2966	0.1483	0.7075	0.1657	0.0655	0.0613		0.3392	-0.3568	0.2776	0.1909	2.5423	0.0565	0.0000
7278	0036	29	9	F	2	D	1207	0.2229	0.1114	0.7100	0.1384	0.0423	0.1094		0.2906	-0.2899	0.2188	0.1789	2.8651	0.0633	0.0000
7196	0037	13	10	F	2	A	1204	0.4568	0.2284	0.5233	0.3588	0.0490	0.0689		0.3692	-0.3596	0.2840	0.1876	2.3040	0.0555	0.4000
6408	0038	14	10	F	2	A	1204	0.3738	0.1869	0.6088	0.2625	0.0556	0.0731		0.3659	-0.3542	0.2611	0.2185	2.3739	0.0555	-0.3000
6617	0039	28	10	F	2	C	1204	0.3297	0.1649	0.6968	0.1387	0.0955	0.0689		0.3719	-0.3474	0.1606	0.3116	2.1867	0.0518	-1.2000
6840	0040	29	10	F	2	A	1204	1.0291	0.5145	0.1653	0.3846	0.3223	0.1279		0.4626	-0.4540	0.1042	0.3338	0.5603	0.0451	1.2000
6585	0041	13	11	F	2	C	1200	0.4483	0.2242	0.6358	0.2100	0.1192	0.0350		0.1296	-0.1112	0.0349	0.1174	1.5694	0.0467	6.8000
6734	0042	14	11	F	2	B	1200	0.6783	0.3392	0.4458	0.3000	0.1892	0.0650		0.4642	-0.4374	0.1718	0.3572	1.0764	0.0429	-3.9000

Appendix G: Grade 4 Constructed-Response Statistics for the 2007 Science Field Test

Information								Proportions							Correlations			Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Maximum	Subscale	n	Average	P-Value	0	1	2	B	F	Item Total Corr.	0	1	2	Measure	Measure SE	Fit
6580	0043	28	11	F	2	A	1200	0.7008	0.3504	0.3750	0.4442	0.1283	0.0525		0.2755	-0.2369	0.0930	0.2122	1.1706	0.0475	2.2000
6500	0044	29	11	F	2	C	1200	0.6017	0.3008	0.4425	0.3267	0.1375	0.0933		0.3131	-0.2976	0.1540	0.2212	1.3026	0.0455	1.4000
7610	0045	13	12	F	2	B	1200	0.8183	0.4092	0.4892	0.1050	0.3567	0.0492		0.3848	-0.3688	0.0341	0.3621	0.9448	0.0387	3.3000
6612	0046	14	12	F	2	C	1200	0.2933	0.1467	0.6458	0.2433	0.0250	0.0858		0.3513	-0.3573	0.3225	0.1274	2.7855	0.0623	-1.9000
6409	0047	28	12	F	2	B	1200	0.9267	0.4633	0.3717	0.2150	0.3558	0.0575		0.5142	-0.5009	0.1017	0.4306	0.7501	0.0406	-1.8000
6475	0048	29	12	F	2	C	1200	0.9267	0.4633	0.2450	0.4417	0.2425	0.0708		0.3734	-0.3715	0.1363	0.2450	0.7568	0.0466	5.2000

Appendix H:

