

MontCas

Criterion-Referenced Test

(Montana CRT)

2011–12

Technical Report

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CHAPTER 1. OVERVIEW OF THE MONTANA CRITERION-REFERENCED TEST

1.1 PURPOSE OF THE ASSESSMENT SYSTEM

The Montana Criterion-Referenced Test (CRT) was developed in accordance with the following federal laws: Title 1 of the Elementary and Secondary Education Act (ESEA) of 1994, P. L. 103–382, and the No Child Left Behind Act (NCLB) of 2001.

In the spring of 2012, Montana students in grades 3 through 8 and 10 participated in the MontCAS Criterion-Referenced Test (Montana CRT) in reading, mathematics, and science. The purpose of this assessment is to measure students' achievement as articulated by Montana content standards and grade-level expectations.

All Montana students enrolled in accredited schools are required to participate in either the Montana CRT or the Montana CRT-Alternate. The majority of students participate in the CRT using standard administration procedures. However, an array of standard accommodations is available to any student, with or without disabilities, when such accommodations are necessary to allow the student to demonstrate his/her skills and competencies. Standard accommodations are not considered to change the constructs being measured and may be provided to students as necessary for any or all of the reading, mathematics, or science portions of the assessment. Students' tests are scored the same way whether they take the test using standard accommodations or not.

In addition to standard accommodations, other accommodations for the Montana CRT are available to students when specified in their IEPs, 504 plans, or LEP plans. These other accommodations are referred to as nonstandard accommodations. Because they are considered to alter the constructs being measured, they do affect a student's score on the CRT. When a nonstandard accommodation is used, the student's score is reported as the lowest possible for that content area (e.g., a scaled score of 200 will fall into the Novice performance level). Nonstandard accommodations may be provided in reading, mathematics, or science, as dictated by the student's IEP, 504 plan, or LEP plan.

A small percentage of students participate in the statewide assessment program by taking the CRT-Alternate. Students with significant cognitive disabilities, who are working toward alternate academic achievement standards as documented in their Individualized Education Program (IEP), are eligible to take the CRT-Alternate. Technical characteristics of the CRT-Alternate program are described in a companion technical report.

Montana grade and content-area combination CRT instruments are based on and aligned to Montana's content standards, benchmarks, and grade-level expectations in reading, mathematics, and science. Montana educators worked with the Montana Office of Public Instruction (OPI) and Measured Progress to

develop test items that assess how well students have met Montana grade-level expectations for each content area. In addition, Northwest Regional Educational Laboratory (NWREL) performed an independent alignment study for mathematics and reading in 2006 and for science in 2007. NWREL’s alignment studies can be found on the OPI’s Web site at www.opi.mt.gov/assessment.

Montana CRT scores are intended to be useful indicators of the extent to which students have mastered material outlined in Montana reading, mathematics, and science content standards, benchmarks, and grade-level expectations. Each student’s Montana CRT score should be used as part of a body of evidence regarding mastery and should not be used in isolation to make high-stakes decisions. Montana CRT scores are more reliable indicators of program success when aggregated to school, system, or state levels, particularly when monitored over the course of several years.

1.2 PURPOSE OF THIS REPORT

This report describes technical aspects of the Montana CRT in an effort to contribute to the accumulation of validity evidence to support Montana CRT score interpretations. Because the interpretations of test scores, not the test itself, are evaluated for validity, this report presents documentation to substantiate intended interpretations (American Educational Research Association [AERA], American Psychological Association & National Council on Measurement in Education, 1999). Subsequent chapters of this report discuss test development, test alignment, test administration, scoring, equating, item analyses, reliability, scaled scores, performance levels, and reporting. Each of these topics contributes important information toward establishing the validity of the assessment program. Note, however, that this report does not include certain aspects of a comprehensive validity argument that could also be important to consider when drawing conclusions about validity. (For instance, additional sources of validity evidence might speak to the extent to which Montana CRT scores converge with other measures of the same or similar constructs and diverge from measures of different constructs, or they might examine consequences that arise from scores at the student, school, district, and state levels.)

Historically, some parts of technical reports may have been used by educated laypersons, but the intended audience was experts in psychometrics and educational research. This edition of the Montana CRT Technical Report attempts to make information more accessible to educated laypersons by providing more thorough descriptions of general categories of information. While making some information more accessible, we have also purposely preserved the depth of technical information provided. The reader will find that some discussions and tables continue to require a working knowledge of measurement concepts, such as “reliability” and “validity,” and statistical concepts, such as “correlation” and “central tendency.” To fully understand some of the data presented, the reader will have to possess a basic understanding of advanced topics in measurement and statistics.

CHAPTER 2. ASSESSMENT AND TEST DEVELOPMENT PROCESS

2.1 TEST SPECIFICATIONS

2.1.1 Criterion-Referenced Test

Items on the Montana Criterion-Referenced Test (CRT) are developed specifically for Montana and are directly linked to Montana’s content standards. These content standards are the basis for the reporting categories developed for each content area and are used to help guide the development of test items. No other content or process is subject to statewide assessment. An item may address part, all, or several of the benchmarks within a standard.

2.1.2 Item Types

Montana educators and students are familiar with the types of items used in the assessment program. The types of items and their functions are described below:

- Multiple-choice (MC) items are used to provide breadth of coverage within a content area. Because they require no more than a minute for most students to answer, multiple-choice items make efficient use of limited testing time and allow for coverage of a wide range of knowledge and skills.
- Short-answer (SA) mathematics items are used to assess students’ skills and abilities to work with brief, well-structured problems that have one or a very limited number of solutions (e.g., mathematical computations). Short-answer items require approximately two minutes for most students to answer. The advantage of this type of item is that it requires students to demonstrate knowledge and skills by generating, rather than merely selecting, an answer.
- Constructed-response (CR) items typically require students to use higher-order thinking skills—evaluation, analysis, summarization, and so on—to construct satisfactory responses. Constructed-response items take most students approximately five to ten minutes to complete. Note that the use of released Montana CRT items to prepare students to respond to constructed-response items is appropriate and encouraged.

2.1.3 Description of Test Design

The Montana CRT is structured using both common and field-test items. Common items are taken by all students in a given grade level. Student scores are based only on common items. In addition, field-test

items are divided among the four forms of the test for each grade level. Each student takes only one form of the test and therefore answers a fraction of the field-test items. Field-test items are not identifiable to test takers and have a negligible impact on testing time. Because all students participate in the field test, it provides the sample size (750–1,500 students per item) needed to produce reliable data that can be used to inform item selection for future tests.

2.2 READING TEST SPECIFICATIONS

2.2.1 Standards

The test specifications/blueprint for reading is based on Montana’s reading content standards, which identify five Montana content standards that apply specifically to reading and reading comprehension. Those content standards are listed below:

- **Reading Standard 1:** Students construct meaning as they comprehend, interpret, and respond to what they read.
- **Reading Standard 2:** Students apply a range of skills and strategies to reading.
- **Reading Standard 3:** Students set goals, and monitor and evaluate their reading progress. (This standard cannot be measured with a traditional paper-pencil test.)
- **Reading Standard 4:** Students select, read, and respond to print and nonprint materials for a variety of purposes.
- **Reading Standard 5:** Students gather, analyze, synthesize, and evaluate information from a variety of sources, and communicate their findings in ways appropriate for their purposes and audience.

2.2.2 Item Types

The Montana CRT in reading includes a mix of multiple-choice and constructed-response items. Constructed-response items require students to write answers consisting of one or more paragraphs. Each type of item is worth a specific number of points in the student’s total reading score, as shown in [Table 2-1](#).

Table 2-1. 2011–12 Montana CRT: Item Types

Item Type	Possible Score Points
MC	0 or 1
CR	0, 1, 2, 3, or 4

MC = multiple-choice; CR = constructed-response

2.2.3 Test Design

Table 2-2 shows the numbers of multiple-choice and constructed-response items for grades 3 through 8 and 10.

Table 2-2. 2011–12 Montana CRT: Common Reading Items—Grades 3–8 and 10

Grade	Session 1	Session 2	Session 3	Total	
				MC	CR
3–8	19 MC, 1 CR	14 MC	19 MC, 1 CR	52	2
10	19 MC, 1 CR	14 MC	19 MC, 1 CR	52	2

MC = multiple-choice; CR = constructed-response

2.2.4 Blueprints (Distribution of Points across Standards)

Table 2-3 shows the distribution of points across content standards.

**Table 2-3. 2011–12 Montana CRT:
Reading Specifications/Blueprint Grades 3–8 and 10**

Number of Points for the Common (Scored) Test:	52 MC items + 2 CR items = 60 points						
Percent point distribution by content standard*							
Content Standards	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Standard 1	34%	34%	34%	34%	34%	34%	25%
Standard 2	30%	30%	30%	30%	30%	30%	32%
Standard 3							
Standard 4	18%	18%	18%	18%	18%	18%	22%
Standard 5	18%	18%	18%	18%	18%	18%	22%

*Because percents are rounded to the nearest whole number, not all sums add to 100%.
Note: Standard 3 cannot be measured with a traditional paper-pencil test.

Target point distribution by content standard (acceptable range)							
Content Standards	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Standard 1	20 (18–22)	20 (18–22)	20 (18–22)	20 (18–22)	20 (18–22)	20 (18–22)	15 (13–17)
Standard 2	18 (16–20)	18 (16–20)	18 (16–20)	18 (16–20)	18 (16–20)	18 (16–20)	19 (17–21)
Standard 3							
Standard 4	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	13 (11–15)
Standard 5	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	11 (9–13)	13 (11–15)

MC = multiple-choice; CR = constructed-response

Four-point items: Each test contains two four-point constructed-response items. In any given year, the two items will measure two different standards. From year to year, those standards may change.

One-point items: The number of one-point items per content standard will vary from year to year depending on which two standards are measured by the four-point items. (The number of total points per standard falls within the acceptable range from year to year.)

2.2.5 Depth of Knowledge

Each item on the Montana CRT in reading is assigned a depth of knowledge (DOK) level. The depth of knowledge level reflects the complexity of mental processing students use to answer an item. Depth of knowledge is not synonymous with difficulty. Each of the levels is described below.

- **Level 1 (Recall).** This level requires students to receive or recite facts or to use simple skills or abilities. Items require only a shallow understanding of the text presented and often consist of verbatim recall from the text, slight paraphrasing of specific details from the text, or simple understanding of a single word or phrase.
- **Level 2 (Skill/Concept).** This level includes the engagement of some mental processing beyond recalling or reproducing a response; it requires both comprehension and subsequent processing of text or portions of text. Inter-sentence analysis of inference is required. Some important concepts are covered, but not in a complex way. Standards and items at this level may include words such as summarize, interpret, infer, classify, organize, collect, display, compare, and determine whether fact or opinion. Literal main ideas are stressed.
- **Level 3 (Strategic Thinking).** Deep knowledge becomes a greater focus at Level 3. Students are encouraged to go beyond the text; however, they are still required to show understanding of the ideas in the text. Students may be encouraged to explain, generalize, or connect ideas. Standards and items at Level 3 involve reasoning and planning. Students must be able to support their thinking. Items may involve abstract theme identification, inference across an entire passage, or students' application of prior knowledge. Items may also involve more superficial connections between texts.

2.2.6 Passage Types

Reading passages include both long and short texts selected from sources that students in each grade level would likely encounter in their classroom or in their independent reading. No passages were written specifically for the assessment, but instead were collected from published works. Each passage is classified as described below.

- **Literary passages** are represented by a variety of genres—modern narratives; diary entries; drama; poetry; biographies; essays; excerpts from novels; short stories; and traditional narratives, such as fables, myths, and folktales.
- **Informational passages** are nonfiction and generally include two subgenres.
 - **Content passages** are primarily informational and often deal with the areas of science and social studies. They are drawn from sources such as newspapers, magazines, and books.

- **Practical passages** are functional materials that instruct or advise the reader—for example, directions, reference tools, or reports.

The main difference among the passages used for grades 3 through 8 and 10 is their degree of complexity, which results from increasing levels of sophistication in language and concepts, as well as passage length. Measured Progress uses a variety of readability formulas to aid in the selection of passages appropriate for the intended audience. In addition, Montana teachers contribute to the selection of passages for each level using their specific grade-level expertise.

Items related to these passages require students to demonstrate their skills in both literal comprehension, where the answer is stated explicitly in the text, and inferential comprehension, where the answer is implied by the text and/or the text must be connected to relevant prior knowledge to determine an answer. Items focus on the reading skills reflected in the content standards and require students to use reading skills and strategies to answer correctly—for example, how to identify the author’s principal purpose, such as to persuade, entertain, or inform—and to demonstrate their understanding of how words and images communicate to readers. **Tables 2-4 and 2-5** depict passage distribution and length in grades 3 through 8 and 10.