**Grade 8 Multiple-Choice Statistics for the
2007 Science Field Test**

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions							Correlations				Rasch				
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6015	0001	1	1	F	C	D	12275	0.4453	0.0859	0.2367	0.4453	0.1670	0.0646	0.0004	0.2954	-0.2385	-0.1555	0.2954	-0.1773	-0.0085	0.0200	4.6000
6549	0002	2	1	F	B	A	12275	0.8424	0.0423	0.8424	0.0289	0.0233	0.0630	0.0002	0.5030	-0.1620	0.5030	-0.1852	-0.1545	-2.5232	0.0311	-8.2000
6035	0003	3	1	F	C	A	12275	0.1066	0.7784	0.0313	0.1066	0.0203	0.0631	0.0003	0.1633	-0.1277	-0.4465	0.1633	-0.3072	2.1808	0.0305	7.3000
5911	0004	4	1	F	A	A	12275	0.5855	0.5855	0.1108	0.1804	0.0582	0.0649	0.0001	0.4869	0.4869	-0.2979	-0.3477	-0.2819	-0.7049	0.0205	-9.9000
5604	0005	5	1	F	D	A	12275	0.4633	0.2345	0.1127	0.1255	0.4633	0.0640	0.0002	0.3369	-0.1950	-0.2513	-0.2280	0.3369	-0.0967	0.0199	-0.9000
5723	0006	6	1	F	D	C	12275	0.5479	0.1469	0.1584	0.0824	0.5479	0.0641	0.0002	0.3246	-0.1674	-0.1567	-0.1796	0.3246	-0.5140	0.0202	3.8000
5510	0007	7	1	F	B	C	12275	0.1231	0.5234	0.1231	0.0752	0.2130	0.0648	0.0004	0.0941	0.0290	0.0941	-0.2707	-0.2317	2.0035	0.0287	9.9000
5564	0008	8	1	F	C	B	12275	0.5551	0.2293	0.0379	0.5551	0.1119	0.0654	0.0003	0.1753	0.0193	-0.2347	0.1753	0.0487	-0.5500	0.0202	9.9000
6825	0009	9	1	F	D	A	12275	0.4359	0.1201	0.2200	0.1575	0.4359	0.0663	0.0002	0.4195	-0.2925	-0.3292	-0.3406	0.4195	0.0375	0.0200	-9.9000
6826	0010	10	1	F	D	B	12275	0.2899	0.3056	0.1320	0.2059	0.2899	0.0662	0.0005	0.3438	-0.3163	-0.3888	-0.2704	0.3438	0.7954	0.0214	-4.2000
6827	0011	11	1	F	A	D	12275	0.3585	0.3585	0.2341	0.1092	0.2305	0.0671	0.0006	0.2971	0.2971	-0.2522	-0.2789	-0.1518	0.4259	0.0205	3.1000
7218	0012	12	1	F	D	A	12275	0.4388	0.0941	0.0919	0.3070	0.4388	0.0677	0.0006	0.2479	-0.2420	-0.2272	-0.0384	0.2479	0.0235	0.0200	9.9000
5562	0013	15	1	F	A	B	12275	0.2270	0.2270	0.2477	0.1242	0.3303	0.0705	0.0002	0.1716	0.1716	-0.1320	-0.3393	-0.0251	1.1759	0.0230	9.5000
5497	0014	16	1	F	A	C	12275	0.2635	0.2635	0.1970	0.2752	0.1933	0.0707	0.0002	0.1068	0.1068	-0.0805	-0.0012	0.0288	0.9487	0.0220	9.9000
7185	0015	17	1	F	B	A	12275	0.4922	0.1988	0.4922	0.1479	0.0893	0.0717	0.0002	0.3940	-0.2319	0.3940	-0.2928	-0.2461	-0.2383	0.0200	-7.6000
5867	0016	18	1	F	A	A	12275	0.5664	0.5664	0.0769	0.1660	0.1180	0.0723	0.0003	0.4003	0.4003	-0.3006	-0.1917	-0.2095	-0.6069	0.0203	-5.5000
5501	0017	19	1	F	B	B	12275	0.5049	0.1330	0.5049	0.1479	0.1415	0.0724	0.0002	0.4061	-0.2322	0.4061	-0.2968	-0.2572	-0.3006	0.0200	-9.4000
5871	0018	20	1	F	C	A	12275	0.7178	0.1215	0.0412	0.7178	0.0469	0.0721	0.0005	0.5023	-0.2269	-0.2466	0.5023	-0.2623	-1.4622	0.0231	-9.9000
5671	0019	21	1	F	C	C	12275	0.4962	0.0879	0.1472	0.4962	0.1956	0.0727	0.0003	0.3140	-0.2255	-0.2763	0.3140	-0.0423	-0.2578	0.0200	3.6000
6352	0020	22	1	F	D	D	12275	0.4340	0.1457	0.1924	0.1541	0.4340	0.0735	0.0004	0.4121	-0.3175	-0.2930	-0.3249	0.4121	0.0472	0.0200	-9.9000
5605	0021	23	1	F	C	A	12275	0.4046	0.0739	0.1127	0.4046	0.3356	0.0729	0.0003	0.3178	-0.3024	-0.3410	0.3178	-0.1313	0.1927	0.0201	0.1000
6364	0022	24	1	F	B	D	12275	0.3108	0.2231	0.3108	0.2051	0.1874	0.0729	0.0007	0.2108	-0.0732	0.2108	-0.2156	-0.1106	0.6793	0.0211	8.1000
5517	0023	25	1	F	C	B	12275	0.7026	0.0582	0.0916	0.7026	0.0739	0.0733	0.0002	0.4794	-0.2646	-0.2058	0.4794	-0.2091	-1.3649	0.0226	-9.8000
5759	0024	26	1	F	A	D	12275	0.4121	0.4121	0.1161	0.2937	0.1031	0.0748	0.0003	0.2595	0.2595	-0.2610	-0.0512	-0.2308	0.1554	0.0201	6.5000
5682	0025	1	2	F	C	A	12270	0.3230	0.1337	0.4271	0.3230	0.0564	0.0597	0.0000	0.2965	-0.2045	-0.2437	0.2965	-0.3055	0.5602	0.0207	-0.7000
5705	0026	2	2	F	C	A	12270	0.4844	0.2461	0.1350	0.4844	0.0746	0.0597	0.0002	0.1946	0.0174	-0.1082	0.1946	-0.1978	-0.2366	0.0198	9.9000
5500	0027	3	2	F	D	B	12270	0.3663	0.0661	0.3462	0.1612	0.3663	0.0597	0.0004	0.1529	-0.1870	0.0109	-0.1196	0.1529	0.3376	0.0202	9.9000
5488	0028	4	2	F	C	C	12270	0.3629	0.3440	0.1512	0.3629	0.0809	0.0607	0.0002	0.1961	-0.0552	-0.1849	0.1961	-0.1499	0.3548	0.0202	9.9000
5558	0029	5	2	F	A	C	12270	0.1932	0.1932	0.0390	0.2502	0.4576	0.0595	0.0004	0.0884	0.0884	-0.2578	-0.1529	0.0621	1.3386	0.0240	9.9000
5838	0030	6	2	F	C	D	12270	0.6107	0.0893	0.1689	0.6107	0.0698	0.0610	0.0003	0.4482	-0.3233	-0.2257	0.4482	-0.2874	-0.8614	0.0206	-9.9000
6007	0031	7	2	F	C	D	12270	0.4390	0.1569	0.0980	0.4390	0.2456	0.0602	0.0002	0.3037	-0.2965	-0.2518	0.3037	-0.1046	-0.0185	0.0198	0.1000
5668	0032	8	2	F	B	A	12270	0.5278	0.1843	0.5278	0.1037	0.1225	0.0615	0.0002	0.4249	-0.2825	0.4249	-0.2678	-0.3117	-0.4459	0.0199	-9.9000
7222	0033	9	2	F	A	D	12270	0.3861	0.3861	0.2720	0.1325	0.1474	0.0618	0.0003	0.1247	0.1247	0.0517	-0.2071	0.0442	0.2394	0.0200	9.9000
6824	0034	10	2	F	D	A	12270	0.3907	0.1112	0.1787	0.2563	0.3907	0.0629	0.0002	0.3789	-0.2976	-0.3100	-0.3148	0.3789	0.2165	0.0200	-9.8000
7221	0035	11	2	F	C	D	12270	0.2158	0.2174	0.3785	0.2158	0.1241	0.0636	0.0007	0.1411	-0.2064	0.0137	0.1411	-0.2150	1.1842	0.0232	9.9000
7219	0036	12	2	F	A	A	12270	0.5897	0.5897	0.1118	0.1069	0.1270	0.0644	0.0002	0.4901	0.4901	-0.3080	-0.3140	-0.3352	-0.7534	0.0204	-9.9000
6507	0037	15	2	F	C	A	12270	0.5703	0.1561	0.1639	0.5703	0.0390	0.0707	0.0001	0.4332	-0.2486	-0.3084	0.4332	-0.1884	-0.6550	0.0202	-9.9000
5639	0038	16	2	F	B	A	12270	0.5240	0.0640	0.5240	0.2288	0.1131	0.0699	0.0002	0.3385	-0.2381	0.3385	-0.1638	-0.1864	-0.4271	0.0199	-2.4000
5636	0039	17	2	F	A	C	12270	0.5500	0.5500	0.1529	0.0690	0.1570	0.0706	0.0006	0.4186	0.4186	-0.2805	-0.2231	-0.2456	-0.5542	0.0200	-9.9000
7187	0040	18	2	F	A	A	12270	0.4174	0.4174	0.1293	0.2371	0.1447	0.0711	0.0004	0.2602	0.2602	-0.2025	-0.1289	-0.1225	0.0862	0.0199	4.2000
6256	0041	19	2	F	C	A	12270	0.2808	0.1395	0.2606	0.2808	0.2477	0.0710	0.0004	0.1478	-0.1861	-0.0458	0.1478	-0.0127	0.7896	0.0214	9.9000
5672	0042	20	2	F	B	C	12270	0.4822	0.1633	0.4822	0.1369	0.1455	0.0720	0.0001	0.2765	-0.1123	0.2765	-0.2176	-0.0837	-0.2256	0.0198	4.2000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5591	0043	21	2	F	D	B	12270	0.5445	0.0881	0.1122	0.1835	0.5445	0.0714	0.0002	0.4891	-0.3053	-0.3509	-0.3391	0.4891	-0.5275	0.0200	-9.9000
5912	0044	22	2	F	B	A	12270	0.1725	0.2373	0.1725	0.3505	0.1666	0.0729	0.0002	0.0560	0.0135	0.0560	0.0339	0.0268	1.4915	0.0250	9.9000
6020	0045	23	2	F	B	D	12270	0.5672	0.1183	0.5672	0.1637	0.0778	0.0725	0.0005	0.3880	-0.1968	0.3880	-0.1906	-0.2656	-0.6400	0.0201	-7.2000
6012	0046	24	2	F	D	A	12270	0.4036	0.1143	0.2877	0.1205	0.4036	0.0731	0.0007	0.3233	-0.2807	-0.1550	-0.2987	0.3233	0.1533	0.0199	-3.1000
5865	0047	25	2	F	D	D	12270	0.7701	0.0503	0.0606	0.0444	0.7701	0.0739	0.0007	0.5274	-0.1911	-0.2641	-0.2303	0.5274	-1.8395	0.0249	-9.9000
5695	0048	26	2	F	B	A	12270	0.2857	0.1571	0.2857	0.3815	0.1002	0.0752	0.0002	0.1497	-0.2479	0.1497	0.0546	-0.1966	0.7622	0.0213	9.9000
5868	0049	1	3	F	D	A	12328	0.4326	0.1131	0.1105	0.2820	0.4326	0.0619	0.0000	0.2468	-0.1452	-0.1994	-0.1071	0.2468	0.0712	0.0202	9.9000
5787	0050	2	3	F	B	A	12328	0.7850	0.0520	0.7850	0.0257	0.0765	0.0608	0.0000	0.4021	-0.1581	0.4021	-0.1663	-0.0901	-1.9700	0.0261	2.1000
6280	0051	3	3	F	B	D	12328	0.2020	0.2410	0.2020	0.3104	0.1845	0.0619	0.0002	0.1548	-0.1822	0.1548	-0.1199	-0.0431	1.3927	0.0241	9.9000
5607	0052	4	3	F	D	A	12328	0.3077	0.1509	0.3380	0.1413	0.3077	0.0621	0.0000	0.2728	-0.3305	-0.1480	-0.2627	0.2728	0.7286	0.0213	6.6000
5620	0053	5	3	F	C	C	12328	0.2180	0.1849	0.3731	0.2180	0.1618	0.0620	0.0002	0.2378	-0.3559	-0.1019	0.2378	-0.3456	1.2800	0.0235	8.5000
5656	0054	6	3	F	D	A	12328	0.8125	0.0242	0.0305	0.0704	0.8125	0.0621	0.0003	0.5450	-0.2041	-0.2338	-0.2669	0.5450	-2.2177	0.0280	-9.9000
5848	0055	7	3	F	B	B	12328	0.7040	0.0870	0.7040	0.0852	0.0605	0.0631	0.0002	0.4745	-0.2013	0.4745	-0.3044	-0.2013	-1.3825	0.0227	-8.1000
5596	0056	8	3	F	D	C	12328	0.6802	0.0805	0.0468	0.1291	0.6802	0.0632	0.0001	0.4960	-0.2747	-0.2667	-0.2775	0.4960	-1.2346	0.0221	-9.9000
6791	0057	9	3	F	B	A	12328	0.3451	0.2340	0.3451	0.1456	0.2108	0.0641	0.0003	0.2365	-0.1542	0.2365	-0.2752	-0.0785	0.5229	0.0208	9.9000
6888	0058	10	3	F	C	B	12328	0.4778	0.1662	0.1019	0.4778	0.1899	0.0639	0.0003	0.3908	-0.2693	-0.2557	0.3908	-0.2794	-0.1552	0.0201	-4.2000
6797	0059	11	3	F	A	B	12328	0.4182	0.4182	0.2226	0.1875	0.1066	0.0649	0.0002	0.3939	0.3939	-0.3054	-0.3167	-0.2805	0.1437	0.0202	-5.6000
6793	0060	12	3	F	A	A	12328	0.2741	0.2741	0.1886	0.2600	0.2107	0.0664	0.0002	0.2095	0.2095	-0.2109	-0.1366	-0.1262	0.9231	0.0220	9.9000
5578	0061	15	3	F	D	C	12328	0.2557	0.2018	0.2061	0.2644	0.2557	0.0712	0.0008	0.3974	-0.4126	-0.4621	-0.3773	0.3974	1.0352	0.0224	-8.8000
5742	0062	16	3	F	C	A	12328	0.5292	0.1438	0.0512	0.5292	0.2041	0.0705	0.0012	0.2985	-0.2278	-0.2724	0.2985	-0.0255	-0.4135	0.0202	9.9000
5741	0063	17	3	F	D	A	12328	0.4830	0.2099	0.1287	0.1058	0.4830	0.0717	0.0009	0.3967	-0.1952	-0.3368	-0.3019	0.3967	-0.1815	0.0201	-4.7000
5707	0064	18	3	F	A	A	12328	0.3565	0.3565	0.1667	0.2644	0.1397	0.0717	0.0011	0.3407	0.3407	-0.2626	-0.2608	-0.2987	0.4624	0.0207	-0.6000
5651	0065	19	3	F	B	C	12328	0.6229	0.0659	0.6229	0.0555	0.1828	0.0716	0.0013	0.4489	-0.2689	0.4489	-0.2944	-0.2158	-0.9044	0.0211	-5.9000
5876	0066	20	3	F	D	A	12328	0.2304	0.2594	0.3026	0.1335	0.2304	0.0729	0.0011	0.2289	-0.1397	-0.1811	-0.3356	0.2289	1.1971	0.0231	7.9000
5560	0067	21	3	F	D	B	12328	0.3283	0.1841	0.1457	0.2684	0.3283	0.0722	0.0014	0.3070	-0.3271	-0.3091	-0.1470	0.3070	0.6143	0.0210	3.2000
6017	0068	22	3	F	B	D	12328	0.4758	0.1224	0.4758	0.0932	0.2348	0.0724	0.0014	0.3247	-0.1644	0.3247	-0.3126	-0.1430	-0.1454	0.0201	5.1000
5534	0069	23	3	F	B	B	12328	0.6087	0.1312	0.6087	0.1224	0.0638	0.0727	0.0011	0.4793	-0.2194	0.4793	-0.3324	-0.2998	-0.8273	0.0209	-9.9000
5850	0070	24	3	F	D	A	12328	0.5539	0.2182	0.0609	0.0932	0.5539	0.0726	0.0012	0.3636	-0.1211	-0.2807	-0.2654	0.3636	-0.5391	0.0204	1.8000
5882	0071	25	3	F	B	A	12328	0.6106	0.1070	0.6106	0.1179	0.0897	0.0732	0.0015	0.4610	-0.2383	0.4610	-0.2972	-0.2405	-0.8374	0.0209	-9.4000
5598	0072	26	3	F	B	C	12328	0.2857	0.1690	0.2857	0.2207	0.2489	0.0745	0.0012	0.2427	-0.1809	0.2427	-0.2042	-0.1607	0.8546	0.0217	9.9000
5561	0073	1	4	F	D	B	12284	0.4516	0.1994	0.0979	0.1899	0.4516	0.0609	0.0002	0.1947	0.0636	-0.2059	-0.1417	0.1947	-0.0017	0.0199	9.9000
5540	0074	2	4	F	B	B	12284	0.6120	0.2103	0.6120	0.0874	0.0291	0.0611	0.0001	0.3421	-0.1533	0.3421	-0.1945	-0.1561	-0.8018	0.0207	1.6000
6022	0075	3	4	F	C	D	12284	0.5758	0.1439	0.1359	0.5758	0.0831	0.0612	0.0001	0.4155	-0.2911	-0.2167	0.4155	-0.2399	-0.6137	0.0203	-8.1000
5870	0076	4	4	F	D	A	12284	0.6364	0.0528	0.0983	0.1506	0.6364	0.0615	0.0004	0.3621	-0.2394	-0.1774	-0.1320	0.3621	-0.9332	0.0211	1.3000
5866	0077	5	4	F	B	B	12284	0.5152	0.2673	0.5152	0.0502	0.1049	0.0615	0.0007	0.3550	-0.2374	0.3550	-0.1759	-0.2098	-0.3121	0.0200	-2.6000
5553	0078	6	4	F	D	A	12284	0.5777	0.0664	0.1894	0.1042	0.5777	0.0620	0.0004	0.4262	-0.2629	-0.2143	-0.3329	0.4262	-0.6234	0.0203	-9.3000
5489	0079	7	4	F	D	C	12284	0.3165	0.1497	0.1461	0.3233	0.3165	0.0640	0.0004	0.1839	-0.0698	-0.1577	-0.1042	0.1839	0.6817	0.0209	9.9000
5803	0080	8	4	F	A	D	12284	0.4017	0.4017	0.3258	0.0891	0.1193	0.0637	0.0002	0.2941	0.2941	-0.1466	-0.2551	-0.2935	0.2430	0.0201	2.5000
6887	0081	9	4	F	C	B	12284	0.4711	0.1329	0.2484	0.4711	0.0842	0.0633	0.0002	0.3127	-0.1881	-0.2031	0.3127	-0.1713	-0.0968	0.0199	1.6000
6886	0082	10	4	F	B	A	12284	0.5440	0.0922	0.5440	0.1368	0.1626	0.0642	0.0002	0.4447	-0.2585	0.4447	-0.3708	-0.2497	-0.4539	0.0201	-9.9000
6885	0083	11	4	F	D	A	12284	0.3264	0.2418	0.1598	0.2067	0.3264	0.0647	0.0007	0.2876	-0.1928	-0.2608	-0.2534	0.2876	0.6289	0.0208	0.6000
6795	0084	12	4	F	C	D	12284	0.2255	0.1521	0.1183	0.2255	0.4381	0.0656	0.0004	0.0761	-0.0218	-0.0770	0.0761	0.0337	1.2162	0.0230	9.9000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions							Correlations				Rasch				
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5637	0085	15	4	F	A	C	12284	0.2269	0.2269	0.3824	0.2529	0.0662	0.0711	0.0006	0.2607	0.2607	-0.2657	-0.2008	-0.2302	1.2072	0.0229	3.4000
5889	0086	16	4	F	A	D	12284	0.2331	0.2331	0.4502	0.1266	0.1179	0.0720	0.0002	0.1276	0.1276	-0.0146	-0.1724	-0.0763	1.1669	0.0227	9.9000
5696	0087	17	4	F	D	B	12284	0.5090	0.1394	0.1189	0.1591	0.5090	0.0728	0.0007	0.4250	-0.2643	-0.3103	-0.2816	0.4250	-0.2817	0.0199	-9.9000
5611	0088	18	4	F	A	B	12284	0.6038	0.6038	0.1251	0.1231	0.0751	0.0725	0.0003	0.4634	0.4634	-0.2795	-0.2555	-0.2792	-0.7584	0.0206	-9.9000
6000	0089	19	4	F	B	A	12284	0.4637	0.1929	0.4637	0.1859	0.0844	0.0727	0.0003	0.3868	-0.2328	0.3868	-0.2641	-0.3285	-0.0608	0.0199	-8.4000
7182	0090	20	4	F	D	A	12284	0.4614	0.0509	0.0521	0.3620	0.4614	0.0733	0.0002	0.3388	-0.3153	-0.3612	-0.1571	0.3388	-0.0497	0.0199	-1.9000
6479	0091	21	4	F	B	C	12284	0.4611	0.1469	0.4611	0.2104	0.1079	0.0732	0.0006	0.3515	-0.2731	0.3515	-0.1776	-0.2488	-0.0481	0.0199	-3.7000
5524	0092	22	4	F	A	C	12284	0.4499	0.4499	0.2542	0.1071	0.1148	0.0733	0.0006	0.3213	0.3213	-0.1859	-0.2411	-0.1888	0.0063	0.0199	0.2000
5869	0093	23	4	F	C	A	12284	0.7108	0.0773	0.0913	0.7108	0.0461	0.0740	0.0006	0.5112	-0.2498	-0.2614	0.5112	-0.2451	-1.3691	0.0227	-9.9000
5623	0094	24	4	F	C	C	12284	0.5401	0.0863	0.2106	0.5401	0.0887	0.0742	0.0002	0.4109	-0.2647	-0.2260	0.4109	-0.2772	-0.4344	0.0201	-9.2000
5519	0095	25	4	F	C	B	12284	0.2444	0.3557	0.1717	0.2444	0.1524	0.0746	0.0012	0.1073	0.0247	-0.0812	0.1073	-0.0614	1.0964	0.0224	9.9000
5849	0096	26	4	F	B	A	12284	0.5017	0.0725	0.5017	0.1129	0.2366	0.0758	0.0005	0.3193	-0.2594	0.3193	-0.2785	-0.0756	-0.2460	0.0199	2.3000
6508	0097	1	5	F	B	A	11684	0.5587	0.1654	0.5587	0.0967	0.1186	0.0606	0.0000	0.3269	-0.2353	0.3269	-0.1742	-0.0993	-0.5286	0.0208	4.4000
5807	0098	2	5	F	B	B	11684	0.5956	0.2369	0.5956	0.0696	0.0375	0.0604	0.0000	0.1810	0.0498	0.1810	-0.1498	-0.0719	-0.7180	0.0211	9.9000
5499	0099	3	5	F	A	C	11684	0.4337	0.4337	0.1309	0.2371	0.1367	0.0612	0.0004	0.3711	0.3711	-0.2918	-0.2823	-0.2605	0.0893	0.0205	-4.6000
5509	0100	4	5	F	B	C	11684	0.3762	0.2190	0.3762	0.1866	0.1565	0.0615	0.0002	0.2323	-0.1095	0.2323	-0.1576	-0.1837	0.3763	0.0208	9.9000
5673	0101	5	5	F	C	C	11684	0.4979	0.1259	0.1419	0.4979	0.1724	0.0619	0.0000	0.3966	-0.2233	-0.2981	0.3966	-0.2888	-0.2263	0.0205	-7.5000
6472	0102	6	5	F	B	A	11684	0.5533	0.1286	0.5533	0.1667	0.0892	0.0621	0.0001	0.3271	-0.1504	0.3271	-0.2032	-0.1672	-0.5014	0.0207	3.1000
5888	0103	7	5	F	D	D	11684	0.3242	0.1121	0.1478	0.3540	0.3242	0.0618	0.0001	0.2514	-0.2639	-0.2216	-0.1507	0.2514	0.6480	0.0214	5.5000
5706	0104	8	5	F	D	A	11684	0.6480	0.0975	0.1076	0.0846	0.6480	0.0621	0.0003	0.4575	-0.2499	-0.2438	-0.2839	0.4575	-1.0008	0.0219	-8.8000
6813	0105	9	5	F	C	D	11684	0.2061	0.1436	0.1499	0.2061	0.4372	0.0631	0.0002	0.0421	-0.1403	-0.1738	0.0421	0.1697	1.3577	0.0243	9.9000
7968	0106	10	5	F	D	A	11684	0.4516	0.0979	0.2157	0.1715	0.4516	0.0631	0.0003	0.3838	-0.3678	-0.2297	-0.2911	0.3838	0.0013	0.0205	-6.2000
6811	0107	11	5	F	B	B	11684	0.2487	0.1618	0.2487	0.2573	0.2677	0.0642	0.0003	0.2650	-0.2981	0.2650	-0.1786	-0.2805	1.0800	0.0229	4.0000
7967	0108	12	5	F	C	A	11684	0.5428	0.1688	0.1036	0.5428	0.1191	0.0656	0.0001	0.4147	-0.1987	-0.3348	0.4147	-0.2891	-0.4486	0.0207	-7.9000
5678	0109	15	5	F	A	C	11684	0.5494	0.5494	0.1238	0.1532	0.1008	0.0727	0.0002	0.4262	0.4262	-0.3128	-0.2896	-0.1751	-0.4817	0.0207	-8.7000
6288	0110	16	5	F	A	A	11684	0.1851	0.1851	0.2569	0.3186	0.1654	0.0737	0.0003	0.0600	0.0600	0.0590	0.0585	-0.1124	1.5083	0.0252	9.9000
7189	0111	17	5	F	B	A	11684	0.6232	0.0881	0.6232	0.0605	0.1543	0.0737	0.0002	0.5057	-0.2871	0.5057	-0.3072	-0.3168	-0.8649	0.0215	-9.9000
6046	0112	18	5	F	D	D	11684	0.4121	0.0881	0.1340	0.2914	0.4121	0.0739	0.0005	0.3465	-0.3050	-0.3597	-0.1674	0.3465	0.1961	0.0206	-2.4000
6506	0113	19	5	F	B	A	11684	0.3440	0.1745	0.3440	0.2640	0.1427	0.0745	0.0004	0.2635	-0.2104	0.2635	-0.1138	-0.2637	0.5429	0.0212	6.1000
5595	0114	20	5	F	B	C	11684	0.2535	0.1568	0.2535	0.1754	0.3394	0.0741	0.0009	0.1647	-0.1742	0.1647	-0.1557	-0.0266	1.0506	0.0228	9.9000
6379	0115	21	5	F	B	D	11684	0.3111	0.1440	0.3111	0.2230	0.2463	0.0749	0.0006	0.1306	-0.1005	0.1306	-0.0661	0.0416	0.7190	0.0216	9.9000
5619	0116	22	5	F	D	C	11684	0.4881	0.1225	0.1308	0.1838	0.4881	0.0744	0.0005	0.3359	-0.0780	-0.3084	0.3359	-0.1780	0.0205	1.1000	
5617	0117	23	5	F	A	D	11684	0.7128	0.7128	0.1063	0.0629	0.0429	0.0746	0.0005	0.5487	0.5487	-0.2902	-0.3271	-0.2602	-1.3876	0.0234	-9.9000
5872	0118	24	5	F	C	A	11684	0.6243	0.1084	0.1265	0.6243	0.0654	0.0749	0.0006	0.5015	-0.2647	-0.3187	0.5015	-0.3137	-0.8704	0.0215	-9.9000
5698	0119	25	5	F	B	B	11684	0.5591	0.1725	0.5591	0.1172	0.0763	0.0747	0.0003	0.4926	-0.2913	0.4926	-0.4034	-0.2950	-0.5303	0.0208	-9.9000
5535	0120	26	5	F	C	B	11684	0.5594	0.0939	0.0966	0.5594	0.1746	0.0751	0.0003	0.4379	-0.2672	-0.2952	0.4379	-0.2517	-0.5321	0.0208	-9.9000
5808	0121	1	6	F	C	C	11725	0.5647	0.1683	0.1445	0.5647	0.0610	0.0614	0.0002	0.2391	-0.0250	-0.1397	0.2391	-0.0966	-0.5469	0.0209	9.9000
5559	0122	2	6	F	D	A	11725	0.7170	0.0754	0.0562	0.0896	0.7170	0.0612	0.0007	0.5075	-0.2291	-0.2754	-0.2961	0.5075	-1.4143	0.0236	-9.9000
5702	0123	3	6	F	B	B	11725	0.5323	0.1189	0.5323	0.1577	0.1284	0.0623	0.0004	0.3137	-0.2133	0.3137	-0.2588	-0.0301	-0.3816	0.0207	8.1000
5615	0124	4	6	F	C	D	11725	0.3141	0.2710	0.1828	0.3141	0.1692	0.0625	0.0004	0.1867	-0.0371	-0.1745	0.1867	-0.1708	0.7329	0.0217	9.9000
5621	0125	5	6	F	C	C	11725	0.6986	0.0974	0.1033	0.6986	0.0389	0.0616	0.0003	0.4125	-0.1445	-0.2462	0.4125	-0.1564	-1.2962	0.0231	-2.5000
5875	0126	6	6	F	C	A	11725	0.5965	0.0761	0.0869	0.5965	0.1778	0.0622	0.0005	0.4550	-0.2801	-0.2917	0.4550	-0.2737	-0.7129	0.0212	-9.3000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5893	0127	7	6	F	D	A	11725	0.6201	0.1236	0.0946	0.0989	0.6201	0.0623	0.0004	0.4754	-0.3055	-0.2802	-0.2755	0.4754	-0.8398	0.0215	-9.9000
5616	0128	8	6	F	B	D	11725	0.4623	0.3781	0.4623	0.0504	0.0455	0.0634	0.0003	0.3277	-0.1765	0.3277	-0.3044	-0.2997	-0.0323	0.0206	2.4000
6809	0129	9	6	F	D	A	11725	0.3713	0.2583	0.1272	0.1800	0.3713	0.0629	0.0003	0.3098	-0.1965	-0.3467	-0.2164	0.3098	0.4277	0.0210	2.6000
6807	0130	10	6	F	B	A	11725	0.1777	0.2563	0.1777	0.3752	0.1272	0.0632	0.0005	0.0423	0.0599	0.0423	0.0453	-0.0471	1.6067	0.0257	9.9000
7966	0131	11	6	F	C	B	11725	0.0921	0.1609	0.6293	0.0921	0.0543	0.0629	0.0005	-0.0064	0.0236	0.1042	-0.0064	-0.2151	2.4446	0.0332	9.9000
8029	0132	12	6	F	D	D	11725	0.2757	0.3833	0.1662	0.1103	0.2757	0.0642	0.0003	0.2173	-0.1674	-0.0941	-0.2748	0.2173	0.9518	0.0224	9.9000
5681	0133	15	6	F	D	A	11725	0.7109	0.0664	0.0636	0.0876	0.7109	0.0711	0.0003	0.5652	-0.2962	-0.3230	-0.3121	0.5652	-1.3743	0.0235	-9.9000
5548	0134	16	6	F	A	C	11725	0.3235	0.3235	0.3180	0.1684	0.1167	0.0731	0.0003	0.3274	0.3274	-0.2498	-0.3419	-0.2306	0.6814	0.0215	0.3000
6888	0135	17	6	F	C	B	11725	0.4948	0.1713	0.0864	0.4948	0.1738	0.0728	0.0009	0.4402	-0.3291	-0.2051	0.4402	-0.3470	-0.1940	0.0206	-9.9000
6471	0136	18	6	F	A	A	11725	0.7087	0.7087	0.0509	0.0490	0.1186	0.0722	0.0005	0.4857	0.4857	-0.2591	-0.1954	-0.2445	-1.3606	0.0234	-9.0000
5592	0137	19	6	F	D	B	11725	0.3620	0.0721	0.2606	0.2324	0.3620	0.0726	0.0004	0.2589	-0.2022	-0.1070	-0.2254	0.2589	0.4761	0.0211	8.4000
5730	0138	20	6	F	D	A	11725	0.3177	0.2693	0.1653	0.1738	0.3177	0.0732	0.0007	0.3548	-0.2917	-0.3862	-0.2730	0.3548	0.7131	0.0216	-3.3000
6011	0139	21	6	F	B	A	11725	0.5233	0.1223	0.5233	0.1332	0.1467	0.0738	0.0007	0.3915	-0.2335	0.3915	-0.2663	-0.2116	-0.3366	0.0207	-4.2000
7186	0140	22	6	F	A	A	11725	0.3340	0.3340	0.1807	0.2520	0.1588	0.0736	0.0009	0.2584	0.2584	-0.2451	-0.1415	-0.1744	0.6245	0.0214	6.6000
5836	0141	23	6	F	B	D	11725	0.2781	0.2456	0.2781	0.2188	0.1832	0.0737	0.0006	0.1786	-0.1133	0.1786	-0.0969	-0.1120	0.9377	0.0223	9.9000
6470	0142	24	6	F	C	A	11725	0.5954	0.0994	0.1226	0.5954	0.1079	0.0740	0.0006	0.4940	-0.3254	-0.3011	0.4940	-0.2821	-0.7070	0.0212	-9.9000
6047	0143	25	6	F	C	A	11725	0.4852	0.0894	0.2767	0.4852	0.0733	0.0747	0.0007	0.3911	-0.2523	-0.2603	0.3911	-0.2537	-0.1461	0.0206	-5.3000
5710	0144	26	6	F	A	D	11725	0.5524	0.5524	0.1145	0.1358	0.1206	0.0763	0.0003	0.4748	0.4748	-0.3115	-0.3199	-0.3016	-0.4838	0.0208	-9.9000
5590	0145	1	7	F	C	B	11676	0.7560	0.0485	0.1159	0.7560	0.0223	0.0572	0.0002	0.4312	-0.2136	-0.1885	0.4312	-0.1719	-1.6446	0.0250	-4.3000
6353	0146	2	7	F	A	D	11676	0.1805	0.1805	0.1373	0.5498	0.0743	0.0581	0.0002	0.0521	0.0521	-0.0750	0.0671	-0.2640	1.6089	0.0257	9.9000
5880	0147	3	7	F	C	A	11676	0.5574	0.0629	0.1811	0.5574	0.1407	0.0578	0.0001	0.4107	-0.2712	-0.2875	0.4107	-0.2325	-0.4816	0.0208	-5.4000
5704	0148	4	7	F	B	A	11676	0.5408	0.1180	0.5408	0.1322	0.1505	0.0583	0.0002	0.3330	-0.1027	0.3330	-0.1982	-0.2740	-0.3975	0.0207	6.6000
6038	0149	5	7	F	D	A	11676	0.4710	0.1170	0.1787	0.1748	0.4710	0.0582	0.0004	0.3676	-0.2903	-0.2536	-0.2418	0.3676	-0.0502	0.0206	-2.2000
5507	0150	6	7	F	C	B	11676	0.4468	0.1049	0.2856	0.4468	0.1043	0.0582	0.0001	0.3817	-0.2934	-0.2618	0.3817	-0.3282	0.0695	0.0206	-4.0000
5546	0151	7	7	F	C	C	11676	0.4952	0.1541	0.1409	0.4952	0.1513	0.0582	0.0003	0.3601	-0.2765	-0.2651	0.3601	-0.1800	-0.1702	0.0206	-0.2000
5701	0152	8	7	F	D	D	11676	0.3309	0.2156	0.1888	0.2040	0.3309	0.0605	0.0003	0.2145	-0.0893	-0.1540	-0.2095	0.2145	0.6637	0.0215	9.9000
6825	0153	9	7	F	D	A	11676	0.4413	0.1391	0.2122	0.1470	0.4413	0.0600	0.0003	0.4099	-0.3111	-0.3132	-0.3395	0.4099	0.0967	0.0206	-8.2000
6826	0154	10	7	F	D	B	11676	0.2868	0.3197	0.1247	0.2086	0.2868	0.0600	0.0002	0.3413	-0.3174	-0.3763	-0.2996	0.3413	0.9096	0.0222	0.3000
6827	0155	11	7	F	A	D	11676	0.3440	0.3440	0.2350	0.1133	0.2466	0.0606	0.0005	0.2729	0.2729	-0.2567	-0.2629	-0.1362	0.5939	0.0213	7.9000
7218	0156	12	7	F	D	A	11676	0.4260	0.0875	0.0892	0.3350	0.4260	0.0621	0.0002	0.2026	-0.2465	-0.2468	0.0103	0.2026	0.1730	0.0207	9.9000
7191	0157	15	7	F	A	A	11676	0.6100	0.6100	0.1359	0.0976	0.0906	0.0659	0.0001	0.4500	0.4500	-0.3258	-0.2492	-0.1914	-0.7549	0.0213	-9.6000
6034	0158	16	7	F	B	A	11676	0.7409	0.1134	0.7409	0.0592	0.0205	0.0659	0.0002	0.5023	-0.2732	0.5023	-0.2386	-0.2140	-1.5375	0.0243	-9.9000
5502	0159	17	7	F	D	B	11676	0.4154	0.2205	0.1934	0.1035	0.4154	0.0669	0.0003	0.3754	-0.2610	-0.2703	-0.3665	0.3754	0.2262	0.0207	-4.6000
5800	0160	18	7	F	B	D	11676	0.5394	0.1973	0.5394	0.0761	0.1204	0.0664	0.0004	0.3102	-0.0690	0.3102	-0.2468	-0.2211	-0.3906	0.0207	6.3000
5618	0161	19	7	F	A	C	11676	0.3734	0.3734	0.1996	0.2086	0.1510	0.0669	0.0004	0.1697	0.1697	-0.0851	-0.0880	-0.0220	0.4397	0.0210	9.9000
5894	0162	20	7	F	D	A	11676	0.5045	0.0808	0.2409	0.1059	0.5045	0.0672	0.0005	0.3688	-0.3076	-0.1655	-0.3002	0.3688	-0.2165	0.0206	-1.5000
5834	0163	21	7	F	A	B	11676	0.4768	0.4768	0.2032	0.1416	0.1110	0.0670	0.0005	0.4380	0.4380	-0.2982	-0.3041	-0.3863	-0.0790	0.0206	-9.9000
6426	0164	22	7	F	B	C	11676	0.6379	0.1650	0.6379	0.0683	0.0614	0.0672	0.0002	0.4649	-0.2910	0.4649	-0.2228	-0.2633	-0.9065	0.0217	-9.3000
6363	0165	23	7	F	D	D	11676	0.3884	0.1485	0.1171	0.2779	0.3884	0.0677	0.0003	0.3490	-0.2613	-0.3075	-0.2567	0.3490	0.3627	0.0209	-2.0000
5892	0166	24	7	F	C	A	11676	0.6641	0.0758	0.1312	0.6641	0.0602	0.0682	0.0005	0.5013	-0.3204	-0.2639	0.5013	-0.2742	-1.0546	0.0222	-9.9000
6037	0167	25	7	F	B	A	11676	0.5272	0.0534	0.5272	0.0723	0.2784	0.0682	0.0005	0.4342	-0.3402	0.4342	-0.3459	-0.2621	-0.3296	0.0207	-9.6000
5495	0168	26	7	F	A	B	11676	0.3483	0.3483	0.2610	0.0646	0.2560	0.0700	0.0002	0.1917	0.1917	-0.0632	-0.3087	-0.0734	0.5707	0.0213	9.9000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions							Correlations				Rasch				
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5602	0169	1	8	F	C	B	11690	0.2748	0.4480	0.1216	0.2748	0.0966	0.0589	0.0001	0.1673	-0.0431	-0.2601	0.1673	-0.1596	0.8096	0.0222	9.9000
7181	0170	2	8	F	B	A	11690	0.6180	0.1328	0.6180	0.1510	0.0394	0.0583	0.0003	0.3039	-0.0996	0.3039	-0.1448	-0.1755	-0.9238	0.0212	4.3000
5873	0171	3	8	F	B	A	11690	0.3420	0.1154	0.3420	0.0627	0.4212	0.0583	0.0003	0.2728	-0.2623	0.2728	-0.3206	-0.1613	0.4437	0.0210	3.6000
5925	0172	4	8	F	C	A	11690	0.2134	0.2586	0.1926	0.2134	0.2757	0.0595	0.0002	0.1249	-0.0857	-0.1536	0.1249	-0.0167	1.1888	0.0239	9.9000
5727	0173	5	8	F	B	A	11690	0.5322	0.1889	0.5322	0.1127	0.1069	0.0589	0.0003	0.3461	-0.1908	0.3461	-0.2705	-0.1655	-0.4907	0.0204	-1.6000
6468	0174	6	8	F	B	D	11690	0.2457	0.2485	0.2457	0.1902	0.2553	0.0598	0.0005	0.1495	0.0088	0.1495	-0.2237	-0.1116	0.9823	0.0229	9.9000
5635	0175	7	8	F	D	C	11690	0.5376	0.0932	0.0818	0.2280	0.5376	0.0589	0.0006	0.4173	-0.2856	-0.2650	-0.2734	0.4173	-0.5166	0.0205	-9.9000
5490	0176	8	8	F	A	C	11690	0.6138	0.6138	0.1033	0.1356	0.0862	0.0607	0.0004	0.4484	0.4484	-0.2994	-0.2535	-0.2512	-0.9014	0.0212	-9.9000
7222	0177	9	8	F	A	D	11690	0.3780	0.3780	0.2671	0.1431	0.1507	0.0609	0.0002	0.1332	0.1332	0.0298	-0.1976	0.0170	0.2604	0.0207	9.9000
6824	0178	10	8	F	D	A	11690	0.3889	0.1091	0.1799	0.2601	0.3889	0.0616	0.0005	0.3796	-0.2878	-0.3187	-0.3140	0.3796	0.2062	0.0206	-9.3000
7221	0179	11	8	F	C	D	11690	0.2119	0.2229	0.3867	0.2119	0.1162	0.0619	0.0003	0.1242	-0.1714	0.0224	0.1242	-0.2192	1.1992	0.0240	9.9000
7219	0180	12	8	F	A	A	11690	0.5766	0.5766	0.1091	0.1164	0.1351	0.0624	0.0003	0.4693	0.4693	-0.3026	-0.3010	-0.3152	-0.7107	0.0207	-9.9000
5722	0181	15	8	F	A	B	11690	0.4903	0.4903	0.2459	0.0868	0.1093	0.0674	0.0002	0.3313	0.3313	-0.2139	-0.2478	-0.1299	-0.2872	0.0203	-2.4000
5610	0182	16	8	F	C	B	11690	0.1851	0.4746	0.1109	0.1851	0.1613	0.0679	0.0001	0.2292	-0.2583	-0.2298	0.2292	-0.0974	1.3878	0.0251	3.0000
5600	0183	17	8	F	C	C	11690	0.7049	0.0741	0.0780	0.7049	0.0743	0.0683	0.0005	0.3929	-0.2263	-0.1226	0.3929	-0.1230	-1.4159	0.0230	-2.8000
5913	0184	18	8	F	A	A	11690	0.5305	0.5305	0.1104	0.1352	0.1558	0.0679	0.0003	0.3527	0.3527	-0.1842	-0.2185	-0.2038	-0.4822	0.0204	-3.0000
5930	0185	19	8	F	C	D	11690	0.2142	0.2698	0.2842	0.2142	0.1624	0.0691	0.0003	0.0941	-0.0574	0.0226	0.0941	-0.0514	1.1837	0.0239	9.9000
5711	0186	20	8	F	D	D	11690	0.3967	0.0971	0.2568	0.1799	0.3967	0.0690	0.0004	0.3591	-0.3051	-0.2202	-0.3287	0.3591	0.1672	0.0205	-6.9000
6354	0187	21	8	F	B	D	11690	0.6575	0.0754	0.6575	0.1388	0.0583	0.0695	0.0004	0.5061	-0.2756	0.5061	-0.2954	-0.2930	-1.1379	0.0219	-9.9000
5881	0188	22	8	F	A	A	11690	0.5802	0.5802	0.1186	0.1055	0.1251	0.0699	0.0007	0.4460	0.4460	-0.2916	-0.2806	-0.2367	-0.7289	0.0208	-9.9000
5703	0189	23	8	F	B	B	11690	0.4340	0.1762	0.4340	0.2464	0.0731	0.0698	0.0004	0.2944	-0.2685	0.2944	-0.1092	-0.2043	-0.0149	0.0204	1.2000
5847	0190	24	8	F	D	B	11690	0.2792	0.1449	0.0799	0.4254	0.2792	0.0703	0.0003	0.1405	0.0344	-0.2241	-0.0611	0.1405	0.7841	0.0221	9.9000
5555	0191	25	8	F	C	A	11690	0.4648	0.0987	0.2777	0.4648	0.0881	0.0705	0.0002	0.3649	-0.3032	-0.1814	0.3649	-0.3298	-0.1642	0.0203	-6.2000
6427	0192	26	8	F	A	C	11690	0.3601	0.3601	0.3131	0.1265	0.1289	0.0713	0.0001	0.2324	0.2324	-0.0838	-0.1769	-0.2386	0.3506	0.0208	5.4000
5498	0193	1	9	F	C	C	11542	0.5078	0.1857	0.1291	0.5078	0.1222	0.0551	0.0001	0.3247	-0.2043	-0.2569	0.3247	-0.1262	-0.3453	0.0205	2.0000
5599	0194	2	9	F	D	C	11542	0.4062	0.0838	0.3583	0.0957	0.4062	0.0558	0.0003	0.3275	-0.2982	-0.1976	-0.3319	0.3275	0.1485	0.0206	-2.0000
5927	0195	3	9	F	C	B	11542	0.2824	0.1389	0.1705	0.2824	0.3525	0.0554	0.0003	0.1684	-0.2629	-0.1397	0.1684	-0.0291	0.7968	0.0222	9.9000
7188	0196	4	9	F	C	A	11542	0.1626	0.1133	0.2081	0.1626	0.4599	0.0556	0.0004	0.0648	-0.1181	0.1663	0.0648	-0.0681	1.5983	0.0266	9.9000
5606	0197	5	9	F	A	A	11542	0.6955	0.6955	0.0494	0.1022	0.0963	0.0562	0.0003	0.3892	0.3892	-0.2151	-0.1868	-0.1524	-1.3308	0.0228	-3.1000
6001	0198	6	9	F	C	A	11542	0.7106	0.0727	0.0891	0.7106	0.0717	0.0557	0.0002	0.4662	-0.2523	-0.2243	0.4662	-0.2474	-1.4229	0.0232	-9.9000
5603	0199	7	9	F	C	B	11542	0.8578	0.0167	0.0408	0.8578	0.0289	0.0555	0.0003	0.4306	-0.1251	-0.1133	0.4306	-0.1296	-2.6540	0.0328	-3.7000
5756	0200	8	9	F	C	D	11542	0.3855	0.2641	0.0952	0.3855	0.1972	0.0578	0.0003	0.3127	-0.1362	-0.3609	0.3127	-0.2964	0.2513	0.0208	0.5000
6791	0201	9	9	F	B	A	11542	0.3562	0.2312	0.3562	0.1320	0.2237	0.0567	0.0003	0.2166	-0.1320	0.2166	-0.2802	-0.0611	0.3996	0.0211	8.6000
6888	0202	10	9	F	C	B	11542	0.4857	0.1639	0.1026	0.4857	0.1904	0.0569	0.0004	0.3884	-0.2988	-0.2318	0.3884	-0.2770	-0.2382	0.0204	-9.0000
6797	0203	11	9	F	A	B	11542	0.4130	0.4130	0.2260	0.1898	0.1127	0.0580	0.0003	0.3733	0.3733	-0.2915	-0.3091	-0.2672	0.1148	0.0206	-7.5000
6793	0204	12	9	F	A	A	11542	0.2575	0.2575	0.2008	0.2619	0.2201	0.0596	0.0001	0.1971	0.1971	-0.2114	-0.1256	-0.1404	0.9428	0.0228	8.4000
5585	0205	15	9	F	A	C	11542	0.2603	0.2603	0.1330	0.3798	0.1605	0.0661	0.0003	0.2506	0.2506	-0.2715	-0.1733	-0.2558	0.9261	0.0227	2.5000
5588	0206	16	9	F	A	B	11542	0.2115	0.2115	0.2699	0.2274	0.2228	0.0683	0.0001	0.1674	0.1674	-0.2257	-0.1617	0.0051	1.2358	0.0242	7.5000
5732	0207	17	9	F	D	A	11542	0.3583	0.3136	0.1239	0.1359	0.3583	0.0678	0.0006	0.2564	-0.0491	-0.3179	-0.3090	0.2564	0.3890	0.0210	3.7000
5801	0208	18	9	F	B	D	11542	0.3001	0.1449	0.3001	0.3226	0.1634	0.0684	0.0007	0.1637	-0.2188	0.1637	-0.0309	-0.0823	0.6975	0.0219	9.9000
5579	0209	19	9	F	C	C	11542	0.5922	0.0669	0.0795	0.5922	0.1932	0.0678	0.0003	0.3808	-0.2865	-0.2710	0.3808	-0.1313	-0.7636	0.0210	-3.9000
5835	0210	20	9	F	A	D	11542	0.6177	0.6177	0.2280	0.0505	0.0353	0.0678	0.0006	0.4119	0.4119	-0.2004	-0.2840	-0.2582	-0.8960	0.0213	-7.3000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6461	0211	21	9	F	D	A	11542	0.4696	0.1021	0.1055	0.2537	0.4696	0.0684	0.0006	0.3750	-0.1299	-0.2503	-0.3295	0.3750	-0.1603	0.0204	-6.9000
5523	0212	22	9	F	A	C	11542	0.3185	0.3185	0.2588	0.1760	0.1774	0.0689	0.0004	0.2353	0.2353	-0.1482	-0.1448	-0.2192	0.5974	0.0216	4.7000
6287	0213	23	9	F	C	A	11542	0.4439	0.1117	0.1228	0.4439	0.2507	0.0703	0.0006	0.2250	-0.1601	-0.1906	0.2250	-0.0210	-0.0362	0.0205	9.9000
6061	0214	24	9	F	B	A	11542	0.4666	0.1388	0.4666	0.1982	0.1253	0.0708	0.0003	0.3417	-0.2453	0.3417	-0.2429	-0.1601	-0.1461	0.0204	-2.9000
6467	0215	25	9	F	A	D	11542	0.4957	0.4957	0.0834	0.0672	0.2822	0.0713	0.0002	0.3989	0.3989	-0.2823	-0.2835	-0.2539	-0.2865	0.0205	-9.9000
7125	0216	26	9	F	B	B	11542	0.5932	0.1928	0.5932	0.0895	0.0524	0.0719	0.0002	0.4299	-0.2237	0.4299	-0.2895	-0.2607	-0.7687	0.0210	-9.9000
5719	0217	1	10	F	C	A	11514	0.3707	0.1977	0.2718	0.3707	0.1001	0.0598	0.0000	0.2622	-0.1824	-0.1714	0.2622	-0.2252	0.4212	0.0211	8.0000
5521	0218	2	10	F	D	C	11514	0.4023	0.2106	0.0895	0.2392	0.4023	0.0585	0.0000	0.4219	-0.3854	-0.2736	-0.3733	0.4219	0.2612	0.0208	-9.5000
5874	0219	3	10	F	C	A	11514	0.4693	0.1625	0.0972	0.4693	0.2121	0.0589	0.0001	0.3687	-0.1268	-0.3144	0.3687	-0.3402	-0.0695	0.0206	-3.0000
5536	0220	4	10	F	D	B	11514	0.4851	0.0951	0.0637	0.2969	0.4851	0.0591	0.0002	0.2788	-0.2816	-0.3139	-0.0629	0.2788	-0.1473	0.0206	8.7000
7193	0221	5	10	F	C	A	11514	0.5485	0.0760	0.2199	0.5485	0.0955	0.0598	0.0003	0.3429	-0.2946	-0.1214	0.3429	-0.2629	-0.4605	0.0208	1.3000
5653	0222	6	10	F	B	C	11514	0.5749	0.1233	0.5749	0.0856	0.1566	0.0593	0.0003	0.3326	-0.1416	0.3326	-0.2574	-0.1564	-0.5933	0.0210	3.0000
5802	0223	7	10	F	D	D	11514	0.4657	0.3451	0.0703	0.0576	0.4657	0.0606	0.0007	0.1887	-0.0104	-0.1584	-0.2079	0.1887	-0.0520	0.0206	9.9000
5697	0224	8	10	F	B	B	11514	0.6298	0.1135	0.6298	0.1644	0.0315	0.0605	0.0002	0.4608	-0.2774	0.4608	-0.2813	-0.2868	-0.8815	0.0217	-9.9000
6887	0225	9	10	F	C	B	11514	0.4583	0.1278	0.2574	0.4583	0.0955	0.0609	0.0001	0.3232	-0.2108	-0.2197	0.3232	-0.2156	-0.0158	0.0206	1.6000
6886	0226	10	10	F	B	A	11514	0.5345	0.0964	0.5345	0.1437	0.1623	0.0628	0.0003	0.4442	-0.2817	0.4442	-0.3863	-0.2463	-0.3904	0.0207	-9.9000
6885	0227	11	10	F	D	A	11514	0.3232	0.2441	0.1533	0.2152	0.3232	0.0636	0.0006	0.2911	-0.1830	-0.2914	-0.2689	0.2911	0.6708	0.0216	1.9000
6795	0228	12	10	F	C	D	11514	0.2179	0.1530	0.1347	0.2179	0.4287	0.0651	0.0006	0.1049	-0.0704	-0.1248	0.1049	-0.0146	1.2976	0.0241	9.9000
5587	0229	15	10	F	C	C	11514	0.2682	0.5149	0.1027	0.2682	0.0485	0.0656	0.0002	0.1076	0.0430	-0.2727	0.1076	-0.1568	0.9811	0.0227	9.9000
5757	0230	16	10	F	B	C	11514	0.3228	0.1553	0.3228	0.2911	0.1645	0.0659	0.0003	0.2648	-0.2213	0.2648	-0.2225	-0.1494	0.6727	0.0216	4.8000
5567	0231	17	10	F	B	B	11514	0.5859	0.0888	0.5859	0.1130	0.1459	0.0658	0.0005	0.3964	-0.2780	0.3964	-0.2505	-0.1635	-0.6498	0.0211	-3.8000
6006	0232	18	10	F	D	D	11514	0.6893	0.0723	0.0800	0.0919	0.6893	0.0661	0.0003	0.4769	-0.2090	-0.2924	-0.2349	0.4769	-1.2195	0.0228	-9.9000
6021	0233	19	10	F	A	D	11514	0.7071	0.7071	0.0821	0.1088	0.0354	0.0662	0.0004	0.5193	0.5193	-0.2929	-0.2851	-0.2533	-1.3281	0.0233	-9.9000
7192	0234	20	10	F	D	A	11514	0.5814	0.1133	0.0968	0.1414	0.5814	0.0665	0.0006	0.5016	-0.3301	-0.3482	-0.3140	0.5016	-0.6267	0.0211	-9.9000
5597	0235	21	10	F	D	C	11514	0.5715	0.0842	0.0816	0.1947	0.5715	0.0675	0.0006	0.4150	-0.2678	-0.2784	-0.2179	0.4150	-0.5761	0.0210	-7.9000
5694	0236	22	10	F	C	A	11514	0.4066	0.1721	0.1525	0.4066	0.1992	0.0687	0.0008	0.3328	-0.2640	-0.3051	0.3328	-0.1619	0.2395	0.0208	-0.1000
5687	0237	23	10	F	C	B	11514	0.3335	0.1452	0.3715	0.3335	0.0801	0.0690	0.0008	0.1102	-0.1461	0.1089	0.1102	-0.2159	0.6153	0.0215	9.9000
6362	0238	24	10	F	A	D	11514	0.3007	0.3007	0.1359	0.3943	0.0995	0.0693	0.0003	0.1995	0.1995	-0.2433	-0.0307	-0.3112	0.7944	0.0220	8.9000
7183	0239	25	10	F	C	A	11514	0.5976	0.0975	0.1603	0.5976	0.0741	0.0700	0.0004	0.4894	-0.3199	-0.3033	0.4894	-0.2969	-0.7105	0.0212	-9.9000
5522	0240	26	10	F	C	C	11514	0.4158	0.2030	0.1647	0.4158	0.1450	0.0714	0.0002	0.3697	-0.2657	-0.2950	0.3697	-0.2550	0.1937	0.0207	-4.6000
5638	0241	1	11	F	C	C	11505	0.3454	0.0753	0.4176	0.3454	0.1028	0.0584	0.0005	0.2035	-0.1800	-0.1329	0.2035	-0.0772	0.2417	0.0211	6.9000
6460	0242	2	11	F	D	A	11505	0.1386	0.5568	0.0929	0.1527	0.1386	0.0588	0.0001	0.2016	-0.1925	-0.2864	0.2016	0.2016	1.5720	0.0281	2.1000
5580	0243	3	11	F	B	C	11505	0.2391	0.0862	0.2391	0.4348	0.1804	0.0593	0.0002	0.1541	-0.2386	0.1541	-0.0610	-0.1552	0.8329	0.0231	7.1000
5496	0244	4	11	F	D	B	11505	0.2723	0.2277	0.1099	0.3313	0.2723	0.0587	0.0001	0.1582	-0.1219	-0.2515	-0.0394	0.1582	0.6356	0.0223	8.4000
6350	0245	5	11	F	B	D	11505	0.3957	0.0838	0.3957	0.2147	0.2446	0.0610	0.0002	0.1835	-0.1181	0.1835	-0.1341	-0.0478	-0.0097	0.0206	9.9000
5679	0246	6	11	F	C	B	11505	0.7538	0.0603	0.0572	0.7538	0.0694	0.0591	0.0002	0.4620	-0.1966	-0.2066	0.4620	-0.2467	-1.8990	0.0247	-9.9000
5725	0247	7	11	F	C	A	11505	0.2842	0.0336	0.1525	0.2842	0.4697	0.0593	0.0007	0.1946	-0.1986	-0.0596	0.1946	-0.1600	0.5682	0.0220	6.8000
7190	0248	8	11	F	D	A	11505	0.4728	0.1784	0.1246	0.1631	0.4728	0.0610	0.0001	0.3794	-0.2702	-0.2493	-0.2802	0.3794	-0.3802	0.0203	-9.9000
6813	0249	9	11	F	C	D	11505	0.1998	0.1422	0.1525	0.1998	0.4442	0.0608	0.0003	0.0684	-0.2030	-0.1983	0.0684	0.1097	1.0898	0.0245	9.9000
6811	0250	10	11	F	B	B	11505	0.2488	0.1590	0.2488	0.2657	0.2650	0.0609	0.0006	0.2522	-0.2746	0.2522	-0.1716	-0.2595	0.7741	0.0229	0.6000
7968	0251	11	11	F	D	A	11505	0.4255	0.1147	0.2419	0.1553	0.4255	0.0620	0.0006	0.3490	-0.3075	-0.1934	-0.3035	0.3490	-0.1539	0.0204	-8.3000
7967	0252	12	11	F	C	A	11505	0.5479	0.1536	0.1082	0.5479	0.1271	0.0630	0.0002	0.3766	-0.1633	-0.2769	0.3766	-0.2614	-0.7415	0.0206	-8.8000