**Table 2-4. 2011–12 Montana CRT:
Reading Passage Distribution Grades 3–8 and 10**

Passage Type	Passage Content	Percent of Test	Point Distribution
Literary	Stories, poetry, and other forms of literature	50%	30 points
Informational	Content and practical passages	50%	30 points
Total			60 points
Passage Length	Passage Type	Percent of Test	Point Distribution
Long	One literary or one informational per session	53%	32 points
Short	At least one literary and informational per session	47%	28 points
Total			60 points

**Table 2-5. 2011–12 Montana CRT:
Approximate Length of Reading Passages**

Grade	Long Passage (Number of Words)	Short Passage (Maximum Word Length)
3	350–800	350
4	400–850	400
5	450–850	450
6	450–900	450
7	450–950	450
8	500–1,000	500
10	550–1,200	550

While every attempt is made to adhere to recommended grade-level word counts for long and short passages, the final decision to select a passage is based on extensive reviews by content area experts and bias

panels, careful analysis of the sophistication of language and complexity of concepts in the passage, and the readability of the passage.

2.3 MATHEMATICS TEST SPECIFICATIONS

2.3.1 Standards

The mathematics specifications/blueprint is based on Montana’s mathematics content standards:

- Mathematics Standard 1: Problem Solving
- Mathematics Standard 2: Numbers and Operations
- Mathematics Standard 3: Algebra
- Mathematics Standard 4: Geometry
- Mathematics Standard 5: Measurement
- Mathematics Standard 6: Data Analysis, Probability, and Statistics
- Mathematics Standard 7: Patterns, Relations, and Functions

2.3.2 Item Types

The Montana CRT in mathematics includes multiple-choice, short-answer, and constructed-response items. Short-answer items require students to perform a computation or solve a simple problem. Constructed-response items are more complex, requiring 8 to 10 minutes of response time. Each type of item is worth a specific number of points in the student’s total mathematics score, as shown in [Table 2-6](#).

Table 2-6. 2011–12 Montana CRT: Item Types

Item Type	Possible Score Points
MC	0 or 1
SA	0 or 1
CR	0, 1, 2, 3, or 4

MC = multiple-choice; SA = short-answer; CR = constructed-response

2.3.3 Test Design

[Table 2-7](#) summarizes the numbers and types of items that were used to construct the common portion of the Montana CRT in mathematics for [2011–12](#).

Table 2-7. 2011–12 Montana CRT: Common Mathematics Items

Session	Calculator	Number of Items Grades 3, 4, 5	Calculator	Number of Items Grades 6, 7, 8, 9, 10
1	Not Allowed	18 MC 2 SA 1 CR	Not Allowed	14 MC 3 SA 1 CR
2	Not Allowed	19 MC 1 SA	Allowed	21 MC
3	Allowed	18 MC 1 CR	Allowed	20 MC 1 CR

MC = multiple-choice; SA = short-answer; CR = constructed-response

2.3.4 Blueprints (Distribution of Points across Standards)

Table 2-8 shows the distribution of points across the content standards.

**Table 2-8. 2011–12 Montana CRT:
Mathematics Specifications/Blueprint**

Content Standards	Raw Score (Percent Point Distribution by Content Strand)*						
	Grade 3	Grade 4	Grade 5	Grade 6	Grade 7	Grade 8	Grade 10
Problem Solving and Number and Operations	34%(22)	34%(22)	32%(21)	32%(21)	27%(18)	27%(18)	20%(13)
Algebra	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)	16%(11)
Geometry	15%(10)	15%(10)	16%(11)	16%(11)	18%(12)	18%(12)	20%(13)
Measurement	15%(10)	15%(10)	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)
Data Analysis, Probability, and Statistics	12%(8)	12%(8)	15%(10)	15%(10)	18%(12)	18%(12)	20%(13)
Patterns, Relations, and Functions	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)	12%(8)

*Because percents are rounded to the nearest whole number, not all sums add up to 100%.

The mathematics test design consists of 55 multiple-choice items, three one-point short-answer items, and two four-point constructed-response items for 66 total points. There are two types of one-point items: multiple-choice and short-answer. The number of one-point items per strand will vary from year to year depending on which two strands are measured by the four-point items.

2.3.5 Depth of Knowledge

Each item on the Montana CRT in mathematics is assigned a depth of knowledge (DOK) level according to the cognitive demand of the item. Depth of knowledge is not synonymous with difficulty. The depth of knowledge level rates the complexity of the mental processing a student must use to solve a problem. Each of the levels is described below:

- **Level 1 (Recall).** This level requires the recall of a fact, definition, term, or simple procedure; the application of a formula; or the performance of a straight algorithmic procedure. Items at this level may require students to demonstrate a rote response.
- **Level 2 (Skill/Concept).** This level requires mental processing beyond that of a habitual response. These items often require students to make some decisions about how to approach a problem.
- **Level 3 (Strategic Thinking).** This level requires students to develop a plan or sequence of steps. These items are more complex and abstract than the items at the previous two levels. These items may also have more than one possible answer and may require students to use evidence, make conjectures, or justify their answers.

It is important that the Montana CRT in mathematics measure a range of depths of knowledge. Table 2-9 shows the percent and point ranges of the three depth of knowledge levels used on the CRT in mathematics.

**Table 2-9. 2011–12 Montana CRT:
Depth of Knowledge (DOK) Percent and Distribution by Level**

<i>DOK Level</i>	Percent Range	Point Range
1	20% to 30%	13 to 20 points
2	60% to 75%	39 to 50 points
3	5% to 10%	4 to 8 points

2.3.6 Use of Calculators

Montana educators who helped develop the Montana CRT acknowledged the importance of mastering arithmetic algorithms. At the same time, they understood that the use of calculators is a necessary and important skill in society today. Calculators can save time and prevent error in the measurement of some higher-order thinking skills and allow students to do more sophisticated and intricate problems. For these reasons, calculators were permitted on some parts of the Montana CRT in mathematics and prohibited on other parts. (Students were allowed to use any calculator with which they were familiar.)

2.4 SCIENCE TEST SPECIFICATIONS

2.4.1 Standards

The science specifications are based on Montana’s science content standards:

- **Science Standard 1:** Scientific Investigations—Students, through the inquiry process, demonstrate the ability to design, conduct, evaluate, and communicate results and reasonable conclusions of scientific investigations.
- **Science Standard 2:** Physical Science—Students, through the inquiry process, demonstrate knowledge of properties, forms, changes, and interactions of physical and chemical systems.
- **Science Standard 3:** Life Science—Students, through the inquiry process, demonstrate knowledge of characteristics, structures and function of living things, the process and diversity of life, and how living organisms interact with each other and their environment.
- **Science Standard 4:** Earth/Space Science—Students, through the inquiry process, demonstrate knowledge of the composition, structures, processes, and interactions of Earth’s systems and other objects in space.
- **Science Standard 5:** Impact on Society—Students, through the inquiry process, understand how scientific knowledge and technological developments impact communities, cultures, and societies.
- **Science Standard 6:** Historical Development—Students understand historical developments in science and technology.

2.4.2 Item Types

The CRT in science includes multiple-choice and constructed-response items. Multiple-choice items require students to select the correct response from four choices, each item taking an average of one minute to answer. Constructed-response items are more involved, requiring 8–10 minutes of response time. Each type of item is worth a specific number of points in the student’s total science score, as shown in Table 2-10.

Table 2-10. 2011–12 Montana CRT: Item Types

<i>Item Type</i>	<i>Possible Score Points</i>
MC	0 or 1
CR	0, 1, 2, 3, or 4

MC = multiple-choice; CR = constructed-response

2.4.3 Test Design

Table 2-11 summarizes the numbers and types of items that were used to compute student scores on the 2011–12 Montana CRT in science. Additionally, each test form had 13 multiple-choice field-test items and one constructed-response field-test item that did not affect student scores.

Table 2-11. 2011-12 Montana CRT: Science Items

<i>Grades</i>	<i>Session 1</i>	<i>Session 2</i>	<i>Session 3</i>	<i>Total</i>	
				<i>MC</i>	<i>CR</i>
4, 8, and 10	17 MC, 1 CR	18 MC	18 MC, 1 CR	53	2

MC = multiple-choice; CR = constructed-response

2.4.4 Blueprints (Distribution of Points across Standards)

Table 2-12 shows the distribution of points and item types across the content standards.

**Table 2-12. 2011-12 Montana CRT: Science Specifications/Blueprint—
Grades 4, 8, and 10**

<i>Montana Standards</i>	<i>Point Distribution by Content Standard</i>	
	<i>Percent</i>	<i>Number</i>
1. Scientific Investigations	23%	14
2. Physical Science	23%	14
3. Life Science	23%	14
4. Earth/Space Science	23%	14
5. Impact on Society		
6. Historical Development	8%	5

The science test design consists of 53 multiple-choice items and 2 four-point constructed-response items for 61 total points. In any given year, the 2 constructed-response items will measure two different standards. From year to year, those standards may change.

2.4.5 Depth of Knowledge

Each item on the Montana CRT in science is assigned a depth of knowledge (DOK) level. The depth of knowledge level reflects the complexity of mental processing students use to answer an item. Depth of knowledge is not synonymous with difficulty. Each of the levels is described below.

- **Level 1 (Recall).** This level requires the recall of information such as a fact, definition, term, or simple procedure. These items require students only to demonstrate a rote response, use a well-known formula, or follow a set procedure.
- **Level 2 (Skill/Concept).** This level requires mental processing beyond that of recalling or reproducing a response. These items require students to make some decisions about how to approach the item.
- **Level 3 (Strategic Thinking).** This level requires reasoning, planning, and using evidence. These items require students to handle more complexity and abstraction than items at the previous two levels.

It is important that the Montana CRT in science measures a range of depths of knowledge. Table 2-13 shows the percent and point ranges of the three depth of knowledge levels used on the CRT in science.

Table 2-13. 2011-12 Montana CRT: Depth of Knowledge (DOK) Percent and Distribution by Level

<i>DOK Level</i>	<i>Percent Range</i>	<i>Point Range</i>
1	21% to 28%	13 to 17 points
2	52% to 66%	32 to 40 points
3	13% to 20%	8 to 12 points

2.4.6 Use of Calculators and Reference Sheets

Calculators are not used or needed when taking the science tests. There are no science reference sheets.

2.5 TEST DEVELOPMENT PROCESS

2.5.1 Item Development

Items used on the Montana CRT are developed and customized specifically for use on the Montana CRT and are consistent with Montana content standards, benchmarks, and grade-level expectations. Measured Progress test developers work with Montana educators to verify the alignment of items to the appropriate Montana content standards.

The development process combined the expertise of Measured Progress test developers and committees of Montana educators to help ensure items meet the needs of the CRT program. All items used on the common portions of the Montana CRT program were reviewed by a committee of Montana content area experts, as well as a committee of Montana bias experts. Tables 2-14 through 2-17 show the numbers of items developed within each content area for the 2011–12 Montana CRT.

**Table 2-14. 2011–12 Montana CRT: Total Numbers of Items Developed by Content Area—
Grades 3–8 and 10**

<i>Grade</i>	<i>Mathematics</i>	<i>Reading</i>	<i>Science</i>
3	76	129–148	
4	76	129–148	78
5	76	129–148	
6	76	129–148	
7	76	129–148	
8	76	129–148	78
10	76	129–148	78

**Table 2-15. 2011–12 Montana CRT: Annual Reading Item Development—
Grades 3–8 and 10**

<i>Passages</i>	<i>MC</i>	<i>CR</i>
3 long passages	63–72	6
5 short passages	60–70	0
8 total passages		

MC = multiple-choice; CR = constructed-response

**Table 2-16. 2011–12 Montana CRT: Annual Mathematics Item Development—
Grades 3–8 and 10**

<i>MC</i>	<i>SA</i>	<i>CR</i>
420	56	56

MC = multiple-choice; SA = short-answer;
CR = constructed-response

**Table 2-17. 2011-12 Montana CRT: Annual Science Item Development—
Grades 4, 8, and 10**

<i>MC</i>	<i>CR</i>
75	3

MC = multiple-choice; CR = constructed response

Table 2-18 provides an overview of the item development process for common and field-test items, including the administration of the operational tests.

Table 2-18. 2011–12 Montana CRT: Item Development Process Overview

<i>Development Step</i>	<i>Step Details</i>
Selection of reading passages and external review for bias and sensitivity issues (November 2010)	Measured Progress test developers located potential reading passages. Reading passages were reviewed for bias and sensitivity issues before the development of reading items.
Development of items (November 2010 through March 2011)	Measured Progress test developers developed reading and mathematics items.
Items reviewed for content appropriateness and for bias and sensitivity issues (April 2011)	Committees of Montana educators reviewed reading, mathematics, and science field-test items.
Edit items (summer 2011)	Montana educators' recommended changes were incorporated into the items.
Field-test items (spring 2012)	Embedded field-test items were administered to a sample of students (minimum of 2,500 students per item) along with the 2009 operational test.
Item selection (July 2011)	Measured Progress test developers selected common items for the spring 2012 operational CRT tests.
Operational test items (March 2012)	Items are part of the common item set and were used to determine student scores. Another embedded field test was also administrated.