Appendix H: Grade 8 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6351	0253	15	11	F	C	D	11505	0.2248	0.1859	0.2732	0.2248	0.2484	0.0674	0.0003	0.1373	-0.1440	-0.1121	0.1373	-0.0145	0.9233	0.0236	7.8000
5833	0254	16	11	F	A	B	11505	0.3931	0.3931	0.1512	0.3207	0.0671	0.0676	0.0003	0.3199	0.3199	-0.2903	-0.2074	-0.2007	0.0031	0.0206	-3.7000
5700	0255	17	11	F	A	D	11505	0.2304	0.2304	0.1601	0.1660	0.3746	0.0684	0.0004	0.0649	0.0649	-0.0792	-0.1442	0.1149	0.8873	0.0234	9.9000
5601	0256	18	11	F	B	C	11505	0.5106	0.1637	0.5106	0.1259	0.1309	0.0681	0.0009	0.4639	-0.3594	0.4639	-0.2760	-0.3203	-0.5609	0.0204	-9.9000
5539	0257	19	11	F	A	B	11505	0.4898	0.4898	0.1717	0.1491	0.1200	0.0689	0.0005	0.4306	0.4306	-0.2686	-0.3522	-0.2807	-0.4616	0.0203	-9.9000
5709	0258	20	11	F	C	D	11505	0.3348	0.2100	0.1679	0.3348	0.2163	0.0702	0.0007	0.2299	-0.1598	-0.2545	0.2299	-0.0688	0.2963	0.0212	3.5000
5582	0259	21	11	F	B	C	11505	0.3698	0.1910	0.3698	0.2141	0.1547	0.0699	0.0005	0.2454	-0.2196	0.2454	-0.1916	-0.0451	0.1183	0.0208	3.5000
5680	0260	22	11	F	D	B	11505	0.3957	0.1291	0.1362	0.2678	0.3957	0.0707	0.0006	0.4575	-0.3775	-0.3908	-0.3714	0.4575	-0.0092	0.0206	-9.9000
5657	0261	23	11	F	B	B	11505	0.4944	0.2087	0.4944	0.0976	0.1275	0.0712	0.0006	0.3382	-0.1756	0.3382	-0.2670	-0.1881	-0.4835	0.0204	-5.6000
5518	0262	24	11	F	A	B	11505	0.4435	0.4435	0.2615	0.0809	0.1416	0.0720	0.0004	0.2753	0.2753	-0.1534	-0.2077	-0.1367	-0.2407	0.0204	1.0000
5806	0263	25	11	F	C	D	11505	0.1674	0.2551	0.3176	0.1674	0.1864	0.0725	0.0010	-0.0296	0.0908	0.1764	-0.0296	0.1357	1.3291	0.0261	9.9000
5877	0264	26	11	F	D	A	11505	0.3853	0.0976	0.1784	0.2648	0.3853	0.0733	0.0005	0.3120	-0.2465	-0.1791	-0.2414	0.3120	0.0416	0.0207	-4.6000
5511	0265	1	12	F	B	C	11599	0.7744	0.0683	0.7744	0.0682	0.0348	0.0542	0.0001	0.3233	-0.0420	0.3233	-0.1111	-0.1412	-1.8820	0.0254	3.3000
6361	0266	2	12	F	D	D	11599	0.2395	0.1878	0.2876	0.2294	0.2395	0.0556	0.0001	0.2579	-0.2449	-0.2488	-0.2582	0.2579	1.0134	0.0232	1.1000
5926	0267	3	12	F	A	B	11599	0.5634	0.5634	0.1286	0.1228	0.1303	0.0547	0.0002	0.2573	0.2573	-0.0568	-0.0793	-0.2064	-0.6515	0.0207	7.2000
5612	0268	4	12	F	D	B	11599	0.3459	0.4104	0.1040	0.0847	0.3459	0.0547	0.0003	0.2312	-0.0878	-0.2987	-0.2835	0.2312	0.4150	0.0211	5.9000
5594	0269	5	12	F	C	C	11599	0.6110	0.0966	0.1229	0.6110	0.1137	0.0557	0.0002	0.4401	-0.1967	-0.2880	0.4401	-0.3059	-0.8924	0.0211	-9.9000
5655	0270	6	12	F	B	A	11599	0.6160	0.0768	0.6160	0.1060	0.1460	0.0550	0.0001	0.4358	-0.2708	0.4358	-0.3114	-0.2194	-0.9183	0.0212	-9.9000
5527	0271	7	12	F	D	B	11599	0.4590	0.0988	0.1780	0.2085	0.4590	0.0555	0.0002	0.2797	-0.2391	-0.1193	-0.1858	0.2797	-0.1448	0.0204	2.7000
6018	0272	8	12	F	A	D	11599	0.6471	0.6471	0.0664	0.1553	0.0747	0.0562	0.0003	0.4178	0.4178	-0.2603	-0.2165	-0.2280	-1.0839	0.0216	-9.4000
6809	0273	9	12	F	D	A	11599	0.3732	0.2517	0.1259	0.1923	0.3732	0.0568	0.0000	0.3015	-0.1784	-0.3401	-0.2283	0.3015	0.2756	0.0208	-1.6000
6807	0274	10	12	F	B	A	11599	0.1792	0.2607	0.1792	0.3877	0.1147	0.0578	0.0000	0.0363	0.0482	0.0363	0.0456	-0.0559	1.4265	0.0255	9.9000
7966	0275	11	12	F	C	B	11599	0.0882	0.1623	0.6305	0.0882	0.0609	0.0576	0.0005	-0.0135	0.0260	0.1027	-0.0135	-0.2051	2.3140	0.0338	9.9000
8029	0276	12	12	F	D	D	11599	0.2758	0.3699	0.1793	0.1160	0.2758	0.0587	0.0003	0.2186	-0.1785	-0.1075	-0.2740	0.2186	0.7959	0.0223	5.3000
5676	0277	15	12	F	A	C	11599	0.2628	0.2628	0.0704	0.4799	0.1245	0.0624	0.0000	0.1208	0.1208	-0.2668	-0.0137	-0.0531	0.8719	0.0226	9.9000
5520	0278	16	12	F	B	B	11599	0.2447	0.4193	0.2447	0.1942	0.0793	0.0625	0.0000	0.1731	-0.0520	0.1731	-0.1826	-0.3160	0.9813	0.0230	9.2000
5652	0279	17	12	F	B	C	11599	0.3264	0.1471	0.3264	0.2901	0.1729	0.0631	0.0004	0.1311	-0.0514	0.1311	-0.0405	-0.0500	0.5170	0.0214	9.9000
5726	0280	18	12	F	B	A	11599	0.5803	0.1132	0.5803	0.1220	0.1212	0.0633	0.0000	0.4279	-0.2551	0.4279	-0.2832	-0.2332	-0.7359	0.0208	-9.9000
6019	0281	19	12	F	A	D	11599	0.4585	0.4585	0.1435	0.1803	0.1535	0.0637	0.0004	0.4344	0.4344	-0.3444	-0.3127	-0.3275	-0.1423	0.0204	-9.9000
5724	0282	20	12	F	B	A	11599	0.2730	0.2747	0.2730	0.1175	0.2700	0.0642	0.0006	0.2219	-0.1954	0.2219	-0.1578	-0.1605	0.8124	0.0223	6.1000
5547	0283	21	12	F	B	C	11599	0.6148	0.1513	0.6148	0.1048	0.0642	0.0644	0.0004	0.4596	-0.2790	0.4596	-0.3004	-0.2193	-0.9121	0.0212	-9.9000
5593	0284	22	12	F	A	B	11599	0.4872	0.4872	0.1513	0.1417	0.1535	0.0656	0.0007	0.3990	0.3990	-0.3158	-0.2984	-0.2065	-0.2806	0.0204	-9.9000
5804	0285	23	12	F	B	D	11599	0.2136	0.1855	0.2136	0.2233	0.3110	0.0658	0.0008	0.0150	0.0402	0.0150	0.0219	0.1400	1.1808	0.0240	9.9000
5624	0286	24	12	F	B	C	11599	0.4862	0.0883	0.4862	0.1312	0.2279	0.0660	0.0004	0.3725	-0.2305	0.3725	-0.2421	-0.2544	-0.2759	0.0204	-7.7000
5583	0287	25	12	F	B	C	11599	0.5027	0.1878	0.5027	0.1325	0.1100	0.0666	0.0004	0.4591	-0.3269	0.4591	-0.3398	-0.3141	-0.3554	0.0204	-9.9000
5658	0288	26	12	F	C	B	11599	0.4468	0.2146	0.1373	0.4468	0.1336	0.0674	0.0003	0.3862	-0.2484	-0.3611	0.3862	-0.2497	-0.0857	0.0204	-9.9000