2.5.2 Item Reviews at Measured Progress

A test developer within each content area reviewed items for

- item integrity, including content and structure, appropriateness to designated content area, format, clarity, possible ambiguity, and single correct answer.
- appropriateness and quality of reading selections and graphics.
- appropriateness of scoring guide descriptions and distinctions.
- whether the item is measuring the intended content standard.
- completeness of associated item documentation (e.g. scoring guide, content area codes, key, grade level, depth of knowledge, and contract identified).
- appropriateness for the designated grade level.

2.5.3 Item Reviews at State Level

All passages and items were reviewed in Montana. In November 2010, the Montana Passage Bias and Sensitivity Review Committee met to review passages that would be developed for the 2011–12 CRT administration. The committee consisted of teachers and education specialists from across the state. In April 2011, Montana educators from across the state reviewed field-test items for content appropriateness, alignment to standards, depth of knowledge, and grade-level appropriateness.

2.5.4 Bias and Sensitivity Review

Bias review is an essential component of the development process. During the bias review process, reading passages and items from all content areas were reviewed by a committee of Montana educators. Items were examined for issues that might offend or dismay students, teachers, or parents. Including such groups in the development of assessment items and materials can avoid many controversial issues, and concerns can be allayed before the test forms are produced.

2.5.5 Reviewing and Refining

Recommended changes from the Item Review and Bias and Sensitivity meetings were incorporated into the items by Measured Progress test developers.

2.5.6 Item Editing

Measured Progress editors then reviewed and edited the items to ensure adherence to sound testing principles and to style guidelines in the Chicago Manual of Style, 15th edition. These principles include the stipulations that items

- demonstrate correct grammar, punctuation, usage, and spelling;
- are written in a clear, concise style;
- contain unambiguous explanations that tell students what is required to attain a maximum score;
- are written at a reading level that allows students to demonstrate their knowledge of the subject matter being tested regardless of reading ability;
- exhibit high technical quality regarding psychometric characteristics;
- have appropriate answer options or score-point descriptors; and
- are free of potentially insensitive content.

2.5.7 Item Selection and Operational Test Assembly

In July 2011, Measured Progress test developers selected common items. In preparation for test construction, test developers and psychometricians at Measured Progress considered the following in selecting sets of items to propose for the common item set to be used on the 2012 assessment:

- **Content coverage/match to test design and blueprints.** The test designs and blueprints stipulate a specific number of multiple-choice and constructed-response items for each content area. Item selection for the embedded field test was based on the number of items in the existing pool of items that are eligible for the common. In addition, item selection for the embedded mathematics and reading field test included items aligned to the Montana Common Core State Standards for release.
- **Item difficulty and complexity.** Item statistics drawn from the data analysis of previously field-tested items were used to ensure similar levels of difficulty and complexity from year to year as well as quality psychometric characteristics.
- **“Cueing” items.** Items were reviewed for any information that might “cue” or provide information that would help to answer another item.

At the meeting, the Montana educators reviewed the proposed sets of items and made the final selection of items for the common.

The test developers then sorted and laid out the items into test forms. During assembly of the test forms, the following criteria were considered:

- **Key patterns.** The sequence of keys (correct answers) was reviewed to ensure that their order appeared random.
- **Option balance.** Items were balanced across forms so that each form contained a roughly equivalent number of key options (As, Bs, Cs, and Ds).
- **Page fit.** Item placement was modified to ensure the best fit and arrangement of items on any given page.

- **Facing-page issues.** For multiple items associated with a single stimulus (reading passages) and multiple-choice items with large graphics, consideration was given to whether those items needed to begin on a left- or right-hand page and to the nature and amount of material that needed to be placed on facing pages. These considerations served to minimize the amount of page flipping required of students.
- **Relationships among forms.** Although field-test items differ from form to form, these items must take up the same number of pages in all forms so that sessions begin on the same page in every form. Therefore, the number of pages needed for the longest form often determines the layout of each form.
- **Visual appeal.** The visual accessibility of each page of the form was always taken into consideration, including such aspects as the amount of “white space,” the density of the test, and the number of graphics.

2.5.8 Operational Test Draft Review

After the forms were laid out as they would appear in the final test booklets, the forms were again thoroughly reviewed by Measured Progress editors to ensure that the items appeared exactly as intended. Any changes made during test construction were reviewed and approved by the test developer.

2.5.9 Alternative Presentations

Form 1 for the grades 3 through 8 and 10 tests was translated into Braille by National Braille Press, a subcontractor that specializes in test materials for blind and visually impaired students. In addition, Form 1 for each grade was adapted into a large-print version.

2.6 TEST SESSIONS

The Montana CRT was administered during the spring of 2012 during a four-week period from February 29, 2012 to March 23, 2012. Reading and mathematics tests were administered in grades 3 through 8 and 10, and science tests were administered in grades 4, 8, and 10. Schools were able to schedule testing sessions at any time during the four-week period, provided they followed the sequence detailed in the scheduling guidelines in the *Test Administrator’s Manual*. Schools were asked to schedule makeup tests for students who were absent from initial test sessions during the testing window.

CHAPTER 3. TEST ADMINISTRATION

3.1 RESPONSIBILITY FOR ADMINISTRATION

As indicated in the *Test Coordinator's Manual*, school system test coordinators, school principals and/or their designated school test coordinators are responsible for the proper administration of the CRT. This report was used to ensure the uniformity of administration procedures from school to school.

3.2 ADMINISTRATION PROCEDURES

School test coordinators were instructed to read the *Test Coordinator's Manual* prior to testing and to be familiar with the instructions given in the *Test Administrator's Manual*. The *Test Coordinator's Manual* provides each school with checklists to help prepare for testing. The checklists outline tasks to be performed before, during, and after test administration. In addition to providing these checklists, the *Test Coordinator's Manual* outlines the nature of the testing materials sent to each school, how to inventory the materials, how to track the materials during administration, and how to return the materials once testing is complete. The *Test Coordinator's Manual* also contains information about including or excluding students. The *Test Administrator's Manual* includes checklists for administrators to prepare themselves, their classrooms, and their students for administration of the test. The *Test Administrator's Manual* contains sections that detail the procedure to be followed for each test session, and it contains instructions for preparing the materials prior to giving them to school test coordinators for return to Measured Progress.

The Montana CRT is an untimed assessment; however, guidelines or ranges were provided in the *Test Coordinator's Manual* and the *Test Administrator's Manual* based on the following estimates of the time it takes an average student to respond to each type of item on the test:

- Multiple-choice items—1 minute per item
- Short-answer items—2 minutes per item
- Constructed-response items—10 minutes per item

The provided guidelines suggested scheduling 45–55 minutes per test session (50–60 minutes for grade 10 students). The guidelines also suggested scheduling a break between each of the three sessions in each content area to prevent fatigue.

While the guidelines for scheduling were based on the assumption that most students would complete the test within the estimated amounts of time, each test administrator was asked to allow additional time for students who needed extra time to complete the test. If classroom space was not available for this purpose, schools were encouraged to use another space, such as a guidance office. If other areas were not available, the

guidelines recommended scheduling each classroom used for test administration for the maximum possible amount of time.

3.3 PARTICIPATION REQUIREMENTS AND DOCUMENTATION

All students were expected to participate in the CRT; however, the scores of students in the following categories were excluded from the calculation of averages:

- foreign exchange students
- students not enrolled in an accredited Montana school (for example, home-schooled students)
- students enrolled in a private accredited school
- students enrolled in a private non-accredited school
- students enrolled in a private non-accredited Title 1 school
- students enrolled part-time (less than 180 hours) taking a mathematics or reading course
- first year in U.S. LEP students who were required to participate in the mathematics assessment only
- students who took the CRT using a “nonstandard” accommodation

A summary of this information is shown in Table 3-1, which was published in the *Test Administrator’s Manual* and the *Test Coordinator’s Manual*.

Table 3-1. 2011–12 Montana CRT: Summary of Eligibility for Exclusion from the CRT

<i>Excluded from Averages</i>	<i>MUST Participate</i>	<i>MAY Participate</i>
Foreign exchange students	Yes	
Students not enrolled in an accredited Montana school		Yes
Students enrolled in a private accredited school	Yes	
Students enrolled in a private non-accredited school		Yes
Students enrolled in a private non-accredited Title I school		Yes
Students enrolled part-time (less than 180 hours) taking a mathematics or reading course		Yes
Reading: first year in U.S. LEP students		Yes
Mathematics: first year in U.S. LEP students	Yes	

Staff members coded information about exclusion, if applicable; in the student response booklet after testing was completed. The *Test Coordinator’s Manual* and *Test Administrator’s Manual* provide detailed instructions for coding exclusions and accommodations. In addition, testing exclusions were discussed thoroughly in the pre-administration training audio CD (see Appendix A: Reporting Decision Rules).

A summary of participation on the 2011–12 Montana CRT by demographic category for each content area is shown in Appendix B.

3.3.1 Students with Disabilities

All students with special needs participate in the CRT assessment program, either by taking the regular CRT or CRT-Alternate Assessment if they meet the eligibility criteria.

Form 1 for the grades 3 through 8 and 10 tests was enlarged to 18-point font for visually impaired students and was translated into Braille by National Braille Press, a subcontractor that specializes in test materials for blind students. Students with special needs and LEP students are often given these test accommodations.

3.4 ADMINISTRATOR TRAINING

The OPI hosted a test-administration workshop in Helena, Montana, on January 18–19, 2012. The workshop was well attended, but attendance of system and school test coordinators was not mandatory. OPI and Measured Progress staff members hosted six sessions that covered test accommodations, student information system (AIM) updates, CRT materials and administration, CRT-Alternate materials and administration, online reporting, and test security.

In addition to the workshop and the distribution of the *Test Coordinator's Manual* and *Test Administrator's Manual*, the OPI and Measured Progress produced the PowerPoint presentation, “Spring 2012: CRT and CRT-ALT Overview and Update of System and School Test Coordinators.” Training materials and the PowerPoint presentation were posted on the OPI's Web site: <http://www.opi.mt.gov>. The training PowerPoint presentations provided the training information for system and school test coordinators who were unable to attend the administration workshops. The PowerPoint presentations also served as useful tools for training both system and school personnel.

3.5 DOCUMENTATION OF ACCOMMODATIONS

The *2012 CRT Accommodations Manual* and the accommodations training PowerPoint, *Guidelines and Procedures for CRT Accommodations*, were produced by the OPI and were included on the CRT training CD provided to each system and school in the first shipment received by systems in early February from Measured Progress. General instructions regarding accommodation usage and a list of available accommodations were included in the *2012 Test Coordinator's Manual*.

Standard accommodations were available to all students on the basis of individual needs and regardless of disability status. Decisions regarding standard accommodations were made by the student's educational team on an individual basis, consistent with either previous accommodation decisions for the student or current educational needs. Accommodations usage was to be consistent with those used during the student's regular classroom instruction and assessment for at least three months prior to testing.

Nonstandard accommodations were offered to students with disabilities only if the accommodations were specified in the student’s IEP. If a student was assessed with a nonstandard accommodation, the student was considered a nonparticipant when calculating the participation rate for AYP purposes. In addition to the student being considered a nonparticipant, the student’s score from the assessment was not included in calculating the proficiency rate for AYP.

Table 3-2 below shows the number of students at each subject and grade who were tested with and without accommodations. In addition, frequencies of accommodations used by accommodation type are presented in Appendix C.

Table 3-2. 2011–12 Montana CRT: Number of Students Tested With and Without Accommodations by Subject and Grade

Subject	Grade	Number of Students Tested	
		With Accommodations	Without Accommodations
Mathematics	3	1,697	8,910
	4	1,702	8,834
	5	1,569	9,024
	6	1,391	8,984
	7	1,034	9,590
	8	975	9,543
	10	596	9,543
Reading	3	1,663	8,913
	4	1,618	8,909
	5	1,563	9,013
	6	1,388	8,981
	7	1,038	9,587
	8	981	9,558
Science	10	612	9,551
	4	1,537	9,000
	8	949	9,582
	10	611	9,544

3.6 TEST SECURITY AND ADMINISTRATION IRREGULARITIES

Test coordinators and administrators are prohibited from disclosing the contents of CRT assessments.

Under no circumstances should test booklets or marked answer booklets be circulated among faculty, administrators, or other persons.