Appendix I:

**Grade 8 Constructed-Response Statistics for the
2007 Science Field Test**

Appendix I: Grade 8 Constructed-Response Statistics for the 2007 Science Field Test

Information								Proportions									Correlations			Rasch		
ID	Pub. ID	Sequence	Form	Status Label	Maximum	Subscale	n	Average	P-Value	0	1	2	B	K	U	Item Total Corr.	0	1	2	Measure	Measure SE	Fit
6775	0001	13	1	F	2	A	1201	0.8435	0.4217	0.1940	0.5021	0.1707	0.1332			0.3333	-0.2847	0.0752	0.2542	0.1602	0.0483	2.6000
6800	0002	14	1	F	2	D	1202	1.0799	0.5399	0.1922	0.3361	0.3719	0.0998			0.4399	-0.4200	0.0524	0.3427	-0.4135	0.0425	0.6000
6642	0003	27	1	F	2	A	1200	1.0633	0.5317	0.1667	0.4200	0.3217	0.0917			0.5066	-0.4903	0.0902	0.3635	-0.4067	0.0450	-3.0000
7120	0004	28	1	F	2	B	1202	1.0832	0.5416	0.1323	0.3178	0.3827	0.1672			0.5134	-0.5135	0.1026	0.3838	-0.4153	0.0420	-3.2000
6655	0005	13	2	F	2	A	1203	0.8063	0.4032	0.3001	0.4572	0.1746	0.0682			0.4470	-0.4030	0.1422	0.3250	0.2100	0.0462	-2.3000
6635	0006	14	2	F	2	B	1205	0.5817	0.2909	0.3925	0.3593	0.1112	0.1369			0.4732	-0.4635	0.2908	0.2912	0.7415	0.0473	-4.9000
6662	0007	27	2	F	2	C	1206	1.1003	0.5502	0.1899	0.3375	0.3814	0.0912			0.4591	-0.4318	0.0353	0.3636	-0.4769	0.0422	-1.8000
6656	0008	28	2	F	2	A	1204	0.5033	0.2517	0.4327	0.4020	0.0507	0.1146			0.4027	-0.4098	0.3451	0.1584	1.1940	0.0533	-2.7000
6799	0009	13	3	F	2	D	1203	0.4505	0.2253	0.5145	0.3558	0.0474	0.0823			0.3433	-0.3285	0.2536	0.1870	1.4132	0.0552	0.2000
6849	0010	14	3	F	2	D	1203	0.7639	0.3820	0.2976	0.3533	0.2053	0.1430		0.0008	0.5216	-0.4841	0.1670	0.3975	0.3032	0.0443	-3.7000
6891	0011	27	3	F	2	A	1203	0.6658	0.3329	0.4123	0.3267	0.1696	0.0914			0.4437	-0.4341	0.2166	0.3077	0.5310	0.0451	-1.6000
6495	0012	28	3	F	2	A	1203	1.0565	0.5283	0.2028	0.3367	0.3599	0.1006			0.4606	-0.4404	0.0650	0.3578	-0.3644	0.0430	0.2000
6606	0013	13	4	F	2	A	1218	0.6691	0.3346	0.4228	0.3358	0.1667	0.0747			0.4413	-0.4239	0.2016	0.3132	0.5342	0.0446	-2.1000
6532	0014	14	4	F	2	C	1218	0.5870	0.2935	0.4023	0.3818	0.1026	0.1133			0.3473	-0.3194	0.1788	0.2398	0.8469	0.0487	0.5000
6459	0015	27	4	F	2	A	1218	1.1100	0.5550	0.1913	0.3317	0.3892	0.0878			0.5518	-0.5289	0.0585	0.4302	-0.4596	0.0426	-4.2000
6661	0016	13	5	F	2	C	1191	1.0663	0.5332	0.2208	0.3342	0.3661	0.0789			0.4778	-0.4026	-0.0417	0.4237	-0.4533	0.0438	0.5000
7122	0017	14	5	F	2	B	1191	0.5155	0.2578	0.4584	0.2905	0.1125	0.1385			0.4790	-0.4755	0.3005	0.3063	0.8805	0.0488	-2.2000
6587	0018	27	5	F	2	D	1191	0.5491	0.2746	0.4307	0.3224	0.1134	0.1335			0.5121	-0.5076	0.3225	0.3185	0.8245	0.0488	-3.9000
6595	0019	28	5	F	2	A	1191	1.0898	0.5449	0.0999	0.4383	0.3258	0.1360			0.5025	-0.5200	0.1363	0.3267	-0.5581	0.0473	-1.0000
6601	0020	13	6	F	2	C	1196	1.1137	0.5569	0.2299	0.2726	0.4206	0.0769			0.5522	-0.5067	0.0011	0.4724	-0.5264	0.0427	-2.8000
6588	0021	14	6	F	2	D	1196	0.7742	0.3871	0.2818	0.4130	0.1806	0.1246			0.4615	-0.4617	0.2347	0.2889	0.2801	0.0470	-0.3000
7075	0022	27	6	F	2	B	1196	1.0100	0.5050	0.2634	0.2475	0.3813	0.1079			0.5933	-0.5793	0.1044	0.4833	-0.2972	0.0415	-4.8000
6496	0023	28	6	F	2	A	1196	0.6288	0.3144	0.3554	0.3946	0.1171	0.1329			0.4599	-0.4639	0.3054	0.2570	0.7014	0.0494	-1.6000
6774	0024	13	7	F	2	C	1180	0.9051	0.4525	0.2263	0.4831	0.2110	0.0797			0.5348	-0.5044	0.1674	0.3645	0.0142	0.0490	-2.8000
7062	0025	14	7	F	2	D	1180	0.5644	0.2822	0.3610	0.4492	0.0576	0.1322			0.4967	-0.4745	0.3539	0.2627	1.1895	0.0555	-3.2000
6671	0026	27	7	F	2	B	1180	0.3864	0.1932	0.5703	0.2661	0.0602	0.1034			0.4257	-0.4079	0.2895	0.2661	1.4646	0.0556	-1.7000
7194	0027	28	7	F	2	A	1180	1.5212	0.7606	0.0237	0.2195	0.6508	0.1059			0.5070	-0.4632	-0.1219	0.4323	-1.5564	0.0530	0.9000
6602	0028	13	8	F	2	C	1187	1.1660	0.5830	0.2165	0.2645	0.4507	0.0682			0.5525	-0.4824	-0.0667	0.4965	-0.7139	0.0423	-3.9000
6669	0029	14	8	F	2	B	1185	0.3730	0.1865	0.6042	0.2127	0.0802	0.1030			0.4667	-0.4554	0.2967	0.3160	1.1385	0.0524	-3.7000
6634	0030	27	8	F	2	B	1185	1.1241	0.5620	0.1165	0.4371	0.3435	0.1030			0.5415	-0.5037	0.0327	0.4048	-0.7133	0.0471	-3.9000
6889	0031	28	8	F	2	D	1185	0.9738	0.4869	0.2110	0.3392	0.3173	0.1325			0.5726	-0.5219	0.0645	0.4669	-0.3172	0.0431	-5.0000
6529	0032	13	9	F	2	C	1055	0.5043	0.2521	0.5128	0.3355	0.0844	0.0673			0.4581	-0.4395	0.2910	0.2861	0.9793	0.0533	-3.5000
6608	0033	14	9	F	2	D	1055	0.4104	0.2052	0.5365	0.3270	0.0417	0.0948			0.2872	-0.2750	0.2164	0.1559	1.4424	0.0594	1.0000
7072	0034	27	9	F	2	B	1055	0.9431	0.4716	0.3403	0.1659	0.3886	0.1052			0.4650	-0.4504	0.0641	0.4103	-0.1699	0.0405	-2.0000
6643	0035	28	9	F	2	A	1055	0.5033	0.2517	0.4891	0.2815	0.1109	0.1185			0.4654	-0.4523	0.2713	0.3147	0.8614	0.0508	-3.1000
6658	0036	13	10	F	2	A	1049	0.6368	0.3184	0.3184	0.3908	0.1230	0.1668	0.0010		0.3616	-0.3615	0.2287	0.2104	0.7114	0.0512	0.7000
6527	0037	14	10	F	2	C	1049	0.4223	0.2112	0.4871	0.3842	0.0191	0.1096			0.2747	-0.2717	0.2480	0.0925	1.8925	0.0637	1.1000
6672	0038	27	10	F	2	B	1049	1.0820	0.5410	0.1716	0.3575	0.3622	0.1087			0.5245	-0.5313	0.1231	0.3737	-0.3915	0.0465	-3.3000
6607	0039	28	10	F	2	D	1049	0.6139	0.3070	0.4032	0.3203	0.1468	0.1296			0.5371	-0.5182	0.2697	0.3750	0.6835	0.0489	-5.4000
7063	0040	13	11	F	2	D	1044	1.1743	0.5872	0.0757	0.5939	0.2902	0.0402			0.3940	-0.3801	0.0038	0.2640	-1.1364	0.0580	-0.7000
6528	0041	14	11	F	2	C	1044	0.8487	0.4243	0.2902	0.4368	0.2059	0.0670			0.3386	-0.3208	0.1181	0.2353	-0.1297	0.0477	0.5000
6636	0042	27	11	F	2	B	1044	1.0948	0.5474	0.1216	0.4971	0.2989	0.0824			0.4463	-0.4338	0.0720	0.3033	-0.7470	0.0504	-2.8000
6456	0043	28	11	F	2	C	1044	0.3649	0.1825	0.6044	0.2117	0.0766	0.1073			0.3684	-0.3564	0.2310	0.2523	0.9612	0.0549	-1.9000
6619	0044	13	12	F	2	C	1051	1.0704	0.5352	0.1751	0.4767	0.2969	0.0514			0.4073	-0.3478	-0.0042	0.3232	-0.5425	0.0495	-0.8000