All system test coordinators and school principals received the *OPI Guidelines and Procedures for Test Security*. This OPI publication was made available to system superintendents, principals, and test administrators for the purpose of outlining the reporting procedures for security and administration violations. All concerns about breaches of test security or noncompliance with test administration procedures were to be reported immediately to the principal, system test coordinator, and state assessment director.

3.7 TEST ADMINISTRATION WINDOW

The Montana CRT was administered during the spring of 2012 during a four-week period from February 29, 2012 to March 23, 2012. Reading and mathematics tests were administered in grades 3 through 8 and 10, and science tests were administered in grades 4, 8, and 10. Schools were able to schedule testing sessions at any time during the four-week period, provided they followed the sequence detailed in the scheduling guidelines in the *Test Administrator's Manual*. Schools were asked to schedule makeup tests for students who were absent from initial test sessions during the testing window.

3.8 SERVICE CENTER

To address testing concerns, Measured Progress established a help desk dedicated to the Montana CRT. Service Center support is an essential element to the successful administration of large-scale assessments. It provides a central location that individuals in the field can call via a toll-free number to request assistance, report problems, or ask specific questions.

The Measured Progress help desk provided support during all phases of the testing window. It was staffed at varying levels, based on need and the volume of calls received, from 8:00 a.m. to 4:00 p.m. MST. At a minimum, the help desk consisted of a product support specialist responsible for receiving, responding to, and tracking calls and e-mails, and routing issues to the appropriate person(s) for resolution. In addition, the program manager and/or program assistant addressed communications that required a higher level of program support.

During the period between February 24, 2012, when the testing materials were delivered to schools, and April 6, 2012 when the materials were returned to Measured Progress, the Service Center received 94 calls. The majority of these calls were to order additional materials for students who enrolled after materials were shipped and to arrange for UPS to pick up the materials after testing. The service center staff also responded to administration questions and referred policy questions regarding test security or accommodations usage to the OPI.

CHAPTER 4. SCORING

Accurate and timely scoring of constructed-response (CR), short-answer (SA), and multiple-choice (MC) items is an important process in any successful assessment program. This chapter defines the scope and processes of Measured Progress's scoring services for the 2011–12 Montana CRT.

4.1 MACHINE-SCORED ITEMS

Preceding the arrival of the Montana CRT student response booklets, Measured Progress prepared customized scanning programs to enable selective reading of all scannable materials including student identification and demographics and to electronically format the scanned information.

Once the student answer documents were received from each Montana school following test administration, Measured Progress optically scanned each page from every student booklet to create digital images of the entire document. Every page was bar coded so that the scores applied to each item could be linked to the correct student, school, and district. Student responses were then imported into iScore™, Measured Progress's proprietary, image-based scoring system, for secure processing and scoring. By using this image scoring system, Measured Progress was able to increase reliability and productivity as well as monitor and maintain quality control.

Student multiple-choice response data was machine-scored at the same time that student constructed-response and short-answer items were scanned into iScore for person-scoring. Multiple-choice items were compared to scoring keys via item analysis software. Correct multiple-choice answers were assigned a score of one point and incorrect answers were assigned zero points. Student multiple-choice responses consisting of multiple marks and blank responses were also assigned zero points.

Student responses that could not physically be scanned (e.g., documents damaged during administration or shipment) were physically reviewed and scored on an individual basis by trained, qualified staff. These scores were linked to the student's demographic data and merged with the student's scoring file by Measured Progress's data processing department.

Table 4-1. 2011–12 Montana CRT: Number of Responses Scanned and Scored

<i>Content Area</i>	<i>Grade</i>	<i>Number of Responses Scanned and Scored</i>
Mathematics	3	88,050
	4	88,002
	5	87,986
	6	85,914
	7	87,781
	8	86,822
	10	85,026
Reading	3	33,275
	4	33,257
	5	33,251
	6	32,474
	7	33,251
	8	33,272
	10	32,141
Science	4	33,050
	8	33,272
	10	32,141

4.2 PERSON-SCORED ITEMS

Scanned images of open-response items were processed and organized into item-specific groups in preparation for person-scoring by iScore. iScore’s secure, Web-based application provided qualified staff, including readers and their leadership, password-protected access for reading and scoring electronic student responses at one or multiple scoring sites without compromising confidentiality. The digital image clip information of constructed-response and short-answer responses allowed iScore to replicate student responses just as they appeared on the originals and to display the replicated responses on individual monitors for person-scoring. In addition, the processes of item benchmarking, reader training, scoring, editing/cleanup, and reporting were all accomplished electronically and without further reference to the originals.

Organized by iScore in this way, qualified readers were able to view only one response from a single item at a time. Because item responses were tracked and distributed among groups of readers by iScore, each response in an individual student’s response booklet could be assigned to and scored by a different reader. This maximization of the number of readers per student response booklet effectively minimized bias errors caused by reader sampling.

Leadership staff, on the other hand, had constant, albeit view-only, access to all of the imaged responses from a student’s booklet for whenever necessary. The actual test booklets and answer documents were also available to the content area chief reader and the iScore operational manager (see section on “Scoring Location and Staff”).

To ensure the security of constructed-response and short-answer items and responses scored, all scoring activities in iScore were performed “blind,” i.e., without student names, district, and/or school information visible or able to be associated with responses or raw scores. During scoring, iScore distributed images of student responses to the computer monitors of readers located at one of Measured Progress’s scoring facilities. When iScore sent an image of a student response to an individual reader’s computer monitor, the reader evaluated the response and recorded the score via keypad or mouse entry. Once the score was entered, a new response appeared immediately on the screen.

Although iScore is based on conventional, best practice scoring procedures, it also offers the following benefits:

- It provides leadership staff with real-time information about group and individual level performance including scoring accuracy and consistency as well as overall process monitoring and reporting.
- It ensures the randomized distribution of student responses among readers during scoring and automatically assigns student responses to one or more scorers for interrater agreement monitoring.
- It permits password-only access limited to those solely in the employ of Measured Progress and working within a qualified scoring or scoring management capacity.
- It maintains student anonymity and confidentiality by masking student biographical information from viewers.
- It offers immediate access to samples of student responses and scores for reporting and analysis.
- It offers early access to subsets of data for tasks such as standard setting.
- It reduces material handling, which saved time and labor while enhancing the security of materials.

The iScore database, its control operation, and its administrative offices are all based in Dover, New Hampshire. The iScore system monitored accuracy, reliability, and consistency across all Measured Progress scoring facilities. To ensure that scoring information and updates were equally shared and implemented across all scoring facilities, constant communication and coordination was accomplished daily via e-mail, telephone, fax, and secure, Web-based networks.

4.2.1 Scoring Location and Staff

Scoring Location

Scoring the 2011–12 Montana CRT program took place at Measured Progress’s scoring facilities located in Longmont, Colorado, and Menands, New York. The overview of scoring operations is presented by content area and grade in Table 4-2.

Table 4-2. 2011–12 Montana CRT: Scoring Locations by Content and Grade

<i>Content</i>	<i>Grade</i>	<i>Longmont, CO</i>	<i>Menands, NY</i>
Mathematics	3	X	
	4	X	
	5	X	
	6	X	
	7	X	
	8	X	
	10	X	
Reading	3	X	
	4	X	
	5	X	
	6	X	
	7	X	
	8	X	
Science	4		X
	8		X
	10		X

Scoring Staff

Staffing for the 2011–12 Montana CRT implemented low scoring-leadership-to-reader ratios and was composed of the following Measured Progress staff members:

- Scoring project manager, who oversaw the overall contract from a scoring perspective and acted as a liaison with contract management staff, data analysis staff, and the client while managing the content area experts (chief readers, quality assurance coordinators, etc.).
- Chief readers, who prepared benchmarking/training materials and led the review and client approval of materials, working closely together with Measured Progress development specialists and Montana educators. Chief readers trained, qualified, and monitored readers during the scoring process; supervised quality assurance coordinators, senior readers, and readers; and monitored scoring accuracy and consistency. The ratio of chief readers to the scoring project manager was three to one.
- Quality assurance coordinators (QACs), who managed the training and benchmarking of grades and items within the Montana CRT. QACs trained, qualified, and monitored readers during the scoring process; supervised senior readers and readers; and monitored scoring accuracy and consistency. The ratio of QACs to chief readers was seven to one.

- Senior readers (SRs), who supervised readers during the scoring process and monitored scoring accuracy and consistency while managing quality control measures via iScore. The ratio of SRs to QACs was one to one.
- Readers, who were qualified, temporary staff members performing the bulk of scoring work, evaluating and scoring student responses according to the Montana CRT guidelines provided for each grade level and content area scored. Readers received the same orientation and training as direct hires. The ratio of readers to SRs was nine to one.

4.2.2 Reader Recruitment and Qualifications

In preparation for scoring the 2011–12 Montana CRT, Measured Progress actively sought and recruited readers to represent a diverse spectrum of educational, professional, and ethnic populations. The customary cross-section of readers employed included content area specialists such as editors, business professionals, scientists, authors, graduate school students, and both current and retired educators.

Although the employment of readers holding a four-year college degree or higher was preferred, all readers were required to have successfully completed a minimum of at least two years of college and to have demonstrated knowledge of the content area they scored. All readers were required to submit documentation (i.e., college transcript and/or resume) of their qualifications.

For training and qualification, readers were placed at grade levels and in content areas that matched their areas of experience and expertise. Reader demographic information (gender, educational, and ethnic background, etc.) was electronically documented for reporting. All readers were subject to stringent nondisclosure requirements and supervision and were required to sign a nondisclosure/confidentiality agreement. Table 4-3 summarizes the educational credentials of the 2011–12 Montana CRT readers and QACs.

Table 4-3. 2011–12 Montana CRT: Education Credentials of Readers and QACs

	<i>Description</i>	<i>Longmont, CO</i>	<i>Menands, NY</i>	<i>Total</i>	<i>Percent</i>
Readers	Less than 48 college credits	0	0	0	0.0
	48+ college credits	10	0	10	4.4
	Associate's degree	16	4	20	8.8
	Bachelor's degree	104	18	122	54.0
	Master's degree	51	8	59	26.1
	Doctorate	14	1	15	6.6
	Total	195	31	226	100.0
Scoring Leadership	Less than 48 college credits	0	0	0	0.0
	48+ college credits	0	0	0	0.0
	Associate's degree	3	0	3	7.1
	Bachelor's degree	22	4	26	61.9
	Master's degree	10	2	12	28.6
	Doctorate	1	0	1	2.4
	Total	36	6	42	100.0

4.2.3 Methodology for Scoring Polytomous Items

Possible Score Points

The ranges of possible score points for the different polytomous items found on the 2011–12 Montana CRT are shown in Tables 4-4 and 4-5.

Table 4-4. 2011–12 Montana CRT: Short-Answer Item Scoring Guide

<i>Score Point</i>	<i>Description</i>
1	The student's response provides a complete and correct answer.
0	The student's response is totally incorrect or too minimal to evaluate.
B	Blank/no response.

Table 4-5. 2011–12 Montana CRT: Constructed-Response Item Scoring Guide

<i>Score Point</i>	<i>Description</i>
4	The student completes all-important components of the task and communicates ideas clearly. The student demonstrates in-depth understanding of the relevant concepts and/or processes. When instructed to do so, the student chooses more efficient and/or sophisticated processes. When instructed to do so, the student offers insightful interpretations or extensions (e.g., generalizations, applications, and analogies).
3	The student completes the most important components of the task and communicates clearly. The student demonstrates understanding of major concepts even though he/she overlooks or misunderstands some less important ideas or details.
2	The student completes the most important components of the task and communicates those clearly. The student demonstrates that there are gaps in his/her conceptual understanding.
1	The student shows minimal understanding. The student addresses only a small portion of the required task(s).
0	The student's response is totally incorrect or irrelevant.
B	Blank/no response.

Condition Codes

When numerical score-point parameters did not apply to a student response, readers had the option of designating one of the following options:

- Blank response (empty entry without an attempt at responding to the question)
- Unreadable response (response is illegible or too faint to accurately interpret)
- Wrong Location (a relevant response entered into the space reserved for a different item)
- Non-English response (a response written entirely in a language other than English)

Unreadable and Wrong Location responses were resolved by consulting the original test booklet and/or by identifying the correct location.

4.2.4 Reader Training

For each item scored in the 2011–12 Montana CRT, Measured Progress readers were required to demonstrate their scoring ability by participating in training sessions specific to each student response item scheduled to be scored. The scoring project began with an introduction of the onsite scoring staff and an overview of the Montana CRT program’s purpose and goals (including discussion about document security, student confidentiality, the proprietary nature of testing materials, scoring materials, and iScore procedures).

Actual training began with groups of readers organized into content area-, grade-, and item-specific group assignments. Each reader was provided a personal hard copy of item-specific training materials distributed at the beginning of each work session and had to account for these materials during secure collection at the end of each work session. During training, readers were strongly encouraged to take notes and highlight their own hard copies of the training materials.