Appendix I: Grade 8 Constructed-Response Statistics for the 2007 Science Field Test

Information								Proportions								Correlations			Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Maximum	Subscale	n	Average	P-Value	0	1	2	B	K	U	Item Total Corr.	0	1	2	Measure	Measure SE	Fit
6841	0045	14	12	F	2	B	1051	0.9486	0.4743	0.1903	0.5357	0.2065	0.0676			0.4671	-0.4557	0.1629	0.2917	-0.2260	0.0517	-2.9000
6589	0046	27	12	F	2	D	1051	0.5452	0.2726	0.4320	0.3568	0.0942	0.1170			0.3833	-0.3626	0.2247	0.2492	0.7818	0.0520	-2.0000
6425	0047	28	12	F	2	C	1051	0.3235	0.1618	0.5775	0.1656	0.0790	0.1779			0.3661	-0.3592	0.2261	0.2608	1.1496	0.0554	-2.2000

Appendix J:

**Grade 11 Multiple-Choice Statistics for the
2007 Science Field Test**

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions								Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5944	0001	1	1	F	A	A	11877	0.6780	0.6780	0.1599	0.0347	0.0243	0.1030	0.0001	0.5067	0.5067	-0.2084	-0.2172	-0.1435	-1.2332	0.0239	-3.5000
6489	0002	2	1	F	D	B	11877	0.1101	0.2536	0.3040	0.2254	0.1101	0.1067	0.0002	0.1649	-0.1339	-0.1979	-0.1313	0.1649	2.2791	0.0306	6.0000
7209	0003	3	1	F	B	C	11877	0.5091	0.1264	0.5091	0.2159	0.0413	0.1072	0.0001	0.3720	-0.1726	0.3720	-0.1504	-0.1873	-0.2525	0.0210	6.5000
7943	0004	4	1	F	C	A	11877	0.7552	0.0410	0.0524	0.7552	0.0477	0.1034	0.0003	0.5983	-0.2156	-0.2369	0.5983	-0.1947	-1.8304	0.0275	-9.0000
7127	0005	5	1	F	A	A	11877	0.5119	0.5119	0.0648	0.2491	0.0706	0.1033	0.0002	0.4592	0.4592	-0.1730	-0.3353	-0.2082	-0.2672	0.0210	-7.0000
6879	0006	6	1	F	C	A	11877	0.7169	0.0484	0.0683	0.7169	0.0625	0.1036	0.0003	0.5530	-0.2003	-0.2201	0.5530	-0.1899	-1.5131	0.0254	-4.9000
7214	0007	7	1	F	C	D	11877	0.4063	0.1100	0.1321	0.4063	0.2473	0.1042	0.0002	0.3319	-0.1753	-0.2753	0.3319	-0.1268	0.2809	0.0209	8.0000
7089	0008	8	1	F	D	A	11877	0.5288	0.0839	0.1542	0.1279	0.5288	0.1049	0.0003	0.5070	-0.3318	-0.3067	-0.3155	0.5070	-0.3567	0.0211	-9.9000
7805	0009	9	1	F	C	B	11877	0.3514	0.1132	0.2581	0.3514	0.1717	0.1053	0.0002	0.2978	-0.2278	-0.1547	0.2978	-0.1480	0.5709	0.0213	8.6000
7808	0010	10	1	F	C	B	11877	0.3278	0.1504	0.1876	0.3278	0.2272	0.1067	0.0003	0.1361	-0.1019	-0.0287	0.1361	0.2045	0.6998	0.0215	9.9000
7810	0011	11	1	F	B	A	11877	0.1853	0.2378	0.1853	0.2914	0.1693	0.1159	0.0003	0.1084	0.1000	0.1084	-0.0144	-0.0656	1.5979	0.0252	9.9000
7806	0012	12	1	F	C	A	11877	0.2299	0.0581	0.1863	0.2299	0.4149	0.1093	0.0015	0.1429	-0.2083	-0.1439	0.1429	0.0728	1.2844	0.0235	9.9000
6842	0013	14	1	F	B	D	11877	0.3151	0.3529	0.3151	0.1292	0.0870	0.1156	0.0002	0.2462	-0.0298	0.2462	-0.2157	-0.2007	0.7701	0.0217	9.9000
6491	0014	15	1	F	C	B	11877	0.7222	0.0642	0.0562	0.7222	0.0431	0.1140	0.0003	0.6487	-0.3337	-0.2886	0.6487	-0.2511	-1.5534	0.0256	-9.9000
6903	0015	16	1	F	A	A	11877	0.6204	0.6204	0.0814	0.0721	0.1121	0.1137	0.0003	0.5152	0.5152	-0.3023	-0.2274	-0.1793	-0.8688	0.0224	-7.2000
5910	0016	17	1	F	C	B	11877	0.3881	0.2228	0.0507	0.3881	0.2244	0.1139	0.0002	0.4232	-0.2704	-0.3869	0.4232	-0.3342	0.3764	0.0210	-8.4000
6226	0017	18	1	F	B	C	11877	0.3795	0.1846	0.3795	0.2256	0.0946	0.1154	0.0003	0.3857	-0.2409	0.3857	-0.2708	-0.2901	0.4215	0.0210	-3.4000
6130	0018	19	1	F	D	D	11877	0.4643	0.1105	0.1707	0.1297	0.4643	0.1244	0.0003	0.3723	-0.2026	-0.1451	-0.2145	0.3723	-0.0194	0.0208	3.2000
7058	0019	20	1	F	D	B	11877	0.5300	0.0763	0.1846	0.0938	0.5300	0.1148	0.0005	0.4320	-0.3386	-0.0931	-0.2843	0.4320	-0.3629	0.0212	0.3000
7055	0020	21	1	F	B	C	11877	0.7207	0.0564	0.7207	0.0635	0.0454	0.1137	0.0003	0.5851	-0.1703	0.5851	-0.2634	-0.2100	-1.5423	0.0256	-8.6000
6594	0021	22	1	F	D	A	11877	0.4550	0.1057	0.1188	0.2059	0.4550	0.1144	0.0002	0.4870	-0.2768	-0.4366	-0.3228	0.4870	0.0289	0.0208	-9.9000
5941	0022	23	1	F	C	A	11877	0.6659	0.0777	0.0605	0.6659	0.0737	0.1221	0.0001	0.5959	-0.2713	-0.3268	0.5959	-0.2659	-1.1525	0.0235	-9.9000
6905	0023	24	1	F	A	C	11877	0.4649	0.4649	0.0519	0.0478	0.3207	0.1143	0.0004	0.3658	0.3658	-0.2945	-0.2628	-0.1119	-0.0224	0.0208	4.7000
6232	0024	25	1	F	B	A	11877	0.1350	0.2602	0.1350	0.4208	0.0685	0.1153	0.0003	0.1025	-0.0216	0.1025	0.0445	-0.2235	2.0230	0.0283	9.9000
6428	0025	1	2	F	D	A	11828	0.5171	0.0381	0.0619	0.2773	0.5171	0.1055	0.0001	0.5165	-0.2692	-0.3766	-0.3510	0.5165	-0.3480	0.0213	-9.9000
6845	0026	2	2	F	A	D	11828	0.2197	0.2197	0.2798	0.2398	0.1551	0.1055	0.0002	0.1719	0.1719	0.1140	-0.2212	-0.2298	1.3328	0.0241	9.9000
6224	0027	3	2	F	D	C	11828	0.5987	0.0513	0.1568	0.0879	0.5987	0.1050	0.0002	0.5106	-0.2176	-0.2804	-0.2812	0.5106	-0.8046	0.0222	-6.8000
7130	0028	4	2	F	C	A	11828	0.4567	0.1751	0.1568	0.4567	0.1046	0.1066	0.0002	0.4110	-0.2551	-0.2643	0.4110	-0.1984	-0.0268	0.0211	0.3000
7128	0029	5	2	F	C	A	11828	0.6516	0.0785	0.0882	0.6516	0.0752	0.1064	0.0001	0.5929	-0.3151	-0.3286	0.5929	-0.2953	-1.1288	0.0233	-9.9000
7945	0030	6	2	F	C	A	11828	0.5833	0.0659	0.0737	0.5833	0.1715	0.1055	0.0000	0.5296	-0.3135	-0.3329	0.5296	-0.2678	-0.7149	0.0220	-9.9000
6284	0031	7	2	F	B	D	11828	0.3993	0.3602	0.3993	0.0945	0.0391	0.1067	0.0002	0.2032	0.1086	0.2032	-0.3012	-0.2295	0.2771	0.0212	9.9000
7090	0032	8	2	F	A	A	11828	0.3595	0.3595	0.4188	0.0817	0.0333	0.1066	0.0001	0.1378	0.1378	0.1096	-0.1166	-0.1761	0.4919	0.0215	9.9000
7478	0033	9	2	F	A	A	11828	0.4763	0.4763	0.0946	0.1497	0.1726	0.1064	0.0003	0.3781	0.3781	-0.3179	-0.1709	-0.1361	-0.1305	0.0211	6.4000
7476	0034	10	2	F	D	A	11828	0.4691	0.1360	0.1405	0.1463	0.4691	0.1075	0.0004	0.4866	-0.3503	-0.3247	-0.3131	0.4866	-0.0925	0.0211	-9.9000
7475	0035	11	2	F	C	C	11828	0.2125	0.3055	0.0714	0.2125	0.3018	0.1086	0.0002	0.1277	0.0681	-0.2636	0.1277	-0.0308	1.3828	0.0244	9.9000
7471	0036	12	2	F	D	C	11828	0.4560	0.0961	0.1667	0.1726	0.4560	0.1083	0.0003	0.4630	-0.3915	-0.3329	-0.2378	0.4630	-0.0233	0.0211	-8.0000
5946	0037	14	2	F	C	C	11828	0.6047	0.0552	0.1238	0.6047	0.1009	0.1154	0.0001	0.5444	-0.2604	-0.3632	0.5444	-0.1984	-0.8394	0.0223	-9.9000
6369	0038	15	2	F	C	D	11828	0.4306	0.2890	0.0963	0.4306	0.0675	0.1166	0.0001	0.4511	-0.2650	-0.4040	0.4511	-0.3076	0.1111	0.0211	-7.0000
7614	0039	16	2	F	B	A	11828	0.3949	0.1272	0.3949	0.1717	0.1900	0.1159	0.0003	0.4027	-0.2420	0.4027	-0.3156	-0.2504	0.3006	0.0212	-0.8000
7061	0040	17	2	F	C	B	11828	0.6058	0.1147	0.1006	0.6058	0.0627	0.1160	0.0002	0.6067	-0.3358	-0.3683	0.6067	-0.3725	-0.8459	0.0224	-9.9000
6877	0041	18	2	F	A	A	11828	0.4231	0.4231	0.1999	0.0577	0.2038	0.1151	0.0003	0.3854	0.3854	-0.1416	-0.4278	-0.2478	0.1505	0.0211	2.8000
6907	0042	19	2	F	D	C	11828	0.2820	0.1185	0.2627	0.2191	0.2820	0.1173	0.0003	0.2299	-0.1930	-0.1094	-0.0816	0.2299	0.9335	0.0225	9.9000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6896	0043	20	2	F	C	B	11828	0.2570	0.3086	0.1394	0.2570	0.1794	0.1155	0.0001	0.2741	-0.0812	-0.3435	0.2741	-0.2563	1.0874	0.0231	9.5000
7059	0044	21	2	F	D	B	11828	0.6382	0.0335	0.1289	0.0835	0.6382	0.1155	0.0003	0.6175	-0.2893	-0.3822	-0.3299	0.6175	-1.0436	0.0230	-9.9000
7069	0045	22	2	F	C	A	11828	0.6445	0.0523	0.1419	0.6445	0.0457	0.1154	0.0003	0.5773	-0.2613	-0.3103	0.5773	-0.2884	-1.0831	0.0232	-9.9000
6296	0046	23	2	F	D	D	11828	0.1039	0.2653	0.2714	0.2404	0.1039	0.1185	0.0004	0.0801	0.0264	0.0199	-0.0389	0.0801	2.3452	0.0316	9.9000
6913	0047	24	2	F	A	B	11828	0.6855	0.6855	0.0748	0.0775	0.0471	0.1150	0.0001	0.5968	0.5968	-0.2635	-0.3140	-0.2385	-1.3570	0.0244	-9.9000
7205	0048	25	2	F	C	A	11828	0.3589	0.2019	0.0792	0.3589	0.2431	0.1167	0.0003	0.3641	-0.2716	-0.3895	0.3641	-0.1646	0.4951	0.0215	1.9000
7134	0049	1	3	F	A	A	11855	0.6100	0.6100	0.1910	0.0441	0.0490	0.1057	0.0003	0.4944	0.4944	-0.2798	-0.2543	-0.1325	-0.9716	0.0220	-7.9000
6932	0050	2	3	F	D	A	11855	0.1899	0.1571	0.2108	0.3380	0.1899	0.1040	0.0002	0.3041	-0.4269	-0.2168	-0.3228	0.3041	1.3741	0.0249	-2.9000
6416	0051	3	3	F	A	D	11855	0.5818	0.5818	0.1920	0.0983	0.0239	0.1039	0.0002	0.4504	0.4504	-0.2171	-0.2263	-0.1640	-0.8123	0.0216	-3.1000
5908	0052	4	3	F	B	A	11855	0.7888	0.0450	0.7888	0.0386	0.0239	0.1035	0.0002	0.6174	-0.2307	0.6174	-0.2127	-0.1968	-2.3159	0.0304	-9.9000
6229	0053	5	3	F	A	A	11855	0.4124	0.4124	0.1962	0.1674	0.1188	0.1049	0.0003	0.3869	0.3869	-0.2744	-0.2470	-0.2134	0.0713	0.0208	-3.4000
7947	0054	6	3	F	C	A	11855	0.4279	0.2289	0.0789	0.4279	0.1601	0.1040	0.0002	0.3408	-0.1470	-0.2324	0.3408	-0.1943	-0.0081	0.0207	3.7000
6926	0055	7	3	F	A	A	11855	0.4073	0.4073	0.0342	0.0757	0.3779	0.1048	0.0002	0.3345	0.3345	-0.2687	-0.2903	-0.1423	0.0978	0.0208	3.7000
6233	0056	8	3	F	B	A	11855	0.5023	0.1608	0.5023	0.1480	0.0841	0.1046	0.0002	0.3536	-0.0507	0.3536	-0.2471	-0.1539	-0.3892	0.0209	5.8000
7472	0057	9	3	F	B	C	11855	0.1771	0.1798	0.1771	0.4159	0.1221	0.1050	0.0001	0.0790	-0.0075	0.0790	0.1017	-0.1086	1.4706	0.0255	9.9000
7474	0058	10	3	F	D	C	11855	0.4303	0.0899	0.2547	0.1183	0.4303	0.1066	0.0003	0.3973	-0.3162	-0.2130	-0.2518	0.3973	-0.0202	0.0207	-3.7000
7477	0059	11	3	F	B	A	11855	0.3174	0.1722	0.3174	0.1844	0.2203	0.1056	0.0001	0.3364	-0.1371	0.3364	-0.3291	-0.2808	0.5740	0.0216	0.3000
7473	0060	12	3	F	A	C	11855	0.3465	0.3465	0.1845	0.1855	0.1753	0.1081	0.0002	0.3418	0.3418	-0.3212	-0.2712	-0.1169	0.4157	0.0212	0.4000
6394	0061	14	3	F	D	A	11855	0.5522	0.1222	0.1211	0.0892	0.5522	0.1151	0.0002	0.4766	-0.1688	-0.3001	-0.2788	0.4766	-0.6510	0.0212	-8.4000
7054	0062	15	3	F	B	C	11855	0.6800	0.0723	0.6800	0.0762	0.0570	0.1145	0.0001	0.5678	-0.2445	0.5678	-0.2502	-0.2411	-1.4058	0.0238	-9.9000
7217	0063	16	3	F	C	D	11855	0.2322	0.1338	0.1699	0.2322	0.3490	0.1148	0.0003	0.1170	-0.0762	-0.1154	0.1170	0.1306	1.0812	0.0234	9.9000
6895	0064	17	3	F	B	B	11855	0.3060	0.4045	0.3060	0.0917	0.0825	0.1152	0.0001	0.3141	-0.1145	0.3141	-0.4011	-0.3748	0.6376	0.0218	0.9000
6283	0065	18	3	F	B	D	11855	0.2913	0.1350	0.2913	0.2752	0.1815	0.1163	0.0006	0.2187	-0.1079	0.2187	-0.0946	-0.0763	0.7215	0.0220	9.9000
6386	0066	19	3	F	C	A	11855	0.3689	0.0908	0.1795	0.3689	0.2441	0.1164	0.0003	0.3212	-0.2796	-0.3237	0.3212	-0.0196	0.2971	0.0210	3.3000
6904	0067	20	3	F	C	A	11855	0.4288	0.1495	0.2209	0.4288	0.0857	0.1146	0.0004	0.4091	-0.2941	-0.2231	0.4091	-0.2397	-0.0129	0.0207	-6.3000
6368	0068	21	3	F	B	B	11855	0.2992	0.3297	0.2992	0.1356	0.1179	0.1174	0.0002	0.2582	-0.0500	0.2582	-0.2792	-0.2000	0.6762	0.0219	7.5000
6382	0069	22	3	F	B	C	11855	0.1614	0.1573	0.1614	0.2188	0.3470	0.1154	0.0001	0.0988	-0.0808	0.0988	0.0006	0.0639	1.5971	0.0264	9.9000
6278	0070	23	3	F	A	B	11855	0.3123	0.3123	0.1577	0.1113	0.3021	0.1165	0.0003	0.3508	0.3508	-0.2159	-0.4310	-0.2121	0.6026	0.0217	-1.9000
6592	0071	24	3	F	C	C	11855	0.6574	0.0447	0.0981	0.6574	0.0838	0.1157	0.0002	0.5680	-0.2643	-0.2791	0.5680	-0.2480	-1.2588	0.0231	-9.9000
6912	0072	25	3	F	A	B	11855	0.5547	0.5547	0.0542	0.2332	0.0409	0.1165	0.0004	0.4294	0.4294	-0.2749	-0.1377	-0.2580	-0.6646	0.0213	-1.3000
6622	0073	1	4	F	C	B	11836	0.3855	0.1224	0.3182	0.3855	0.0690	0.1047	0.0002	0.2897	-0.1797	-0.1177	0.2897	-0.1548	0.2813	0.0209	8.4000
6484	0074	2	4	F	C	A	11836	0.4238	0.2263	0.1104	0.4238	0.1356	0.1038	0.0001	0.3808	-0.2065	-0.2833	0.3808	-0.2377	0.0851	0.0207	-1.6000
5897	0075	3	4	F	D	C	11836	0.1453	0.3249	0.2337	0.1910	0.1453	0.1051	0.0000	0.1013	0.1524	-0.1275	-0.1677	0.1013	1.7994	0.0274	9.9000
7082	0076	4	4	F	A	A	11836	0.7977	0.7977	0.0544	0.0204	0.0242	0.1032	0.0001	0.5841	0.5841	-0.1448	-0.1624	-0.1840	-2.3355	0.0314	-5.0000
6502	0077	5	4	F	C	B	11836	0.5178	0.1695	0.0784	0.5178	0.1303	0.1038	0.0003	0.3550	-0.1875	-0.2142	0.3550	-0.0249	-0.3953	0.0209	7.4000
6664	0078	6	4	F	C	A	11836	0.6237	0.0500	0.1136	0.6237	0.1071	0.1054	0.0001	0.5595	-0.2592	-0.3302	0.5595	-0.2862	-0.9752	0.0223	-9.9000
6005	0079	7	4	F	C	D	11836	0.2982	0.0677	0.4393	0.2982	0.0894	0.1052	0.0002	0.1864	-0.2493	0.0206	0.1864	-0.1566	0.7505	0.0218	9.9000
6930	0080	8	4	F	B	A	11836	0.3881	0.0900	0.3881	0.2932	0.1238	0.1049	0.0000	0.3572	-0.2881	0.3572	-0.1795	-0.2679	0.2678	0.0209	0.2000
6835	0081	9	4	F	C	C	11836	0.4213	0.0858	0.2423	0.4213	0.1427	0.1080	0.0000	0.2772	-0.1471	-0.1297	-0.0207	0.0980	0.0207	9.9000	
6836	0082	10	4	F	A	C	11836	0.4393	0.4393	0.0898	0.1007	0.2637	0.1064	0.0002	0.3135	0.3135	-0.2159	-0.2480	-0.0446	0.0064	0.0207	8.8000
7649	0083	11	4	F	A	C	11836	0.3041	0.3041	0.1556	0.1867	0.2475	0.1060	0.0001	0.2685	0.2685	-0.1823	-0.2447	-0.0826	0.7176	0.0217	8.1000
7959	0084	12	4	F	C	A	11836	0.2720	0.2110	0.3025	0.2720	0.1069	0.1076	0.0001	0.2089	0.0034	-0.1322	0.2089	-0.2007	0.9025	0.0223	9.9000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6663	0085	14	4	F	C	A	11836	0.3226	0.3018	0.1456	0.3226	0.1146	0.1154	0.0001	0.3413	-0.2081	-0.3812	0.3413	-0.1366	0.6151	0.0215	-1.5000
6494	0086	15	4	F	A	C	11836	0.2367	0.2367	0.1424	0.2346	0.2694	0.1167	0.0002	0.1974	0.1974	-0.2667	-0.1310	0.0424	1.1197	0.0232	9.1000
6878	0087	16	4	F	A	A	11836	0.5612	0.5612	0.0538	0.2157	0.0545	0.1145	0.0003	0.4602	0.4602	-0.2118	-0.2367	-0.1818	-0.6243	0.0213	-5.8000
5933	0088	17	4	F	D	A	11836	0.2887	0.1837	0.2430	0.1680	0.2887	0.1165	0.0001	0.2232	-0.1393	-0.0166	-0.1608	0.2232	0.8050	0.0220	8.7000
6388	0089	18	4	F	A	B	11836	0.4580	0.4580	0.1196	0.1964	0.1074	0.1184	0.0003	0.4814	0.4814	-0.3731	-0.3349	-0.2555	-0.0889	0.0207	-9.9000
5891	0090	19	4	F	B	A	11836	0.5071	0.0956	0.5071	0.2295	0.0518	0.1157	0.0003	0.4132	-0.2938	0.4132	-0.1364	-0.2315	-0.3398	0.0209	-2.1000
7173	0091	20	4	F	C	D	11836	0.5258	0.1367	0.1342	0.5258	0.0866	0.1164	0.0003	0.4649	-0.1576	-0.3067	0.4649	-0.2740	-0.4367	0.0210	-9.7000
6897	0092	21	4	F	B	B	11836	0.7431	0.0513	0.7431	0.0573	0.0310	0.1171	0.0003	0.6251	-0.2350	0.6251	-0.2431	-0.2416	-1.7985	0.0266	-9.9000
6776	0093	22	4	F	D	A	11836	0.4948	0.0947	0.2320	0.0597	0.4948	0.1184	0.0003	0.4459	-0.2924	-0.2082	-0.2955	0.4459	-0.2767	0.0208	-8.5000
6667	0094	23	4	F	A	A	11836	0.4617	0.4617	0.1708	0.0678	0.1832	0.1163	0.0002	0.4133	0.4133	-0.2901	-0.3492	-0.1178	-0.1077	0.0207	-5.2000
6481	0095	24	4	F	A	A	11836	0.3602	0.3602	0.1324	0.1993	0.1922	0.1157	0.0003	0.2913	0.2913	-0.2596	-0.1691	-0.0327	0.4135	0.0211	5.2000
7941	0096	25	4	F	A	A	11836	0.6729	0.6729	0.0452	0.0666	0.0983	0.1166	0.0003	0.5929	0.5929	-0.2726	-0.2619	-0.2825	-1.2810	0.0235	-9.9000
6359	0097	1	5	F	D	A	11018	0.3198	0.2348	0.2398	0.1049	0.3198	0.1007	0.0000	0.3097	-0.1729	-0.2522	-0.2722	0.3097	0.6002	0.0221	-2.6000
7132	0098	2	5	F	C	A	11018	0.6852	0.0234	0.0603	0.6852	0.1331	0.0979	0.0000	0.5159	-0.1856	-0.2131	0.5159	-0.2099	-1.3605	0.0246	-6.8000
7067	0099	3	5	F	B	A	11018	0.7451	0.0300	0.7451	0.0308	0.0965	0.0975	0.0002	0.5857	-0.1835	0.5857	-0.2144	-0.2553	-1.8017	0.0273	-9.9000
5991	0100	4	5	F	B	C	11018	0.3370	0.3193	0.3370	0.1040	0.1400	0.0996	0.0001	0.3197	-0.2050	0.3197	-0.3229	-0.1674	0.5084	0.0219	0.5000
5907	0101	5	5	F	C	A	11018	0.7164	0.0472	0.1058	0.7164	0.0329	0.0977	0.0001	0.4895	-0.2108	-0.0910	0.4895	-0.1660	-1.5784	0.0258	-0.9000
6929	0102	6	5	F	C	A	11018	0.7476	0.0334	0.0757	0.7476	0.0453	0.0980	0.0000	0.5768	-0.2555	-0.1990	0.5768	-0.1830	-1.8230	0.0275	-8.7000
7083	0103	7	5	F	D	A	11018	0.8316	0.0193	0.0236	0.0264	0.8316	0.0990	0.0000	0.6554	-0.1780	-0.2110	-0.1782	0.6554	-2.7426	0.0370	-9.9000
7056	0104	8	5	F	D	B	11018	0.3528	0.3943	0.0610	0.0696	0.3528	0.1223	0.0000	0.2674	-0.0751	-0.2268	-0.2451	0.2674	0.4253	0.0217	7.2000
7958	0105	9	5	F	C	A	11018	0.2475	0.0514	0.0771	0.2475	0.5240	0.0999	0.0002	0.0862	-0.1540	-0.2153	0.0862	0.1518	1.0150	0.0236	9.9000
6834	0106	10	5	F	A	A	11018	0.3268	0.3268	0.4337	0.1158	0.0222	0.1010	0.0004	0.1978	0.1978	0.0265	-0.2036	-0.2890	0.5626	0.0220	9.9000
6833	0107	11	5	F	B	A	11018	0.2579	0.0574	0.2579	0.0775	0.5068	0.1001	0.0004	0.1383	-0.2346	0.1383	-0.1900	0.0693	0.9521	0.0233	9.9000
7957	0108	12	5	F	A	C	11018	0.2447	0.2447	0.2504	0.2000	0.2037	0.1010	0.0002	0.1731	0.1731	-0.0136	-0.1119	-0.0753	1.0323	0.0237	9.9000
6624	0109	14	5	F	C	B	11018	0.4813	0.1019	0.1058	0.4813	0.2067	0.1042	0.0001	0.3977	-0.1769	-0.2507	0.3977	-0.2147	-0.2245	0.0213	-4.1000
6843	0110	15	5	F	D	D	11018	0.3300	0.2175	0.1067	0.2407	0.3300	0.1050	0.0001	0.3205	-0.1648	-0.1663	-0.3040	0.3205	0.5455	0.0220	-0.6000
6908	0111	16	5	F	D	C	11018	0.4712	0.0682	0.1296	0.2262	0.4712	0.1044	0.0005	0.4540	-0.3632	-0.2743	-0.2841	0.4540	-0.1740	0.0213	-9.9000
6384	0112	17	5	F	C	B	11018	0.3166	0.2682	0.1673	0.3166	0.1415	0.1062	0.0003	0.2275	0.0048	-0.1646	0.2275	-0.1839	0.6179	0.0222	9.1000
6881	0113	18	5	F	B	A	11018	0.2286	0.2711	0.2286	0.1188	0.2763	0.1049	0.0003	0.1867	-0.0661	0.1867	-0.1957	-0.0608	1.1336	0.0241	8.8000
6042	0114	19	5	F	A	A	11018	0.6248	0.6248	0.1071	0.1068	0.0560	0.1052	0.0001	0.5358	0.5358	-0.3129	-0.2311	-0.2600	-0.9861	0.0229	-9.9000
6921	0115	20	5	F	C	A	11018	0.3726	0.2768	0.1704	0.3726	0.0740	0.1061	0.0002	0.3124	-0.1063	-0.2351	0.3124	-0.2548	0.3229	0.0216	2.5000
6910	0116	21	5	F	A	C	11018	0.3700	0.3700	0.1480	0.2166	0.1584	0.1069	0.0001	0.3231	0.3231	-0.2590	-0.1168	-0.2246	0.3360	0.0216	1.3000
7207	0117	22	5	F	A	C	11018	0.3366	0.3366	0.1416	0.0944	0.3207	0.1067	0.0000	0.3429	0.3429	-0.3845	-0.3752	-0.1290	0.5103	0.0219	-2.9000
6934	0118	23	5	F	C	A	11018	0.3987	0.1906	0.1431	0.3987	0.1591	0.1082	0.0003	0.3529	-0.1791	-0.3198	0.3529	-0.1544	0.1898	0.0214	-1.1000
6390	0119	24	5	F	C	B	11018	0.2868	0.2591	0.1270	0.2868	0.2207	0.1063	0.0001	0.1856	0.0545	-0.2050	0.1856	-0.0650	0.7832	0.0227	9.9000
7211	0120	25	5	F	B	D	11018	0.6821	0.1038	0.6821	0.0424	0.0651	0.1066	0.0000	0.5328	-0.2061	0.5328	-0.2335	-0.1988	-1.3395	0.0245	-8.9000
7100	0121	1	6	F	A	A	11061	0.5166	0.5166	0.1589	0.1845	0.0382	0.1017	0.0000	0.3419	0.3419	-0.0787	-0.1708	-0.1647	-0.4835	0.0216	7.2000
6230	0122	2	6	F	A	A	11061	0.4112	0.4112	0.1466	0.1211	0.2182	0.1029	0.0000	0.4181	0.4181	-0.3450	-0.3368	-0.2235	0.0522	0.0214	-8.4000
7213	0123	3	6	F	B	D	11061	0.2711	0.3122	0.2711	0.0808	0.2342	0.1016	0.0001	0.1860	0.0551	0.1860	-0.3130	-0.1492	0.8091	0.0231	9.9000
6429	0124	4	6	F	B	A	11061	0.3491	0.0773	0.3491	0.2102	0.2618	0.1016	0.0000	0.2920	-0.1951	0.2920	-0.1311	-0.1861	0.3742	0.0219	6.2000