For each item trained, the QAC assigned to the item commenced reader training by reviewing and discussing the item-specific scoring guide. The training QAC demonstrated the process of applying the item’s scoring guide and score point descriptors to the exemplars found in the subsequent *anchor* and *training sets* before attempting to demonstrate scoring accuracy in the *qualifying set*.

Anchor Set

This is a set of responses approved by the respective content area specialists for reading, mathematics, or science representing the OPI. Each anchor set contained one OPI-approved sample response per score point considered to be a mid-range exemplar. This set occasionally included a second sample response if there was more than one plausible way to illustrate the merits and intent of a score point. Responses in the anchor sets were typical, rather than unusual or uncommon; solid, rather than controversial or borderline; and true, meaning that their scores could not be changed except by the OPI and Measured Progress test development specialists.

Each anchor set response was read aloud to readers by the training QAC. Training QACs facilitated group discussion of responses in relation to the scoring guide and score point descriptors to help readers internalize the typical characteristics of score points. The anchor set served as a reference for readers as they went on to scoring sample responses in the training set that followed.

Training Set

Next, readers practiced applying the scoring guide and anchor set to responses in the training set. The training set typically included 6 to 10 student responses designed to help establish both the full score point range and the variation of possible responses within each score point. The training set often included unusual responses that were less clear or solid (e.g., briefer than normal, employing atypical approaches, simultaneously containing very low and very high attributes, and written in ways difficult to decipher).

Responses in the training set were presented to readers without scores and in a randomized score point order. Once readers had independently read and applied their score to a training set response, the training QAC would poll readers and then announce the actual response score. The QAC then responded to reader questions and/or comments while pointing out particular scoring issues at hand (e.g., the borderline between two score points). Throughout each item training, the QAC continually routed reader discussion of score points back to the anchor set and scoring guide. After the training set had been completed, readers were required to demonstrate scoring accuracy using qualifying sets assembled for constructed-response items.

Qualifying Set

Following participation in each item training session, readers were administered a qualification set of committee-reviewed responses (CRRs) assigned to each item in the reader's content area. Each qualifying set was composed of 10 preselected, previously scored responses chosen as clear illustrations of score point examples that would measure which readers had adequately internalized item training before those readers were able to score live student responses. These CRRs were selected by scoring leadership and randomly distributed to each reader via iScore during qualification.

In order to qualify on a qualification set, readers were required to demonstrate a scoring accuracy level of at least eighty percent (80%) exact agreement (i.e., exactly match scores on at least 8 of the 10 CRRs) and at least ninety percent (90%) exact-or-adjacent agreement (i.e., exactly match or be within one score point on 9 or 10 of the 10 CRRs). In other words, readers were allowed 1 discrepant score (i.e., 1 score out of the 10 CRRs that was more than one score point from the CRR score) provided they had at least 8 exact scores.

Once a group of readers successfully qualified on a particular item, responses for that item in iScore were randomly assigned and presented to them on their computer monitors, one response at a time. Readers unable to qualify on the first qualification set received QAC retraining (see section on "Retraining") and a subsequent opportunity at qualification on a second qualification set. Readers unable to qualify on the second qualification set were not eligible to score that item.

(Note: In order to be eligible to score short-answer mathematics items in grades 3 through 8 and 10, readers were required to qualify on at least one mathematics constructed-response item for that grade.)

Retraining

Readers unable to qualify on the first qualification set received QAC retraining by reviewing their performance in relation to the item training materials. The QAC responded to reader questions and routed discussion of score points back to the anchor set and scoring guide. Readers were then allowed the opportunity at qualification on a second qualification set. Readers unable to qualify on the second qualification set were not eligible to score that item. Table 4-6 depicts the accuracy and qualification percentages of the reader applicants.

Table 4-6. 2011–12 Montana CRT: Scoring Accuracy and Qualification Statistics

Content Area	Grade	Item	Average Percent Exact Agreement		Readers		
			Embedded CR Sets	Double-Blind Scoring	Taking Qualification Sets	Successfully Qualifying	Percent Qualifying
Mathematics	3	23	NA	95.5	NA	NA	NA
		24	NA	90.1	NA	NA	NA
		25	94.6	90.4	16	16	100.0
		48	NA	97.6	NA	NA	NA
		72	94.6	88.7	16	16	100.0
	4	23	NA	95.5	NA	NA	NA
		24	NA	90.1	NA	NA	NA
		25	94.6	90.4	17	17	100.0
		48	NA	97.6	NA	NA	NA
		72	94.6	88.7	17	17	100.0
	5	23	NA	91.5	NA	NA	NA
		24	NA	99.3	NA	NA	NA
		25	86.8	87.4	18	18	100.0
		48	NA	98.6	NA	NA	NA
		72	94.8	86.9	18	18	100.0
	6	18	NA	98.1	NA	NA	NA
		19	NA	98.1	NA	NA	NA
		20	NA	98.6	NA	NA	NA
		23	91.1	90.9	17	16	94.1
		73	94.3	92.1	16	16	100.0
	7	18	NA	98.3	NA	NA	NA
		19	NA	98.0	NA	NA	NA
		20	NA	96.8	NA	NA	NA
		23	87.1	94.7	16	16	100.0
		73	88.5	89.3	16	15	93.8
	8	18	NA	97.3	NA	NA	NA
		19	NA	98.5	NA	NA	NA
		20	NA	98.2	NA	NA	NA
23		95.9	93.9	13	13	100.0	
73		92.9	83.0	13	13	100.0	

continued

Content Area	Grade	Item	Average Percent Exact Agreement		Readers		
			Embedded CR Sets	Double-Blind Scoring	Taking Qualification Sets	Successfully Qualifying	Percent Qualifying
Mathematics	10	18	NA	92.3	NA	NA	NA
		19	NA	91.7	NA	NA	NA
		20	NA	99.5	NA	NA	NA
		23	85.1	88.5	18	17	94.4
		73	83.9	85.9	17	17	100.0
Reading	3	27	92.8	80.3	20	19	95.0
		81	90.5	74.7	19	17	89.5
	4	27	83.6	74.3	20	20	100.0
		81	80.7	72.3	24	20	83.3
	5	27	86.0	67.3	22	19	86.4
		81	82.6	77.4	23	21	91.3
	6	27	84.8	60.1	20	18	90.0
		81	89.8	66.8	22	20	90.9
	7	27	92.5	70.5	21	20	95.2
		81	92.1	68.1	22	21	95.5
	8	27	85.3	73.4	22	22	100.0
		81	86.8	77.8	20	20	100.0
	10	27	90.2	72.1	23	22	95.7
		81	90.2	76.8	22	21	95.5
Science	4	23	82.9	72.9	10	10	100.0
		69	95.5	83.9	10	10	100.0
	8	23	97.1	81.8	16	16	100.0
		69	86.6	79.4	17	17	100.0
	10	23	91.6	91.5	17	17	100.0
		69	93.3	83.2	17	17	100.0

4.2.5 Leadership Training

A core group of scoring leadership staff including QACs and SRs guided and monitored readers throughout the scoring process. Because quality control by QACs and SRs moderated the scoring process and maintained the integrity of scores, the individuals chosen to fill those positions were selected for their accuracy and consistency. In addition, the training QACs assigned to train readers were also selected for their ability to instruct, as well as for their content area specialization.

The purpose of leadership training was to ensure that QACs provided thorough and consistent training and feedback to readers. Chief readers were able to discuss item details and score point rationale within training materials in order to prepare scoring leadership for reader questions. Chief readers trained and reviewed items with QACs, who in turn trained and reviewed items with their SRs. During actual item scoring, QACs trained and supervised readers and monitored SR accuracy and consistency. The SRs, in turn, supervised their own group of readers and monitored reader accuracy and consistency. Similar to readers, scoring leadership who performed quality control measures in iScore were also required to qualify using

qualification sets by demonstrating a scoring accuracy level of at least eighty percent (80%) exact agreement and at least ninety percent (90%) exact-or-adjacent agreement.

4.2.6 Monitoring of Scoring Quality Control

iScore was preprogrammed to monitor individual reader accuracy and scoring consistency among readers on a constant basis. iScore’s use of multiple monitoring techniques was critical to the process of live scoring, allowing readers who met or exceeded accuracy standards to continue scoring. Reader accuracy and consistency was measured in iScore throughout the scoring process using the following methods and tools:

- Embedded Committee-Reviewed Responses (CRRs)
- Read-Behind Scoring
- Double-Blind Scoring
- Reader Arbitration

Embedded Committee-Reviewed Responses

Embedded Committee-Reviewed Responses (Embedded CRRs) are preselected, previously scored responses used to ensure that readers had adequately internalized item training and remained calibrated to the scoring standard during live scoring. Previous to scoring, scoring leadership selected Embedded CRRs for each item and loaded the examples into iScore (“embedded”). Each example represented images of actual student work and appeared no different from live student responses. During the first day of live scoring of each item, iScore randomly distributed 30 Embedded CRRs to each reader. Embedded CRRs were employed for all constructed-response items and enabled scoring leadership to monitor reader accuracy and consistency as gauged by the known scores of the Embedded CRRs.

Readers with a disproportionate number of adjacent and/or discrepant scores in Embedded CRRs were subject to increased monitoring, additional read-behinds, consultation by scoring leadership, and/or retraining by the QAC. Following these measures, it was at the discretion of scoring leadership whether or when the reader could resume scoring. If the individual was allowed to resume scoring, scoring leadership carefully monitored these readers by increasing the number of read-behinds.

Read-Behind Procedures

Read-behind scoring refers to scoring leadership (typically a SR) scoring a response that was recently scored by a reader. The gain was an immediate, real-time snapshot of each reader’s accuracy and consistency during scoring. SRs were required to perform read-behinds on each reader throughout each day and at any point during scoring. This practice was applied to all open-ended item types and performed on all readers as required.

Once called up in iScore by the SR, read-behind responses were selected by iScore and placed into the SR’s read-behind queue. Readers were aware neither of iScore’s selection nor which of their scored responses was to be reviewed by their SR. Likewise, SRs were not aware of the reader’s score when iScore presented each read-behind response for their own review and eventual score. The SR then applied his or her own score to the response before the reader’s score was made viewable in iScore. This SR review and comparison of the two scores created the score of record determination (i.e., the reported score) as follows:

- If the reader and SR applied the same score (exact agreement), no action was necessary; the reader’s score became the score of record.
- If the reader and SR scores differed by 1 point (adjacent), the SR’s score became the score of record, thereby overriding the reader’s score.
- If the reader and SR scores differed by more than 1 point (discrepant), the SR’s score became the score of record, thereby overriding the reader’s score.

Readers with a disproportionate number of adjacent and/or discrepant scores in read-behinds were subject to increased monitoring, additional read-behinds, consultation by scoring leadership, and/or retraining by the QAC. Following these measures, it was at the discretion of scoring leadership whether or when the reader could resume scoring. If the individual was allowed to resume scoring, scoring leadership carefully monitored these readers by increasing the number of read-behinds. Table 4-7 outlines the resolution of reader scores using the read-behind procedure.

Table 4-7. 2011–12 Montana CRT: Examples of Read-Behind Scoring Resolution

<i>Reader Score</i>	<i>QAC/SR Score</i>	<i>Score of Record</i>
4	4	4
4	3	3*
4	2	2*

* QAC/SR’s score.

Double-Blind Scoring

Scoring procedures for both constructed-response and short-answer item types included both single-scoring and double-scoring. Single-scored responses were scored by one reader. Double-scored responses were scored “blindly” by two different readers, unaware of the other’s score. These double-blind scores were monitored for interrater agreement accuracy and scoring consistency. A default minimum setting of two percent (2%) from all open-ended item types was double-blind scored. In addition, responses marked blank, unreadable, and non-English were automatically routed for double-blind scoring. Table 4-8 indicates the frequency for which open-ended item responses from each content area were double-blind scored.

Table 4-8. 2011–12 Montana CRT: Frequency of Double-Blind Scoring by Grade and Content

<i>Grade</i>	<i>Content Area</i>	<i>Responses Double-Blind Scored</i>
3–8, 10	Mathematics	2% minimum
3–8, 10	Reading	2% minimum
4, 8, 10	Science	2% minimum
All	Unreadable responses	100%
All	Blank responses	100%
All	Non-English	100%

Reader Arbitration

When double-blind scores applied by two readers on a single response differed by more than 1 point (a discrepancy), iScore placed the response into an arbitration queue for review and rescoring by the SR. Readers were aware neither of the discrepancy arbitration nor which of their scored responses was to be arbitrated. Likewise, the SR was not aware of either readers’ scores when iScore presented the response for review. It was only after the SR had applied their own score to the response that the readers’ scores were then made viewable. This SR review and rescoring of the response became the score of record, thereby overriding the readers’ scores.