6648	0125	5	6	F	C	C	11061	0.2072	0.4280	0.1608	0.2072	0.1007	0.1032	0.0000	0.2601	-0.1929	-0.2531	0.2601	-0.2575	1.2178	0.0251	4.4000
7097	0126	6	6	F	A	A	11061	0.6357	0.6357	0.0626	0.1453	0.0533	0.1031	0.0001	0.4839	0.4839	-0.2467	-0.2015	-0.1833	-1.1363	0.0232	-6.4000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
7065	0127	7	6	F	C	B	11061	0.6665	0.0410	0.0647	0.6665	0.1253	0.1024	0.0000	0.5102	-0.2408	-0.1903	0.5102	-0.2175	-1.3261	0.0240	-6.6000
7071	0128	8	6	F	D	A	11061	0.7281	0.1119	0.0287	0.0293	0.7281	0.1018	0.0001	0.4587	-0.0533	-0.1702	-0.1836	0.4587	-1.7590	0.0265	4.5000
6796	0129	9	6	F	D	A	11061	0.2846	0.3770	0.1772	0.0571	0.2846	0.1041	0.0000	0.2570	-0.0488	-0.2926	-0.3787	0.2570	0.7302	0.0228	4.8000
7042	0130	10	6	F	D	D	11061	0.2173	0.1212	0.3037	0.2501	0.2173	0.1075	0.0002	0.1815	-0.2074	-0.0685	-0.0716	0.1815	1.1484	0.0247	9.9000
7140	0131	11	6	F	C	A	11061	0.3918	0.1446	0.0871	0.3918	0.2719	0.1046	0.0000	0.2984	-0.2216	-0.2518	0.2984	-0.0595	0.1512	0.0215	5.9000
6790	0132	12	6	F	B	D	11061	0.3648	0.1511	0.3648	0.1748	0.2031	0.1061	0.0000	0.2345	-0.0706	0.2345	-0.1702	-0.0150	0.2913	0.0217	9.9000
7091	0133	14	6	F	B	A	11061	0.6012	0.0580	0.6012	0.1529	0.0781	0.1098	0.0001	0.4715	-0.2551	0.4715	-0.2063	-0.1737	-0.9364	0.0225	-6.6000
7175	0134	15	6	F	D	D	11061	0.1965	0.1942	0.1391	0.3579	0.1965	0.1120	0.0002	0.1658	-0.0315	-0.1745	-0.0683	0.1658	1.2933	0.0255	8.7000
6900	0135	16	6	F	A	B	11061	0.2770	0.2770	0.1593	0.1487	0.3049	0.1100	0.0001	0.2406	0.2406	-0.1282	-0.2264	-0.1004	0.7744	0.0230	6.3000
7197	0136	17	6	F	A	A	11061	0.5208	0.5208	0.1041	0.1581	0.1062	0.1104	0.0003	0.4360	0.4360	-0.1446	-0.2814	-0.2207	-0.5054	0.0216	-6.2000
7952	0137	18	6	F	C	A	11061	0.2943	0.1818	0.2191	0.2943	0.1937	0.1109	0.0001	0.2408	-0.1263	-0.1460	0.2408	-0.1038	0.6746	0.0227	8.3000
6598	0138	19	6	F	A	B	11061	0.4053	0.4053	0.1439	0.2199	0.1183	0.1123	0.0003	0.4673	0.4673	-0.3564	-0.3513	-0.3361	0.0822	0.0215	-9.9000
7203	0139	20	6	F	C	A	11061	0.5946	0.2068	0.0445	0.5946	0.0429	0.1110	0.0002	0.5026	-0.2437	-0.2855	0.5026	-0.2475	-0.8994	0.0224	-9.9000
6279	0140	21	6	F	B	B	11061	0.2106	0.0895	0.2106	0.3992	0.1877	0.1126	0.0005	0.3119	-0.2324	0.3119	-0.3124	-0.2638	1.1946	0.0249	-0.6000
6375	0141	22	6	F	D	C	11061	0.3495	0.1230	0.1666	0.2482	0.3495	0.1126	0.0001	0.3908	-0.3272	-0.3311	-0.2525	0.3908	0.3719	0.0219	-8.6000
6882	0142	23	6	F	B	A	11061	0.6602	0.0928	0.6602	0.0848	0.0488	0.1132	0.0002	0.5302	-0.1818	0.5302	-0.2512	-0.2569	-1.2861	0.0238	-9.7000
6227	0143	24	6	F	D	C	11061	0.2909	0.2264	0.2962	0.0737	0.2909	0.1123	0.0005	0.2588	-0.1270	-0.1378	-0.2673	0.2588	0.6938	0.0227	4.8000
6383	0144	25	6	F	B	D	11061	0.3907	0.0934	0.3907	0.2580	0.1446	0.1129	0.0004	0.3429	-0.2556	0.3429	-0.1544	-0.2333	0.1568	0.0215	0.5000
7135	0145	1	7	F	A	A	11024	0.0858	0.0858	0.7243	0.0624	0.0270	0.1003	0.0001	0.0241	0.0241	-0.0741	-0.1160	0.2217	2.4025	0.0352	9.9000
6295	0146	2	7	F	B	D	11024	0.3046	0.1857	0.3046	0.1948	0.2139	0.1008	0.0002	0.2596	-0.1884	0.2596	-0.2261	-0.0651	0.6710	0.0225	6.6000
6043	0147	3	7	F	D	A	11024	0.6703	0.0693	0.0366	0.1235	0.6703	0.1003	0.0000	0.5386	-0.1956	-0.1931	-0.3001	0.5386	-1.2958	0.0242	-9.9000
6488	0148	4	7	F	A	A	11024	0.7470	0.7470	0.0591	0.0520	0.0415	0.1004	0.0001	0.5861	0.5861	-0.2477	-0.2257	-0.1913	-1.8562	0.0276	-9.9000
6370	0149	5	7	F	D	A	11024	0.2001	0.2812	0.1965	0.2187	0.2001	0.1035	0.0000	0.1663	0.0731	-0.1660	-0.2183	0.1663	1.3208	0.0253	9.9000
5988	0150	6	7	F	B	A	11024	0.5887	0.1488	0.5887	0.0843	0.0736	0.1046	0.0001	0.4579	-0.1655	0.4579	-0.2539	-0.2482	-0.8118	0.0224	-5.1000
7946	0151	7	7	F	A	A	11024	0.5795	0.5795	0.0920	0.1963	0.0300	0.1022	0.0000	0.4505	0.4505	-0.1912	-0.2363	-0.2002	-0.7610	0.0222	-5.1000
7095	0152	8	7	F	C	A	11024	0.6021	0.0393	0.2174	0.6021	0.0397	0.1015	0.0000	0.4623	-0.2455	-0.1952	0.4623	-0.2481	-0.8863	0.0226	-5.5000
7139	0153	9	7	F	C	A	11024	0.5378	0.0785	0.0889	0.5378	0.1929	0.1019	0.0001	0.4409	-0.1997	-0.3648	0.4409	-0.1620	-0.5386	0.0218	-6.3000
6792	0154	10	7	F	B	D	11024	0.3540	0.1188	0.3540	0.2779	0.1440	0.1052	0.0000	0.2709	-0.1558	0.2709	-0.1319	-0.1345	0.4034	0.0219	6.8000
7043	0155	11	7	F	B	D	11024	0.2957	0.2148	0.2957	0.1581	0.2252	0.1060	0.0001	0.2092	-0.0795	0.2092	-0.1676	-0.0366	0.7210	0.0226	9.9000
7141	0156	12	7	F	C	A	11024	0.3804	0.2262	0.1697	0.3804	0.1185	0.1051	0.0000	0.3123	-0.1202	-0.2125	0.3123	-0.2256	0.2651	0.0216	3.7000
7950	0157	14	7	F	D	A	11024	0.3370	0.1147	0.2883	0.1515	0.3370	0.1085	0.0001	0.2858	-0.1728	-0.2032	-0.0914	0.2858	0.4937	0.0220	4.3000
6225	0158	15	7	F	B	C	11024	0.6829	0.0557	0.6829	0.0780	0.0743	0.1091	0.0000	0.5126	-0.2033	0.5126	-0.1332	-1.3787	0.0246	-6.2000	
6884	0159	16	7	F	D	A	11024	0.3878	0.3500	0.1042	0.0491	0.3878	0.1086	0.0004	0.3258	-0.1364	-0.1993	-0.3473	0.3258	0.2272	0.0216	2.2000
6417	0160	17	7	F	A	D	11024	0.5469	0.5469	0.1236	0.0620	0.1581	0.1092	0.0002	0.4645	0.4645	-0.2384	-0.3116	-0.2081	-0.5863	0.0219	-9.4000
6899	0161	18	7	F	B	B	11024	0.1207	0.2769	0.1207	0.3078	0.1846	0.1099	0.0002	0.0911	0.0673	0.0911	-0.0118	-0.1057	1.9899	0.0305	9.9000
6777	0162	19	7	F	A	A	11024	0.6922	0.6922	0.0893	0.0533	0.0552	0.1098	0.0002	0.5229	0.5229	-0.1428	-0.2253	-0.2174	-1.4417	0.0249	-6.5000
6933	0163	20	7	F	C	A	11024	0.3422	0.2025	0.2567	0.3422	0.0861	0.1122	0.0004	0.3144	-0.2283	-0.2073	0.3144	-0.1119	0.4660	0.0220	1.8000
7060	0164	21	7	F	B	B	11024	0.5091	0.0518	0.5091	0.1895	0.1380	0.1116	0.0001	0.3651	-0.2706	0.3651	-0.1655	-0.0734	-0.3896	0.0216	3.2000
7085	0165	22	7	F	D	A	11024	0.3094	0.2144	0.0927	0.2706	0.3094	0.1128	0.0001	0.3373	-0.2334	-0.3947	-0.2135	0.3373	0.6441	0.0224	-2.7000
6916	0166	23	7	F	C	B	11024	0.3003	0.0274	0.1353	0.3003	0.4260	0.1108	0.0001	0.2172	-0.2591	-0.1660	0.2172	-0.0380	0.6949	0.0226	9.9000
6009	0167	24	7	F	A	C	11024	0.3065	0.3065	0.1359	0.1411	0.3062	0.1101	0.0002	0.3690	0.3690	-0.3862	-0.4107	-0.2024	0.6603	0.0225	-5.7000
7949	0168	25	7	F	B	A	11024	0.1666	0.4749	0.1666	0.0493	0.1979	0.1110	0.0002	0.2075	-0.1196	0.2075	-0.4270	-0.1805	1.5737	0.0270	5.7000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
6935	0169	1	8	F	D	A	11124	0.7798	0.0884	0.0129	0.0135	0.7798	0.1050	0.0004	0.5739	-0.2187	-0.1414	-0.1304	0.5739	-2.1319	0.0305	-6.1000
6596	0170	2	8	F	C	A	11124	0.6980	0.0633	0.0832	0.6980	0.0517	0.1036	0.0001	0.5636	-0.2017	-0.3092	0.5636	-0.1954	-1.4400	0.0253	-8.7000
6285	0171	3	8	F	D	D	11124	0.5493	0.0822	0.1143	0.1484	0.5493	0.1056	0.0002	0.5073	-0.2392	-0.2596	-0.3706	0.5073	-0.5395	0.0219	-9.9000
6391	0172	4	8	F	C	B	11124	0.3875	0.1544	0.1410	0.3875	0.2044	0.1125	0.0003	0.2285	-0.0603	-0.1030	0.2285	-0.0241	0.3002	0.0216	9.9000
6234	0173	5	8	F	A	A	11124	0.1176	0.1176	0.1949	0.5627	0.0214	0.1032	0.0002	0.1927	0.1927	-0.2225	-0.1553	-0.3151	2.1118	0.0308	5.8000
7096	0174	6	8	F	D	A	11124	0.4303	0.2728	0.0977	0.0942	0.4303	0.1049	0.0000	0.4263	-0.1977	-0.4098	-0.3838	0.4263	0.0789	0.0215	-6.8000
7099	0175	7	8	F	A	A	11124	0.4533	0.4533	0.1085	0.2052	0.1286	0.1044	0.0001	0.2874	0.2874	-0.2071	-0.0083	-0.1344	-0.0388	0.0214	9.9000
7939	0176	8	8	F	C	C	11124	0.2800	0.1892	0.2677	0.2800	0.1557	0.1073	0.0000	0.2116	-0.1105	-0.0720	0.2116	-0.1214	0.8900	0.0230	9.9000
7969	0177	9	8	F	D	A	11124	0.4815	0.1166	0.1636	0.1326	0.4815	0.1056	0.0001	0.4506	-0.2577	-0.2441	-0.3499	0.4506	-0.1839	0.0215	-8.4000
6803	0178	10	8	F	C	B	11124	0.3412	0.1138	0.1309	0.3412	0.3063	0.1079	0.0000	0.2415	-0.2715	-0.2996	0.2415	0.0626	0.5462	0.0220	9.9000
6802	0179	11	8	F	C	B	11124	0.5151	0.1120	0.1151	0.5151	0.1516	0.1063	0.0000	0.3991	-0.1570	-0.2173	0.3991	-0.1962	-0.3585	0.0217	0.6000
7971	0180	12	8	F	A	A	11124	0.3330	0.3330	0.1575	0.1882	0.2132	0.1078	0.0004	0.2743	0.2743	-0.1886	-0.1788	-0.1062	0.5906	0.0221	8.5000
6902	0181	14	8	F	D	A	11124	0.4994	0.0648	0.2726	0.0502	0.4994	0.1131	0.0000	0.4826	-0.2358	-0.3141	-0.3673	0.4826	-0.2764	0.0216	-9.9000
6623	0182	15	8	F	B	B	11124	0.2706	0.2134	0.2706	0.2227	0.1801	0.1129	0.0004	0.2289	-0.1777	0.2289	-0.0673	-0.1337	0.9460	0.0232	9.9000
7068	0183	16	8	F	D	A	11124	0.1885	0.2223	0.2824	0.1925	0.1885	0.1142	0.0002	0.2183	-0.1512	-0.1455	-0.2304	0.2183	1.4895	0.0259	6.5000
5942	0184	17	8	F	A	A	11124	0.5974	0.5974	0.1279	0.0821	0.0791	0.1135	0.0000	0.5414	0.5414	-0.2619	-0.3218	-0.2996	-0.8053	0.0226	-9.9000
6906	0185	18	8	F	D	C	11124	0.6370	0.0781	0.0586	0.1083	0.6370	0.1179	0.0001	0.4630	-0.1639	-0.2134	-0.1491	0.4630	-1.0387	0.0234	0.6000
7202	0186	19	8	F	A	A	11124	0.3991	0.3991	0.2536	0.1516	0.0839	0.1118	0.0000	0.4211	0.4211	-0.2927	-0.3107	-0.2916	0.2399	0.0216	-7.9000
7094	0187	20	8	F	C	A	11124	0.4844	0.0946	0.2288	0.4844	0.0801	0.1120	0.0001	0.4442	-0.3023	-0.2202	0.4442	-0.3060	-0.1992	0.0215	-7.1000
7093	0188	21	8	F	C	A	11124	0.4454	0.1737	0.1751	0.4454	0.0930	0.1126	0.0001	0.4024	-0.2797	-0.1731	0.4024	-0.2736	0.0015	0.0214	-2.4000
5990	0189	22	8	F	C	C	11124	0.4253	0.2335	0.1846	0.4253	0.0430	0.1134	0.0002	0.3534	-0.1171	-0.2382	0.3534	-0.2757	0.1048	0.0215	2.9000
6298	0190	23	8	F	D	D	11124	0.4928	0.0786	0.1409	0.1729	0.4928	0.1146	0.0003	0.3829	-0.2243	-0.1771	-0.1724	0.3829	-0.2424	0.0215	5.1000
7198	0191	24	8	F	C	A	11124	0.4644	0.2100	0.1490	0.4644	0.0637	0.1125	0.0003	0.4000	-0.1900	-0.2072	0.4000	-0.3177	-0.0960	0.0215	-1.0000
6591	0192	25	8	F	D	B	11124	0.4596	0.0861	0.0937	0.2472	0.4596	0.1132	0.0002	0.4079	-0.3545	-0.3257	-0.1426	0.4079	-0.0715	0.0214	-2.7000
7615	0193	1	9	F	B	D	10849	0.7787	0.0841	0.7787	0.0374	0.0100	0.0898	0.0001	0.5245	-0.2249	0.5245	-0.0699	-0.0961	-1.9157	0.0296	-1.3000
7066	0194	2	9	F	D	B	10849	0.7192	0.0511	0.0972	0.0438	0.7192	0.0887	0.0000	0.5615	-0.2103	-0.2581	-0.2772	0.5615	-1.4222	0.0260	-7.4000
6306	0195	3	9	F	D	A	10849	0.4072	0.0859	0.1115	0.3057	0.4072	0.0897	0.0000	0.3523	-0.2305	-0.3170	-0.1894	0.3523	0.3420	0.0218	2.7000
6848	0196	4	9	F	C	D	10849	0.3166	0.1944	0.2787	0.3166	0.1194	0.0909	0.0000	0.2308	-0.1271	-0.0733	0.2308	-0.2092	0.8265	0.0227	9.9000
7057	0197	5	9	F	A	B	10849	0.3792	0.3792	0.0906	0.1812	0.2595	0.0894	0.0001	0.2132	0.2132	-0.2495	-0.0860	0.0347	0.4880	0.0220	9.9000
5940	0198	6	9	F	D	A	10849	0.5794	0.1115	0.0301	0.1853	0.5794	0.0936	0.0000	0.4765	-0.2818	-0.2629	-0.2580	0.4765	-0.5546	0.0224	-6.1000
6931	0199	7	9	F	C	A	10849	0.5421	0.0781	0.1615	0.5421	0.1280	0.0901	0.0002	0.4386	-0.2575	-0.2135	0.4386	-0.2585	-0.3541	0.0221	-4.5000
7137	0200	8	9	F	A	A	10849	0.8118	0.8118	0.0274	0.0318	0.0395	0.0895	0.0001	0.5943	0.5943	-0.1990	-0.2082	-0.1459	-2.2665	0.0330	-7.0000
8030	0201	9	9	F	B	D	10849	0.5332	0.1266	0.5332	0.1496	0.0997	0.0908	0.0001	0.3229	-0.0247	0.3229	-0.1732	-0.1339	-0.3074	0.0220	9.9000
7983	0202	10	9	F	B	A	10849	0.5815	0.0973	0.5815	0.1187	0.1108	0.0915	0.0001	0.5381	-0.3684	0.5381	-0.3684	-0.2526	-0.5664	0.0225	-9.9000
8031	0203	11	9	F	D	D	10849	0.3275	0.0833	0.1386	0.3590	0.3275	0.0915	0.0000	0.2975	-0.4192	-0.2954	-0.1062	0.2975	0.7660	0.0225	5.4000
7984	0204	12	9	F	C	A	10849	0.6104	0.0732	0.0768	0.6104	0.1466	0.0930	0.0000	0.5498	-0.3207	-0.3428	0.5498	-0.3068	-0.7276	0.0229	-9.9000
6131	0205	14	9	F	A	D	10849	0.3223	0.3223	0.2598	0.1019	0.2188	0.0972	0.0000	0.3134	0.3134	-0.2795	-0.3343	-0.1085	0.7947	0.0226	3.4000
7940	0206	15	9	F	D	A	10849	0.5540	0.1657	0.0908	0.0916	0.5540	0.0978	0.0001	0.4179	-0.1492	-0.2061	-0.2779	0.4179	-0.4171	0.0222	1.1000
6482	0207	16	9	F	D	C	10849	0.5171	0.0927	0.0701	0.2222	0.5171	0.0977	0.0002	0.4240	-0.2150	-0.3076	-0.2142	0.4240	-0.2232	0.0219	-3.1000
5939	0208	17	9	F	D	A	10849	0.7470	0.0546	0.0540	0.0463	0.7470	0.0980	0.0002	0.6307	-0.2703	-0.2935	-0.2924	0.6307	-1.6370	0.0274	-9.9000
5890	0209	18	9	F	C	A	10849	0.5236	0.0580	0.1751	0.5236	0.1445	0.0984	0.0004	0.4264	-0.2505	-0.2498	0.4264	-0.2046	-0.2572	0.0219	-2.8000
6003	0210	19	9	F	A	D	10849	0.2573	0.2573	0.2779	0.1525	0.2126	0.0993	0.0004	0.3014	0.3014	-0.2275	-0.3320	-0.2347	1.1753	0.0239	5.0000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information							Proportions								Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
5938	0211	20	9	F	C	A	10849	0.5692	0.1286	0.1198	0.5692	0.0838	0.0982	0.0005	0.5100	-0.3647	-0.2855	0.5100	-0.2384	-0.4990	0.0223	-9.9000
6778	0212	21	9	F	A	A	10849	0.3668	0.3668	0.0789	0.2796	0.1760	0.0984	0.0004	0.2953	0.2953	-0.1889	-0.1810	-0.1446	0.5538	0.0221	9.2000
7086	0213	22	9	F	B	A	10849	0.4329	0.1849	0.4329	0.1921	0.0919	0.0981	0.0002	0.3323	-0.1532	0.3323	-0.1892	-0.1840	0.2099	0.0217	7.1000
5895	0214	23	9	F	D	C	10849	0.4008	0.1454	0.2627	0.0917	0.4008	0.0991	0.0004	0.3415	-0.1271	-0.1869	-0.3813	0.3415	0.3754	0.0218	3.2000
7208	0215	24	9	F	B	C	10849	0.4530	0.0991	0.4530	0.2351	0.1140	0.0985	0.0002	0.3529	-0.0800	0.3529	-0.2462	-0.1949	0.1065	0.0217	3.9000
6901	0216	25	9	F	C	B	10849	0.2681	0.2542	0.2202	0.2681	0.1581	0.0991	0.0003	0.1830	-0.0935	-0.0647	0.1830	-0.0546	1.1086	0.0236	9.9000
7133	0217	1	10	F	A	A	10852	0.2985	0.2985	0.0640	0.4880	0.0603	0.0891	0.0002	0.3026	0.3026	-0.3165	-0.2069	-0.2273	0.7914	0.0230	5.8000
7064	0218	2	10	F	B	B	10852	0.6140	0.1042	0.6140	0.0749	0.1174	0.0893	0.0002	0.4814	-0.2452	0.4814	-0.2900	-0.2089	-0.8770	0.0228	-7.5000
6430	0219	3	10	F	C	A	10852	0.2637	0.2399	0.2329	0.2637	0.1743	0.0891	0.0001	0.1744	-0.0035	-0.0969	0.1744	-0.1569	0.9970	0.0237	9.9000
6294	0220	4	10	F	C	C	10852	0.3903	0.1841	0.2614	0.3903	0.0730	0.0910	0.0002	0.3485	-0.2208	-0.2739	0.3485	-0.1651	0.2933	0.0219	1.2000
5898	0221	5	10	F	B	C	10852	0.8133	0.0347	0.8133	0.0521	0.0108	0.0889	0.0002	0.5845	-0.2011	0.5845	-0.2350	-0.1388	-2.3933	0.0329	-9.9000
7938	0222	6	10	F	A	C	10852	0.4101	0.4101	0.1914	0.2534	0.0544	0.0905	0.0003	0.3749	-0.3749	-0.3134	-0.1823	-0.3399	0.1908	0.0218	-1.1000
7081	0223	7	10	F	C	A	10852	0.5053	0.0527	0.0705	0.5053	0.2806	0.0907	0.0002	0.2257	-0.2320	-0.2664	0.2257	0.1143	-0.2961	0.0217	9.9000
6392	0224	8	10	F	C	B	10852	0.4959	0.0768	0.1311	0.4959	0.1843	0.1120	0.0000	0.4481	-0.2663	-0.3066	0.4481	-0.2789	-0.2473	0.0217	-8.0000
7988	0225	9	10	F	D	C	10852	0.3312	0.2666	0.1366	0.1732	0.3312	0.0920	0.0005	0.3861	-0.1840	-0.4683	-0.4061	0.3861	0.6080	0.0225	-5.4000
7986	0226	10	10	F	A	A	10852	0.3888	0.3888	0.0844	0.3473	0.0862	0.0931	0.0003	0.3637	0.3637	-0.3113	-0.2084	-0.3067	0.3010	0.0219	0.1000
7987	0227	11	10	F	B	C	10852	0.5372	0.1560	0.5372	0.1273	0.0879	0.0910	0.0005	0.4621	-0.2529	0.4621	-0.2945	-0.2743	-0.4611	0.0219	-7.9000
7985	0228	12	10	F	B	A	10852	0.3979	0.2273	0.3979	0.2006	0.0804	0.0935	0.0002	0.3180	-0.1447	0.3180	-0.1857	-0.2918	0.2536	0.0218	6.6000
7087	0229	14	10	F	C	A	10852	0.4262	0.1100	0.1638	0.4262	0.1966	0.1031	0.0002	0.3075	-0.1575	-0.2205	0.3075	-0.0882	0.1081	0.0217	8.0000
6316	0230	15	10	F	C	A	10852	0.5152	0.2167	0.1133	0.5152	0.0555	0.0992	0.0001	0.4592	-0.2861	-0.2453	0.4592	-0.3027	-0.3467	0.0218	-8.8000
6395	0231	16	10	F	D	A	10852	0.4996	0.1315	0.0736	0.1907	0.4996	0.1045	0.0001	0.4183	-0.2113	-0.2515	-0.2561	0.4183	-0.2667	0.0217	-3.6000
6381	0232	17	10	F	C	D	10852	0.1873	0.1226	0.1221	0.1873	0.4687	0.0992	0.0001	0.0082	0.0170	-0.0798	0.0082	0.2203	1.5123	0.0264	9.9000
6389	0233	18	10	F	C	B	10852	0.4222	0.2147	0.1503	0.4222	0.1119	0.1008	0.0001	0.3084	-0.0576	-0.2766	0.3084	-0.1733	0.1283	0.0217	9.0000
6927	0234	19	10	F	B	B	10852	0.5192	0.1069	0.5192	0.1009	0.1729	0.1000	0.0002	0.4941	-0.2815	0.4941	-0.3968	-0.2744	-0.3673	0.0218	-9.9000
7131	0235	20	10	F	C	B	10852	0.3835	0.1803	0.1162	0.3835	0.2198	0.1000	0.0002	0.3360	-0.2053	-0.3247	0.3360	-0.1522	0.3284	0.0219	3.3000
7129	0236	21	10	F	A	A	10852	0.4055	0.4055	0.1128	0.2994	0.0819	0.1001	0.0003	0.3454	0.3454	-0.3265	-0.1464	-0.2358	0.2140	0.0218	2.5000
6522	0237	22	10	F	A	B	10852	0.5346	0.5346	0.1358	0.1253	0.1037	0.1005	0.0000	0.5353	0.5353	-0.3340	-0.3851	-0.3193	-0.4476	0.0219	-9.9000
7204	0238	23	10	F	D	A	10852	0.6802	0.0465	0.1377	0.0339	0.6802	0.1016	0.0001	0.4916	-0.2770	-0.1505	-0.2212	0.4916	-1.2761	0.0244	-3.6000
6277	0239	24	10	F	C	B	10852	0.4306	0.0713	0.1986	0.4306	0.1987	0.1008	0.0000	0.4061	-0.3338	-0.2544	0.4061	-0.2431	0.0854	0.0217	-4.7000
7215	0240	25	10	F	B	D	10852	0.4582	0.1332	0.4582	0.1893	0.1175	0.1016	0.0002	0.4315	-0.2567	0.4315	-0.3176	-0.2469	-0.0550	0.0216	-7.8000
6258	0241	1	11	F	A	B	10841	0.5570	0.5570	0.1076	0.0846	0.1595	0.0910	0.0003	0.4210	0.4210	-0.2603	-0.1765	-0.5961	0.0220	-3.2000	
7951	0242	2	11	F	B	A	10841	0.4618	0.2586	0.4618	0.1464	0.0411	0.0920	0.0002	0.2696	-0.0226	0.2696	-0.1776	-0.1684	-0.1119	0.0215	9.9000
6487	0243	3	11	F	D	A	10841	0.3652	0.0772	0.1854	0.2815	0.3652	0.0905	0.0002	0.4055	-0.2989	-0.3422	-0.3293	0.4055	0.3766	0.0218	-8.3000
6231	0244	4	11	F	B	A	10841	0.6066	0.0799	0.6066	0.1540	0.0683	0.0910	0.0003	0.3685	-0.1792	0.3685	-0.1028	-0.1146	-0.8633	0.0226	5.2000
7079	0245	5	11	F	D	A	10841	0.5581	0.1029	0.0741	0.1740	0.5581	0.0909	0.0002	0.4891	-0.1893	-0.3336	-0.3380	0.4891	-0.6018	0.0220	-9.9000
5896	0246	6	11	F	A	C	10841	0.2052	0.2052	0.2805	0.2902	0.1273	0.0965	0.0003	0.1034	0.1034	-0.0060	-0.0032	0.0148	1.3102	0.0253	9.9000
7092	0247	7	11	F	D	A	10841	0.5610	0.1350	0.0796	0.1333	0.5610	0.0909	0.0003	0.4600	-0.2353	-0.3001	-0.2427	0.4600	-0.6173	0.0220	-9.2000
6597	0248	8	11	F	B	A	10841	0.5364	0.0791	0.5364	0.1998	0.0930	0.0915	0.0002	0.4729	-0.2477	0.4729	-0.2969	-0.3028	-0.4891	0.0218	-9.9000
7981	0249	9	11	F	C	C	10841	0.4568	0.1599	0.2087	0.4568	0.0803	0.0943	0.0001	0.4042	-0.2420	-0.3151	0.4042	-0.1670	-0.0870	0.0215	-6.3000
7980	0250	10	11	F	B	C	10841	0.3918	0.1881	0.3918	0.1790	0.1464	0.0945	0.0001	0.3986	-0.2633	0.3986	-0.3592	-0.2658	0.2398	0.0216	-7.9000
7977	0251	11	11	F	C	A	10841	0.5313	0.0992	0.0770	0.5313	0.1999	0.0923	0.0003	0.4495	-0.2915	-0.2848	0.4495	-0.2290	-0.4631	0.0217	-9.4000
7975	0252	12	11	F	D	A	10841	0.3577	0.1659	0.2194	0.1627	0.3577	0.0939	0.0003	0.3378	-0.2358	-0.1702	-0.3327	0.3378	0.4155	0.0219	-0.7000

Appendix J: Grade 11 Multiple-Choice Statistics for the 2007 Science Field Test

Information								Proportions							Correlations				Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Key	Subscale	n	P-Value	A	B	C	D	-	*	Item Total Corr.	A	B	C	D	Measure	Measure SE	Fit
7944	0253	14	11	F	C	C	10841	0.6493	0.0921	0.0933	0.6493	0.0656	0.0994	0.0003	0.5142	-0.2161	-0.2642	0.5142	-0.2384	-1.1093	0.0235	-9.5000
6898	0254	15	11	F	D	B	10841	0.2832	0.1813	0.2018	0.2325	0.2832	0.1009	0.0004	0.2412	-0.1245	-0.1262	-0.1916	0.2412	0.8217	0.0230	6.3000
6300	0255	16	11	F	C	D	10841	0.2635	0.2042	0.1170	0.2635	0.3161	0.0988	0.0004	0.2053	-0.2135	-0.3034	0.2053	0.0324	0.9367	0.0234	8.1000
6486	0256	17	11	F	B	A	10841	0.4786	0.1715	0.4786	0.1776	0.0724	0.0996	0.0003	0.3597	-0.1224	0.3597	-0.1774	-0.3035	-0.1964	0.0215	1.3000
7613	0257	18	11	F	B	A	10841	0.4912	0.1543	0.4912	0.0946	0.1608	0.0990	0.0001	0.4375	-0.2491	0.4375	-0.3240	-0.2449	-0.2594	0.0215	-9.4000
7176	0258	19	11	F	C	D	10841	0.2606	0.1373	0.3015	0.2606	0.1994	0.1009	0.0002	0.1326	-0.1239	0.0012	0.1326	0.0641	0.9544	0.0235	9.9000
5899	0259	20	11	F	D	C	10841	0.6145	0.0383	0.1739	0.0743	0.6145	0.0990	0.0001	0.4813	-0.2401	-0.2289	-0.2367	0.4813	-0.9075	0.0228	-8.5000
6501	0260	21	11	F	B	B	10841	0.3280	0.0657	0.3280	0.2293	0.2770	0.0996	0.0004	0.1729	-0.2211	0.1729	-0.1543	0.1323	0.5728	0.0223	9.9000
6490	0261	22	11	F	B	B	10841	0.5959	0.1602	0.5959	0.0831	0.0610	0.0995	0.0003	0.4452	-0.2148	0.4452	-0.2393	-0.1419	-0.8042	0.0224	-5.0000
7177	0262	23	11	F	D	D	10841	0.2525	0.2482	0.1654	0.2316	0.2525	0.1017	0.0006	0.2054	-0.1060	-0.1419	-0.1188	0.2054	1.0036	0.0237	7.0000
6844	0263	24	11	F	A	D	10841	0.2741	0.2741	0.1292	0.4088	0.0871	0.1006	0.0002	0.2231	0.2231	-0.1889	-0.0743	-0.2508	0.8746	0.0232	6.7000
5526	0264	25	11	F	C	B	10841	0.4188	0.0899	0.0790	0.4188	0.3114	0.1005	0.0005	0.3153	-0.3063	-0.2415	0.3153	-0.0844	0.1035	0.0215	3.5000
6299	0265	1	12	F	D	D	10830	0.4524	0.1143	0.1642	0.1750	0.4524	0.0938	0.0003	0.4085	-0.1959	-0.2310	-0.3370	0.4085	-0.2177	0.0215	-8.0000
7937	0266	2	12	F	D	C	10830	0.4839	0.1162	0.1512	0.1534	0.4839	0.0953	0.0000	0.3277	-0.0639	-0.1498	-0.2402	0.3277	-0.3755	0.0215	5.8000
7098	0267	3	12	F	B	A	10830	0.3935	0.1728	0.3935	0.2251	0.1149	0.0935	0.0002	0.3259	-0.2445	0.3259	-0.1991	-0.1511	0.0791	0.0217	2.8000
7138	0268	4	12	F	B	A	10830	0.5392	0.1141	0.5392	0.1626	0.0922	0.0919	0.0000	0.4441	-0.2355	0.4441	-0.2586	-0.2528	-0.6562	0.0218	-8.7000
6228	0269	5	12	F	B	A	10830	0.5859	0.1132	0.5859	0.1429	0.0663	0.0916	0.0001	0.4828	-0.2348	0.4828	-0.2766	-0.2841	-0.9019	0.0223	-9.9000
6235	0270	6	12	F	D	A	10830	0.2850	0.2434	0.2055	0.1731	0.2850	0.0928	0.0001	0.3328	-0.2505	-0.2798	-0.3231	0.3328	0.6615	0.0230	-2.4000
7078	0271	7	12	F	C	A	10830	0.4799	0.0518	0.0627	0.4799	0.3128	0.0925	0.0003	0.3425	-0.2245	-0.1987	0.3425	-0.1543	-0.3551	0.0215	1.8000
6367	0272	8	12	F	A	B	10830	0.1778	0.1778	0.1819	0.3222	0.2225	0.0954	0.0002	0.1623	0.1623	-0.1519	-0.1518	-0.0254	1.3654	0.0267	6.2000
6808	0273	9	12	F	C	A	10830	0.5446	0.0969	0.2036	0.5446	0.0610	0.0938	0.0001	0.4093	-0.2611	-0.1928	0.4093	-0.1769	-0.6840	0.0218	-4.2000
6810	0274	10	12	F	A	A	10830	0.3496	0.3496	0.3663	0.0491	0.1404	0.0946	0.0001	0.2769	0.2769	-0.0878	-0.3185	-0.2518	0.3069	0.0221	7.0000
6812	0275	11	12	F	B	D	10830	0.2836	0.1413	0.2836	0.3372	0.1437	0.0943	0.0000	0.2281	-0.2214	0.2281	-0.0888	-0.1648	0.6700	0.0231	8.0000
6814	0276	12	12	F	A	D	10830	0.2585	0.2585	0.2207	0.2657	0.1577	0.0969	0.0005	0.2203	0.2203	-0.2096	-0.1194	-0.1045	0.8182	0.0237	7.4000
6396	0277	14	12	F	D	A	10830	0.2257	0.0613	0.1110	0.5028	0.2257	0.0993	0.0000	0.3378	-0.3932	-0.4339	-0.2663	0.3378	1.0257	0.0246	-4.1000
7936	0278	15	12	F	B	C	10830	0.3131	0.1311	0.3131	0.3931	0.0636	0.0991	0.0000	0.2661	-0.2284	0.2661	-0.1206	-0.2362	0.5033	0.0225	5.3000
7088	0279	16	12	F	B	A	10830	0.2327	0.0809	0.2327	0.2730	0.3129	0.1005	0.0000	0.1113	-0.2408	0.1113	0.0552	0.0235	0.9800	0.0244	9.9000
6374	0280	17	12	F	A	C	10830	0.4106	0.4106	0.0712	0.1497	0.2688	0.0996	0.0001	0.3685	0.3685	-0.3000	-0.2621	-0.1892	-0.0075	0.0216	-3.2000
6593	0281	18	12	F	B	C	10830	0.6285	0.0584	0.6285	0.1200	0.0930	0.1001	0.0000	0.5346	-0.2749	0.5346	-0.2728	-0.2904	-1.1392	0.0230	-9.9000
6576	0282	19	12	F	A	D	10830	0.2319	0.2319	0.3427	0.1512	0.1705	0.1037	0.0001	0.1419	0.1419	0.0523	-0.2053	-0.0905	0.9848	0.0244	9.9000
6521	0283	20	12	F	A	B	10830	0.6717	0.6717	0.0522	0.0873	0.0887	0.1001	0.0000	0.5401	0.5401	-0.2563	-0.2901	-0.2211	-1.3986	0.0241	-9.9000
7210	0284	21	12	F	D	D	10830	0.2725	0.3553	0.1304	0.1403	0.2725	0.1016	0.0000	0.2640	-0.0998	-0.3378	-0.2450	0.2640	0.7348	0.0233	3.4000
6360	0285	22	12	F	B	D	10830	0.2657	0.2149	0.2657	0.1349	0.2829	0.1015	0.0002	0.2599	-0.1575	0.2599	-0.2878	-0.1534	0.7753	0.0235	3.9000
6911	0286	23	12	F	B	C	10830	0.4032	0.1383	0.4032	0.2246	0.1339	0.0999	0.0001	0.3476	-0.2484	0.3476	-0.1759	-0.2407	0.0299	0.0216	-1.5000
6257	0287	24	12	F	C	B	10830	0.2850	0.1356	0.1151	0.2850	0.3622	0.1018	0.0002	0.1925	-0.2237	-0.2103	0.1925	0.0203	0.6615	0.0230	9.9000
7942	0288	25	12	F	D	A	10830	0.5147	0.1905	0.1178	0.0765	0.5147	0.1003	0.0002	0.4908	-0.2828	-0.3297	-0.3237	0.4908	-0.5307	0.0216	-9.9000

Appendix K:

**Grade 11 Constructed-Response Statistics for the
2007 Science Field Test**

Appendix K: Grade 11 Constructed-Response Statistics for the 2007 Science Field Test

Information								Proportions							Correlations			Rasch			
ID	Pub. ID	Sequence	Form	Status Label	Maximum	Subscale	n	Average	P-Value	0	1	2	B	K	Item Total Corr.	0	1	2	Measure	Measure SE	Fit
7813	0001	13.1	1	F	2	A	1087	0.3855	0.1927	0.5363	0.2953	0.0451	0.1224	0.0009	0.3585	-0.3689	0.3170	0.1455	1.6735	0.0595	-0.4000
7812	0002	13.2	1	F	2	B	1087	0.2355	0.1178	0.6605	0.1969	0.0193	0.1224	0.0009	0.3337	-0.3397	0.3109	0.1178	2.3048	0.0704	-1.0000
6646	0003	26	1	F	2	A	1087	0.7516	0.3758	0.3358	0.1095	0.3211	0.2309	0.0028	0.5441	-0.5351	0.1106	0.4935	0.3665	0.0413	-4.1000
8005	0004	13.1	2	F	2	C	1063	0.2154	0.1077	0.6707	0.1891	0.0132	0.1270		0.3386	-0.3371	0.3094	0.1250	2.5138	0.0757	-0.7000
8006	0005	13.2	2	F	2	A	1063	0.7723	0.3862	0.2540	0.4657	0.1533	0.1270		0.5370	-0.5626	0.3475	0.2771	0.4097	0.0535	-2.2000
6644	0006	26	3	F	2	A	1078	0.5714	0.2857	0.3367	0.3692	0.1011	0.1902	0.0028	0.4437	-0.4489	0.3136	0.2411	0.8005	0.0519	-1.7000
6837A	0007	13.1	4	F	2	C	1079	0.1418	0.0709	0.6867	0.1121	0.0148	0.1863		0.2778	-0.2701	0.2275	0.1501	2.4145	0.0828	0.5000
6837B	0008	13.2	4	F	2	A	1079	0.1687	0.0843	0.6701	0.1186	0.0250	0.1863		0.2148	-0.2236	0.1954	0.0976	2.1163	0.0747	1.6000
6637	0009	26	4	F	2	A	1079	0.7581	0.3791	0.2558	0.3818	0.1881	0.1705	0.0037	0.5074	-0.5168	0.2719	0.3167	0.3620	0.0479	-3.9000
7960	0010	13.1	5	F	2	C	1158	0.3195	0.1598	0.5889	0.2539	0.0328	0.1244		0.3316	-0.3343	0.2894	0.1416	1.7445	0.0602	-0.9000
7961	0011	13.2	5	F	2	A	1158	0.1390	0.0695	0.7573	0.0976	0.0207	0.1244		0.1951	-0.1950	0.1606	0.1077	2.2064	0.0776	1.2000
6874	0012	26	5	F	2	D	1158	0.3489	0.1744	0.5380	0.2539	0.0475	0.1606		0.3841	-0.3833	0.3073	0.1981	1.5277	0.0569	-2.3000
7045A	0013	13.1	6	F	2	A	1160	0.5009	0.2504	0.4793	0.2319	0.1345	0.1543		0.3544	-0.3609	0.2191	0.2387	0.8480	0.0473	0.4000
7045B	0014	13.2	6	F	2	D	1160	0.1147	0.0573	0.7543	0.0681	0.0233	0.1543		0.3360	-0.3200	0.2188	0.2460	2.2314	0.0827	-3.0000
6645	0015	26	6	F	2	A	1160	0.8474	0.4237	0.1259	0.4750	0.1862	0.2129		0.5547	-0.5368	0.2308	0.3566	0.1172	0.0493	-4.4000
7142A	0016	13.1	7	F	2	A	1156	0.3131	0.1566	0.5900	0.1990	0.0571	0.1531	0.0009	0.3664	-0.3834	0.3117	0.1849	1.5491	0.0569	-1.7000
7142B	0017	13.2	7	F	2	D	1156	0.2734	0.1367	0.6332	0.1522	0.0606	0.1531	0.0009	0.2818	-0.2919	0.2217	0.1670	1.5745	0.0576	0.1000
6871	0018	26	7	F	2	A	1156	1.1237	0.5619	0.1410	0.3573	0.3832	0.1185		0.5756	-0.5728	0.0964	0.4214	-0.5223	0.0464	-3.9000
6651	0019	26	8	F	2	C	1173	0.4902	0.2451	0.4382	0.2634	0.1134	0.1850		0.3174	-0.2862	0.1322	0.2538	1.0791	0.0489	3.1000
7992	0020	13.1	9	F	2	A	1181	0.6867	0.3434	0.3014	0.3887	0.1490	0.1609		0.5477	-0.5544	0.3292	0.3256	0.6493	0.0488	-4.0000
7991	0021	13.2	9	F	2	D	1181	0.8425	0.4213	0.2058	0.4242	0.2091	0.1609		0.5711	-0.5993	0.3109	0.3323	0.2257	0.0482	-3.5000
6638	0022	26	9	F	2	B	1181	0.7401	0.3700	0.2286	0.4793	0.1304	0.1617		0.5519	-0.5288	0.2890	0.3373	0.5747	0.0520	-3.2000
7989	0023	13.1	10	F	2	C	1172	0.7500	0.3750	0.2892	0.3695	0.1903	0.1510		0.5884	-0.5866	0.2878	0.3881	0.3145	0.0469	-5.6000
7990	0024	13.2	10	F	2	A	1172	0.2910	0.1455	0.5956	0.2159	0.0375	0.1510		0.4233	-0.4234	0.3496	0.2122	1.7651	0.0615	-3.2000
6873	0025	26	10	F	2	C	1171	0.2519	0.1260	0.5192	0.2092	0.0213	0.2502		0.4110	-0.4034	0.3497	0.1916	2.1030	0.0668	-2.4000
7995	0026	13.1	11	F	2	C	1184	0.4223	0.2111	0.4713	0.2601	0.0811	0.1875		0.4984	-0.4696	0.2910	0.3479	1.1474	0.0521	-4.3000
7996	0027	13.2	11	F	2	A	1184	0.4105	0.2052	0.4434	0.3277	0.0414	0.1875		0.4504	-0.4595	0.3980	0.1754	1.4736	0.0573	-2.6000
6616	0028	26	11	F	2	A	1184	0.0693	0.0346	0.7644	0.0659	0.0017	0.1681		0.2017	-0.2004	0.1938	0.0542	3.5587	0.1148	-1.0000
6801	0029	13.1	12	F	2	A	1173	0.3112	0.1556	0.5158	0.1628	0.0742	0.2472		0.3786	-0.3940	0.2901	0.2307	1.1770	0.0549	-1.2000
8002	0030	13.2	12	F	2	D	1173	0.6897	0.3448	0.2694	0.2771	0.2063	0.2472		0.5722	-0.5763	0.2749	0.4076	0.1876	0.0448	-4.9000
6653	0031	26	12	F	2	A	1173	0.4382	0.2191	0.3402	0.2813	0.0784	0.3001		0.5289	-0.5194	0.3620	0.3218	0.9644	0.0528	-4.9000