Readers with a disproportionate number of adjacent and/or discrepant scores in double-blind scoring were subject to increased monitoring, additional read-behinds, consultation by scoring leadership, and/or retraining by the QAC. Following these measures, it was at the discretion of scoring leadership whether or when the reader could resume scoring. If the individual was allowed to resume scoring, scoring leadership carefully monitored these readers by increasing the number of read-behinds. Table 4-9 displays the final summary statistics for double-blind scoring.

Table 4-9. 2011–12 Montana CRT: Double Blind Summary Statistics

Content Area	Grade	Responses		
		Number Scored	Double-Blind Scored Number	Percent
Mathematics	3	88,050	2,190	2.5
	4	88,002	2,150	2.4
	5	87,986	1,925	2.2
	6	85,914	2,195	2.6
	7	87,781	2,717	3.1
	8	86,822	2,975	3.4
	10	85,026	3,858	4.5
Reading	3	33,275	1,013	3.0
	4	33,257	835	2.5
	5	33,251	850	2.6
	6	32,474	768	2.4
	7	33,251	793	2.4
	8	33,272	987	3.0
	10	32,141	1,169	3.6
Science	4	33,050	776	2.3
	8	33,272	954	2.9
	10	32,141	1,400	4.4

In the case that the individual was not allowed to resume scoring, however, the content area chief reader had the right to remove (“void”) all of that reader’s scores applied to the item from that day’s work totals. Voided responses in iScore were returned to the response queue and rescored by readers able to maintain the scoring accuracy standard. Table 4-10 summarizes the statistics relevant to voided or blocked readers.

Table 4-10. 2011–12 Montana CRT: Voided or Blocked Reader Statistics

Content Area	Grade	Item	Number of Readers	
			With Voided Scores	NOT Allowed to Continue Scoring*
Mathematics	3	23	0	0
		24	0	0
		25	0	0
		48	0	0
		72	0	0
	4	23	0	0
		24	0	0
		25	0	0
		48	0	0
		72	0	0
	5	23	0	0
		24	0	0
		25	0	0
		48	0	0
		72	5	0

continued

Content Area	Grade	Item	Number of Readers	
			With Voided Scores	NOT Allowed to Continue Scoring*
Mathematics	6	18	0	0
		19	0	0
		20	0	0
		23	0	0
		73	0	0
	7	18	0	0
		19	0	0
		20	0	0
		23	0	0
		73	0	0
	8	18	0	0
		19	0	0
		20	0	0
		23	0	0
		73	0	0
	10	18	0	0
		19	0	0
		20	0	0
		23	0	0
		73	1	0
Reading	3	27	0	0
		81	2	0
	4	27	2	0
		81	18	0
	5	27	0	0
		81	0	0
	6	27	1	0
		81	0	0
	7	27	0	0
		81	0	0
	8	27	1	0
		81	0	0
	10	27	0	0
		81	0	0
Science	4	23	0	0
		69	0	0
	8	23	0	0
		69	1	0
	10	23	0	0
		69	0	0

* Based upon other quality monitoring (read-behinds and double-blinds)

CHAPTER 5. CLASSICAL ITEM ANALYSIS

As noted in Brown (1983), “A test is only as good as the items it contains.” A complete evaluation of a test’s quality must include an evaluation of each item. Both *Standards for Educational and Psychological Testing* (AERA et al., 1999) and *Code of Fair Testing Practices in Education* (2004) include standards for identifying quality items. Items should assess only knowledge or skills that are identified as part of the domain being tested and should avoid assessing irrelevant factors. Items should also be unambiguous and free of grammatical errors, potentially insensitive content or language, and other confounding characteristics. In addition, items must not unfairly disadvantage students in particular racial, ethnic, or gender groups.

Both qualitative and quantitative analyses are conducted to ensure that Montana CRT items meet these standards. Qualitative analyses are described in earlier chapters of this report; this chapter focuses on quantitative evaluations. Statistical evaluations are presented in four parts: 1) difficulty indices, 2) item-test correlations, 3) differential item functioning (DIF) statistics, and 4) dimensionality analyses. The item analyses presented here are based on the statewide administration of the Montana CRT in spring 2012. Note that the information presented in this chapter is based on the items common to all forms, since those are the items on which student scores are calculated. (Item analyses are also performed for field-test items, and the statistics are then used during the item review and form assembly processes for future administrations.)

5.1 CLASSICAL DIFFICULTY AND DISCRIMINATION INDICES

All multiple-choice, constructed-response, and short-answer items are evaluated in terms of item difficulty according to standard classical test theory practices. Difficulty is defined as the average proportion of points achieved on an item and is measured by obtaining the average score on an item and dividing it by the maximum possible score for the item. Multiple-choice and short-answer items are scored dichotomously (correct vs. incorrect), so for these items the difficulty index is simply the proportion of students who correctly answered the item. Constructed-response items are scored polytomously, meaning that a student can achieve a score of 0, 1, 2, 3, or 4. By computing the difficulty index as the average proportion of points achieved, the indices for the different item types are placed on a similar scale, ranging from 0.0 to 1.0 regardless of the item type. Although this index is traditionally described as a measure of difficulty, it is properly interpreted as an *easiness* index, because larger values indicate easier items. An index of 0.0 indicates that all students received no credit for the item, and an index of 1.0 indicates that all students received full credit for the item.

Items that are answered correctly by almost all students provide little information about differences in student abilities, but they do indicate knowledge or skills that have been mastered by most students. Similarly, items that are correctly answered by very few students provide little information about differences in student abilities, but may indicate knowledge or skills that have not yet been mastered by most students. In general, to provide the best measurement, difficulty indices should range from near-chance performance (0.25 for four-

option multiple-choice items or essentially zero for constructed-response or short-answer items) to 0.90, with the majority of items generally falling between around 0.4 and 0.7. However, on a standards-referenced assessment such as the Montana CRT, it may be appropriate to include some items with very low or very high item difficulty values to ensure sufficient content coverage.

A desirable characteristic of an item is for higher-ability students to perform better on the item than lower-ability students. The correlation between student performance on a single item and total test score is a commonly used measure of this characteristic of the item. Within classical test theory, the item-test correlation is referred to as the item’s discrimination, because it indicates the extent to which successful performance on an item discriminates between high and low scores on the test. For constructed-response items, the item discrimination index used was the Pearson product-moment correlation; for dichotomous items (multiple-choice and short-answer), the corresponding statistic is commonly referred to as a point-biserial correlation. The theoretical range of these statistics is -1.0 to 1.0, with a typical observed range from 0.2 to 0.6.

Discrimination indices can be thought of as measures of how closely an item assesses the same knowledge and skills assessed by other items contributing to the criterion total score. That is, the discrimination index can be thought of as a measure of construct consistency.

A summary of the item difficulty and item discrimination statistics for each subject/grade combination is presented in Table 5-1. Note that the statistics are presented for all items as well as by item type (multiple-choice and open-response, which includes both constructed-response and short-answer items). The mean difficulty and discrimination values shown in the table are within generally acceptable and expected ranges.

Table 5-1. 2011–12 Montana CRT: Summary of Item Difficulty and Discrimination Statistics by Subject and Grade

Subject	Grade	Item Type	Number of Items	p-value		Discrimination	
				Mean	Standard Deviation	Mean	Standard Deviation
Mathematics	3	ALL	60	0.68	0.17	0.40	0.08
		MC	55	0.69	0.17	0.39	0.07
		OR	5	0.64	0.17	0.48	0.04
	4	ALL	60	0.67	0.14	0.39	0.09
		MC	55	0.67	0.15	0.38	0.08
		OR	5	0.63	0.10	0.54	0.08
	5	ALL	60	0.62	0.14	0.39	0.10
		MC	55	0.62	0.15	0.38	0.09
		OR	5	0.53	0.08	0.51	0.11
	6	ALL	60	0.59	0.16	0.38	0.11
		MC	55	0.59	0.17	0.36	0.10
			OR	5	0.57	0.13	0.52

continued

Subject	Grade	Item Type	Number of Items	p-value		Discrimination	
				Mean	Standard Deviation	Mean	Standard Deviation
Mathematics	7	ALL	60	0.59	0.16	0.39	0.08
		MC	55	0.60	0.16	0.38	0.07
		OR	5	0.48	0.16	0.51	0.07
	8	ALL	59	0.58	0.15	0.41	0.10
		MC	54	0.58	0.15	0.40	0.09
		OR	5	0.51	0.04	0.57	0.09
	10	ALL	60	0.49	0.17	0.35	0.09
		MC	55	0.50	0.16	0.33	0.08
		OR	5	0.42	0.21	0.50	0.09
Reading	3	ALL	54	0.69	0.15	0.39	0.08
		MC	52	0.69	0.14	0.38	0.08
		OR	2	0.44	0.07	0.54	0.02
	4	ALL	54	0.68	0.14	0.36	0.08
		MC	52	0.69	0.13	0.36	0.08
		OR	2	0.40	0.04	0.50	0.07
	5	ALL	54	0.70	0.13	0.38	0.07
		MC	52	0.71	0.12	0.38	0.06
		OR	2	0.48	0.04	0.57	0.02
	6	ALL	54	0.71	0.12	0.38	0.07
		MC	52	0.72	0.11	0.38	0.06
		OR	2	0.47	0.03	0.53	0.01
	7	ALL	54	0.72	0.11	0.37	0.07
		MC	52	0.73	0.10	0.37	0.06
		OR	2	0.51	0.01	0.53	0.04
	8	ALL	54	0.71	0.12	0.38	0.09
		MC	52	0.72	0.11	0.37	0.08
		OR	2	0.51	0.02	0.59	0.01
10	ALL	54	0.70	0.10	0.35	0.09	
	MC	52	0.71	0.10	0.35	0.08	
	OR	2	0.51	0.01	0.59	0.02	
Science	4	ALL	55	0.67	0.14	0.31	0.08
		MC	53	0.68	0.13	0.30	0.07
		OR	2	0.45	0.21	0.45	0.01
	8	ALL	55	0.62	0.17	0.33	0.09
		MC	53	0.63	0.17	0.32	0.08
		OR	2	0.53	0.18	0.53	0.01
	10	ALL	55	0.58	0.15	0.37	0.09
		MC	53	0.59	0.14	0.36	0.09
		OR	2	0.31	0.11	0.52	0.01

MC = multiple-choice; OR = open-response

5.2 DIFFERENTIAL ITEM FUNCTIONING

A comparison of indices across grade levels is complicated because these indices are population dependent. Direct comparisons would require that either the items or students were common across groups.

Since that is not the case, it cannot be determined whether differences in performance across grade levels are due to differences in student abilities, differences in item difficulties, or both. With this caveat in mind, it appears generally that for mathematics and, to a lesser extent, science, students in higher grades found their items more difficult than students in lower grades found theirs, while in reading, the difficulty values are fairly constant across grades.

Comparing the difficulty indices of multiple-choice items and constructed-response or short-answer items is inappropriate because multiple-choice items can be answered correctly by guessing. Thus, it is not surprising that the difficulty indices for multiple-choice items tend to be higher (indicating that students performed better on these items) than the difficulty indices for constructed-response items. Similarly, discrimination indices for the four-point constructed-response items were larger than those for the dichotomous items due to the greater variability of the former (i.e., the partial credit these items allow) and the tendency for correlation coefficients to be higher given greater variances of the correlates.

In addition to the item difficulty and discrimination summaries presented above, item-level classical statistics and item-level score distributions were also calculated. Item-level classical statistics are provided in Appendix E; item difficulty and discrimination values are presented for each item. The item difficulty and discrimination indices are within generally acceptable and expected ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that students who performed well on individual items tended to perform well overall. There were a small number of items with near-zero discrimination indices, but none were negative. While it is not inappropriate to include items with low discrimination values or with very high or very low item difficulty values to ensure that content is appropriately covered, there were very few such cases on the Montana CRT. Item-level score-point distributions are provided for constructed-response items in Appendix F; for each item, the percentage of students who received each score point is presented.

5.3 DIMENSIONALITY ANALYSIS

The DIF analyses of the previous section were performed to identify items that showed evidence of differences in performance between pairs of subgroups beyond that which would be expected based on the primary construct that underlies total test score (also known as the “primary dimension,” for example, general achievement in math). When items are flagged for DIF, statistical evidence points to their measuring an additional dimension(s) to the primary dimension.

Because tests are constructed with multiple content area subcategories, and their associated knowledge and skills, the potential exists for a large number of dimensions being invoked beyond the common primary dimension. Generally, the subcategories are highly correlated with each other; therefore, the primary dimension they share typically explains an overwhelming majority of variance in test scores. In fact, the presence of just such a dominant primary dimension is the psychometric assumption that provides the foundation for the unidimensional IRT models that are used for calibrating, linking, scaling, and equating the

2011–12 MontCAS test forms. As noted in the previous section, a statistically significant DIF result does not automatically imply that an item is measuring an irrelevant construct or dimension. An item could be flagged for DIF because it measures one of the construct-relevant dimensions of a subcategory’s knowledge and skills.

The purpose of dimensionality analysis is to investigate whether violation of the assumption of test unidimensionality is statistically detectable and, if so, (a) the degree to which unidimensionality is violated and (b) the nature of the multidimensionality. Findings from dimensionality analyses performed on the 2011–12 MontCAS common items for mathematics, reading, and science are reported below. (Note: Only common items were analyzed since they are used for score reporting.)

The dimensionality analyses were conducted using the nonparametric IRT-based methods DIMTEST (Stout, 1987; Stout, Froelich, & Gao, 2001) and DETECT (Zhang & Stout, 1999). Both of these methods use as their basic statistical building block the estimated average conditional covariances for item pairs. A conditional covariance is the covariance between two items conditioned on expected total score for the rest of the test, and the average conditional covariance is obtained by averaging over all possible conditioning scores. When a test is strictly unidimensional, all conditional covariances are expected to take on values within random noise of zero, indicating statistically independent item responses for examinees with equal expected total test scores. Non-zero conditional covariances are essentially violations of the principle of local independence, and local dependence implies multidimensionality. Thus, nonrandom patterns of positive and negative conditional covariances are indicative of multidimensionality.

DIMTEST is a hypothesis-testing procedure for detecting violations of local independence. The data are first divided into a training sample and a cross-validation sample.

Then an exploratory analysis of the conditional covariances is conducted on the training sample data to find the cluster of items that displays the greatest evidence of local dependence. The cross-validation sample is then used to test whether the conditional covariances of the selected cluster of items displays local dependence, conditioning on total score on the nonclustered items. The DIMTEST statistic follows a standard normal distribution under the null hypothesis of unidimensionality.

DETECT is an effect-size measure of multidimensionality. As with DIMTEST, the data are first divided into a training sample and a cross-validation sample. The training sample is used to find a set of mutually exclusive and collectively exhaustive clusters of items that best fit a systematic pattern of positive conditional covariances for pairs of items from the same cluster and negative conditional covariances from different clusters. Next, the clusters from the training sample are used with the cross-validation sample data to average the conditional covariances: within-cluster conditional covariances are summed, from this sum the between-cluster conditional covariances are subtracted. This difference is then divided by the total number of item pairs, and the average is multiplied by 100 to yield an index of the average violation of local independence for an item pair. DETECT values less than 0.2 indicate very weak multidimensionality (or near

unidimensionality), values of 0.2 to 0.4 weak to moderate multidimensionality; values of 0.4 to 1.0 moderate to strong multidimensionality, and values greater than 1.0 very strong multidimensionality.

DIMTEST and DETECT were applied to the 2011–12 MontCAS. The data for each grade and content area were split into a training sample and a cross-validation sample. Every grade/content area combination had at least 10,380 student examinees, so every training sample and cross-validation sample had at least 5,190 students. DIMTEST was then applied to every grade/content area. DETECT was applied to each dataset for which the DIMTEST null hypothesis was rejected in order to estimate the effect size of the multidimensionality.

Because of the large sample sizes of the Montana tests, DIMTEST would be sensitive even to quite small violations of unidimensionality, and the null hypothesis was rejected at a significance level of 0.01 for every dataset. The rejection of the null hypothesis of unidimensionality for every test was not surprising because strict unidimensionality is an idealization that almost never holds exactly for a given dataset. Thus, it was important to use DETECT to estimate the effect size of the violations of local independence found by DIMTEST. Table 5-2 displays the multidimensional effect size estimates from DETECT.

Table 5-2. 2011–12 Montana CRT: Multidimensionality Effect Sizes by Subject and Grade

Subject	Grade	Multidimensionality Effect Size	
		2011–12	2010–11
Mathematics	3	0.12	0.14
	4	0.11	0.11
	5	0.07	0.14
	6	0.12	0.11
	7	0.14	0.10
	8	0.15	0.11
	10	0.12	0.11
	Average	0.12	0.12
Reading	3	0.09	0.10
	4	0.08	0.12
	5	0.07	0.13
	6	0.08	0.07
	7	0.11	0.09
	8	0.11	0.17
	10	0.11	0.12
	Average	0.09	0.11
Science	4	0.12	0.11
	8	0.11	0.09
	10	0.12	0.08
	Average	0.12	0.09

All the DETECT values for 2011–12 indicated very weak multidimensionality. The average DETECT values for the three content areas were 0.12 for mathematics, 0.09 for reading, and 0.12 for science. Also shown in Table 5-2 are the values reported in last year’s dimensionality analyses. The DETECT indices for

the individual content areas for each grade are seen to be very similar between the two years. In particular, both sets of values indicate very weak multidimensionality for all the tests; and, consequently, the averages for the three content areas for 2011–12 (0.12 for mathematics, 0.09 for reading, and 0.12 for science) are similar to the 2010–11 averages. We also investigated how DETECT divided the tests into clusters to see if there were any discernable patterns with respect to item type—that is, multiple choice (MC) and constructed response (CR). Because there were only two CR items at each grade level for each content area, it was difficult to judge whether the clusters produce a significant separation of the MC and CR items. The strongest separations occurred with grades 4 and 5 mathematics, grade 10 reading, and grade 8 science, each of which had a single cluster that contained the two CR items along with eight (grade 4 math), eighteen (grade 5 math), ten (grade 10 reading), and nine (grade 8 science) MC items. In all of these cases, the MC items clearly outnumbered the CR items. No other cases displayed significant separation of MC and CR items. This lack of separation of MC and CR items also occurred in the 2010–11, 2009–10, 2008–09 and 2007–08 tests. A more thorough investigation employing experts in the substantive content of the test forms may result in identification of clusters related to the skills and knowledge areas measured by the items. In any case, the violations of local independence from all such effects, as evidenced by the DETECT effect sizes, were very small and do not warrant any changes in test design or scoring.

CHAPTER 6. ITEM RESPONSE THEORY SCALING AND EQUATING

This chapter describes the procedures used to calibrate, equate, and scale the Montana CRT. During the course of these psychometric analyses, a number of quality control procedures and checks on the processes were implemented. These procedures included evaluation of the calibration processes (e.g., checking the number of Newton cycles required for convergence for reasonableness, checking item parameters and their standard errors for reasonableness, or examining test characteristic curves [TCC] and test information functions [TIF] for reasonableness), evaluation of model fit, evaluation of equating items (e.g., delta analyses, rescore analyses, examination of *b*-plots for reasonableness), and evaluation of the scaling results (e.g., parallel processing by the Psychometrics and Research and Data Analysis departments, comparing lookup tables to the previous year's). An equating report, which provided complete documentation of the quality control procedures and results, was reviewed by the Montana Department of Education (MDE) and approved prior to production of student reports (Measured Progress Department of Psychometrics and Research, *2011–12 MontCAS Criterion-Referenced Test Equating Report*, unpublished manuscript).

Table 6-1 lists items that required intervention either during item calibration or as a result of the evaluations of the equating items. For each flagged item, the table shows the reason it was flagged (e.g., the item was flagged as a result of the delta analyses) and what action was taken. The number of items identified for evaluation was typical across grades and content areas. Descriptions of the evaluations and results are included in the Item Response Theory Results and Equating Results sections below.

Table 6-1. 2011–12 Montana CRT: Items that Required Intervention During IRT Calibration and Equating

<i>Subject</i>	<i>Grade</i>	<i>IREF</i>	<i>Reasons</i>	<i>Action</i>
Mathematics	3	77008	Delta Analysis	Removed from equating
	4	61817	Delta Analysis	Removed from equating
	5	237156	Delta Analysis	Removed from equating
	6	61168	Delta Analysis	Removed from equating
	7	86570	Delta Analysis	Removed from equating
	8	175610	Delta Analysis	Removed from equating
Reading	3	92714	Delta Analysis	Removed from equating
	4	178225	Delta Analysis	Removed from equating
	6	177117	Delta Analysis	Removed from equating
	8	152479	Delta Analysis	Removed from equating
	10	149862	Delta Analysis	Removed from equating
Science	8	122710	Delta Analysis	Removed from equating
	10	158433	Delta Analysis	Removed from equating

6.1 ITEM RESPONSE THEORY

All Montana CRT items were calibrated using item response theory (IRT). IRT uses mathematical models to define a relationship between an unobserved measure of student performance, usually referred to as theta (θ), and the probability (p) of getting a dichotomous item correct or of getting a particular score on a polytomous item (Hambleton, Swaminathan, & Rogers, 1991; Hambleton & Swaminathan, 1985). In IRT, it is assumed that all items are independent measures of the same construct (i.e., of the same θ). Another way to think of θ is as a mathematical representation of the latent trait of interest. Several common IRT models are used to specify the relationship between θ and p (Hambleton & van der Linden, 1997; Hambleton & Swaminathan, 1985). The process of determining the specific mathematical relationship between θ and p is called item calibration. After items are calibrated, they are defined by a set of parameters that specify a nonlinear, monotonically increasing relationship between θ and p . Once the item parameters are known, an estimate of θ for each student can be calculated. This estimate, $\hat{\theta}$, is considered to be an estimate of the student's true score or a general representation of student performance. It has characteristics that may be preferable to those of raw scores for equating purposes.

For the 2011–12 CRT, the one-parameter logistic (1PL) model, which can be simplified from the three-parameter logistic (3PL) model, was used for dichotomous items (Hambleton & van der Linden, 1997; Hambleton, Swaminathan, & Rogers, 1991), and the partial credit model (PCM), which can be simplified from the generalized partial credit model, was used for polytomous items (Nering & Ostini, 2010). The 3PL model for dichotomous items can be defined as

$$P_i(1|\theta_j, \xi_i) = c_i + (1 - c_i) \frac{\exp[D a_i (\theta_j - b_i)]}{1 + \exp[D a_i (\theta_j - b_i)]},$$

where

i indexes the items,

j indexes students,

a represents item discrimination,

b represents item difficulty,

c is the pseudo guessing parameter,

ξ_i represents the set of item parameters (a , b , and c), and

D is a normalizing constant equal to 1.701.

In the case of the Montana CRT, the a_i term in the equation is equal to 1.0 and the c_i term is equal to 0.0 for all items, which reduces to the 1PL model:

$$P_i(\theta) = \frac{\exp D(\theta - b_i)}{1 + \exp D(\theta - b_i)}$$

For polytomous items, the generalized partial credit model can be defined as

$$P_{jk}(\theta) = \frac{\exp \sum_{v=0}^k [Da_j(\theta - b_j + d_v)]}{\sum_{c=1}^m \exp \sum_{v=1}^c [Da_j(\theta - b_j + d_v)]}$$

where
 j indexes items,
 k indexes students,
 a represents item discrimination,
 b represents item difficulty,
 d represents category step parameter, and
 D is a normalizing constant equal to 1.701.

In the case of the Montana CRT, the a_j term in the equation is equal to 1.0 for all items.

For more information about item calibration and determination, the reader is referred to Lord and Novick (1968), Hambleton and Swaminathan (1985), or Baker and Kim (2004).

6.2 ITEM RESPONSE THEORY RESULTS

The tables in [Appendix H](#) give the IRT item parameters of all common items on the 2011–12 CRT by grade and content area. In addition, Appendix I shows graphs of the test characteristic curves (TCCs) and test information functions (TIFs), which are defined below.

TCCs display the expected (average) raw score associated with each θ_j value between -4.0 and 4.0. Mathematically, the TCC is computed by summing the ICCs of all items that contribute to the raw score. Using the notation introduced in Section 10.1, the expected raw score at a given value of θ_j is

$$E(X | \theta_j) = \sum_{i=1}^n P_i(1 | \theta_j),$$

where
 i indexes the items (and n is the number of items contributing to the raw score),
 j indexes students (here, θ_j runs from -4 to 4), and

$E(X | \theta_j)$ is the expected raw score for a student of ability θ_j .

The expected raw score monotonically increases with θ_j , consistent with the notion that students of high ability tend to earn higher raw scores than do students of low ability. Most TCCs are “S-shaped”—flatter at the ends of the distribution and steeper in the middle.

The TIF displays the amount of statistical information that the test provides at each value of θ_j . Information functions depict test precision across the entire latent trait continuum. There is an inverse relationship between the information of a test and its standard error of measurement (SEM). For long tests, the SEM at a given θ_j is approximately equal to the inverse of the square root of the statistical information at θ_j (Hambleton, Swaminathan, & Rogers, 1991), as follows:

$$SEM(\theta_j) = \frac{1}{\sqrt{I(\theta_j)}}$$

Compared to the tails, TIFs are often higher near the middle of the θ distribution where most students are located.

PARSCALE v4.1 (Muraki & Bock, 2003) software was used to perform all IRT analyses for the Montana CRT. Each item occupied only one block in the calibration run, and the 1.701 normalizing constant was used. A default convergence criterion of 0.001 was used. The number of Newton cycles required for convergence for each grade and content area during the IRT analysis can be found in Table 6-2. The number of cycles required fell within acceptable ranges.

Table 6-2. 2011–12 Montana CRT: Number of Newton Cycles Required for Convergence

<i>Subject</i>	<i>Grade</i>	<i>Cycles</i>
Mathematics	3	34
	4	27
	5	15
	6	4
	7	7
	8	5
	10	5
Reading	3	32
	4	25
	5	34
	6	34
	7	35
	8	33
	10	27
Science	4	7
	8	5
	10	13

6.3 EQUATING

The purpose of equating is to ensure that scores obtained from different forms of a test are equivalent to each other. Equating may be used if multiple test forms are administered in the same year, as well as to equate one year's forms to those given in the previous year. Equating ensures that students are not given an unfair advantage or disadvantage because the test form they took is easier or harder than those taken by other students.

Equating for the Montana CRT used the *anchor-test-nonequivalent-groups* design described by Petersen, Kolen, and Hoover (1989). In this equating design, no assumption is made about the equivalence of the examinee groups taking different test forms (that is, naturally occurring groups are assumed). IRT is particularly useful for equating nonequivalent groups (Allen & Yen, 1979). The fixed common-item IRT procedure was used. The anchor items from the previous year's administration were identified during this year's calibrations, and their IRT parameters were fixed to last year's values. This method results in all person and item parameters being on the same θ scale as they were in the previous year. The procedures used for equating and scaling do not change the ranking of students, give more weight to particular items, or change students' performance-level classifications.

6.4 EQUATING RESULTS

An Equating Report was submitted to the OPI for their approval prior to production of student reports. The Equating report details the results of a variety of quality control activities that were implemented within the Psychometrics and Research Department during IRT calibration and equating, including examining *b*-plots and TCCs and conducting delta and rescore analyses. The evaluations of the equating results are summarized in Table 6-1 above. The *b*-plots can be found in Appendix J. The procedures used to evaluate equating items are described below.

Appendix K presents the results from the delta analysis. This procedure was used to evaluate the performance of equating items, and the discard status presented in the appendix indicates whether the item was used in equating. As can be seen in the appendix, as well as in Table 6-1, a very small number of items were identified as problematic based on the results of the delta analyses and were excluded from use in equating.

Also presented in Appendix K are the results from the rescore analysis. With this analysis, 200 random papers from the previous year were interspersed with this year's papers to evaluate scorer consistency from one year to the next. All effect sizes were well below the criterion value for excluding an item as an equating item, 0.80 (in absolute value).

6.5 ACHIEVEMENT STANDARDS

Cutpoints for the Montana CRT in reading and mathematics were set at standard-setting meetings held in June and July 2006, and cutpoints in science were set in June 2008. Details of the standard-setting procedures can be found in the standard-setting reports and technical reports of those years. The cuts on the theta scale that were established at those meetings are presented in Table 6-3 below. The θ -metric cut scores that emerged from the standard-setting meetings will remain fixed throughout the assessment program unless standards are reset for any reason. Also shown in the table are the cutpoints on the reporting score scale (described below).

Table 6-3. 2011–12 Montana CRT: Cut Scores on the Theta Metric and Reporting Scale by Subject and Grade

Subject	Grade	Theta			Scaled Score				
		Cut 1	Cut 2	Cut 3	Minimum	Cut 1	Cut 2	Cut 3	Maximum
Mathematics	3	-0.54340	-0.20337	0.44500	200	225	250	290	300
	4	-0.29081	0.05530	0.65734	200	225	250	291	300
	5	-0.55315	-0.20313	0.38248	200	225	250	289	300
	6	-0.55054	-0.17902	0.36958	200	225	250	287	300
	7	-0.51684	-0.16514	0.35144	200	225	250	289	300
	8	-0.52251	-0.09914	0.46022	200	225	250	283	300
	10	-0.57541	-0.06623	0.50451	200	225	250	281	300
Reading	3	-1.03019	-0.52098	0.26228	200	225	250	287	300
	4	-0.64979	-0.19215	0.55362	200	225	250	289	300
	5	-0.86117	-0.43483	0.24763	200	225	250	287	300
	6	-0.82220	-0.42340	0.26115	200	225	250	289	300
	7	-0.87767	-0.44082	0.29929	200	225	250	288	300
	8	-0.54622	-0.17634	0.50092	200	225	250	289	300
	10	-0.42862	-0.08340	0.55241	200	225	250	289	300
Science	4	-0.70081	-0.14474	0.55956	200	225	250	282	300
	8	-0.57275	-0.07715	0.58285	200	225	250	283	300
	10	-0.37793	0.12744	0.52244	200	225	250	270	300

6.5.1 Distributions

Table L-1 in Appendix L shows performance-level distributions for each of the last three years by subject and grade.

6.6 SCALED SCORES

6.6.1 Description of Scale

Montana CRT scores in each content area are reported on a scale ranging from 200 to 300. By providing information that is more specific about the position of a student's results, scaled scores supplement performance-level scores. School- and district-level scaled scores are calculated by computing the average of

student-level scaled scores. Students' raw scores (i.e., total number of points) on the 2011–12 Montana CRT were translated to scaled scores using a data analysis process called *scaling*. Scaling simply converts from one scale to another. In the same way that a given temperature can be expressed on either Fahrenheit or Celsius scales, or the same distance can be expressed in either miles or kilometers, student scores on the 2011–12 Montana CRT tests can be expressed in raw or scaled scores.

It is important to note that converting from raw scores to scaled scores does not change students' performance-level classifications. Given the relative simplicity of raw scores, it is fair to ask why scaled scores instead of raw scores are used in Montana CRT reports. Foremost, scaled scores offer the advantage of simplifying result reporting across content areas, grade levels, and subsequent years. Because the standard-setting process typically results in different cut scores across content areas on a raw score basis, it is useful to transform these raw cut scores to a scale that is more easily interpretable and consistent. For the Montana CRT, a score of 225 is the cut score between the Novice and Nearing Proficiency performance levels. This is true regardless of content area, grade level, or year. For example, the raw cut score between Novice and Nearing Proficiency may be 35 in grade 8 mathematics, but may be 33 in grade 10 mathematics. Using scaled scores greatly simplifies the task of understanding how a student performed. The raw score to scaled score look-up tables for each content area and grade are presented in Appendix M.

6.6.2 Calculations

For Montana CRT, scaled scores were obtained by a simple translation of students' scores using a linear equation of the form

$$SS = mY + b,$$

where
 m is the slope,
 b is the intercept, and
 Y represents the student's score.

A separate linear transformation was used for each grade/content area combination. Each line was determined by using threshold values obtained via standard setting and fixing the Novice/Nearing Proficiency and Nearing Proficiency/Proficient scaled score cuts to 225 and 250, respectively. The cut between Proficient and Advanced was then allowed to vary across grades and content areas. The scaled score values obtained using this formula were rounded to the nearest integer and truncated, as necessary, so that no student received a score lower than 200 or higher than 300.

For science, the student score used for scaling was the ability estimate on the theta scale, $\hat{\theta}$, which was found from the students' raw scores by mapping through the TCC. For reading and mathematics, on the other hand, scaling was done from raw score. As with science, the students' raw scores on the 2011–12 test were transformed into ability estimates on the theta scale using the TCC. These ability estimates were then

transformed into an expected raw score on the reference test form (2005–06, when standards were established for reading and mathematics) using the TCC for the reference test. This expected raw score was then scaled onto the reporting metric.

Table 6-4 shows the scaling constants by subject and grade.

Table 6-4. 2011–12 Montana CRT: Scaled Score Slope and Intercept by Subject and Grade

<i>Subject</i>	<i>Grade</i>	<i>Slope</i>	<i>Intercept</i>
Mathematics	3	3.1692	118.5242
	4	3.0431	141.4551
	5	2.8083	155.7965
	6	2.7906	159.5450
	7	3.0378	159.7850
	8	2.4365	172.4985
	10	2.0947	181.1735
Reading	3	2.4370	182.0623
	4	2.5939	174.3429
	5	2.7798	161.4892
	6	3.0026	154.7492
	7	2.5872	169.9388
	8	3.0898	145.1710
	10	3.1680	130.2323
Science	4	44.9584	256.5073
	8	50.4439	253.8917
	10	49.4687	243.6957

6.6.3 Distributions

Graphs of the scaled score cumulative frequency distributions for the last three years are presented in Appendix L. Note that the graphs show the percent of students at or below each scaled score, thus the lowest line in a given graph depicts the highest performing group. For example, in the graph for grade 5 mathematics (Figure L-3), the line showing the cumulative distribution for 2011–12 is consistently to the right of the line for 2010–11 which, in turn, is consistently to the right of the line for 2009–10. This pattern indicates that student performance on the grade 5 mathematics test has improved in each of the last two years.

CHAPTER 7. RELIABILITY

Although an individual item's performance is an important focus for evaluation, a complete evaluation of an assessment must also address the way items function together and complement one another. Tests that function well provide a dependable assessment of the student's level of ability. Unfortunately, no test can do this perfectly. A variety of factors can contribute to a given student's score being either higher or lower than his or her true ability. For example, a student may misread an item, or mistakenly fill in the wrong bubble when he or she knew the answer. Collectively, extraneous factors that impact a student's score are referred to as measurement error. Any assessment includes some amount of measurement error; that is, no measurement is perfect. This is true of all academic assessments—some students will receive scores that underestimate their true ability, and other students will receive scores that overestimate their true ability. When tests have a high amount of measurement error, student scores are very unstable. Students with high ability may get low scores or vice versa. Consequently, one cannot reliably measure a student's true level of ability with such a test. Assessments that have less measurement error (i.e., errors made are small on average and student scores on such a test will consistently represent their ability) are described as reliable.

There are a number of ways to estimate an assessment's reliability. One possible approach is to give the same test to the same students at two different points in time. If students receive the same scores on each test, then the extraneous factors affecting performance are small and the test is reliable. (This is referred to as "test-retest reliability.") A potential problem with this approach is that students may remember items from the first administration or may have gained (or lost) knowledge or skills in the interim between the two administrations. A solution to the "remembering items" problem is to give a different, but parallel test at the second administration. If student scores on each test correlate highly, the test is considered reliable. (This is known as "alternate forms reliability," because an alternate form of the test is used in each administration.) This approach, however, does not address the problem that students may have gained (or lost) knowledge or skills in the interim between the two administrations. In addition, the practical challenges of developing and administering parallel forms generally preclude the use of parallel forms reliability indices. One way to address the latter problem is to split the test in half and then correlate students' scores on the two half-tests; this, in effect, treats each half-test as a complete test. By doing this, the problems associated with an intervening time interval and of creating and administering two parallel forms of the test are alleviated. This is known as a "split-half estimate of reliability." If the two half-test scores correlate highly, items on the two half-tests must be measuring very similar knowledge or skills. This is evidence that the items complement one another and function well as a group. This also suggests that measurement error will be minimal.

The split-half method requires psychometricians to select items that contribute to each half-test score. This decision may have an impact on the resulting correlation, since each different possible split of the test halves will result in a different correlation. Another problem with the split-half method of calculating reliability is that it underestimates reliability, because test length is cut in half. All else being equal, a shorter

test is less reliable than a longer test. Cronbach (1951) provided a statistic, α (alpha), which eliminates the problem of the split-half method by comparing individual item variances to total test variance. Cronbach's α was used to assess the reliability of the 2011–12 Montana CRT:

$$\alpha \equiv \frac{n}{n-1} \left[1 - \frac{\sum_{i=1}^n \sigma^2_{(Y_i)}}{\sigma_x^2} \right],$$

where
i indexes the item,
n is the total number of items,
 $\sigma^2_{(Y_i)}$ represents individual item variance, and
 σ_x^2 represents the total test variance.

7.1 RELIABILITY AND STANDARD ERRORS OF MEASUREMENT

Table 7-1 presents descriptive statistics, Cronbach's α coefficient, and raw score standard errors of measurement (SEMs) for each content area and grade. (Statistics are based on common items only.)

Table 7-1. 2011–12 Montana CRT: Raw Score Descriptive Statistics, Cronbach's Alpha, and Standard Errors of Measurement (SEM) by Subject and Grade

Subject	Grade	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
Mathematics	3	10,606	66	44.11	12.03	0.92	3.41
	4	10,536	66	43.47	12.54	0.92	3.60
	5	10,592	66	40.10	12.72	0.92	3.61
	6	10,375	66	38.52	12.81	0.91	3.77
	7	10,624	66	37.95	12.93	0.92	3.73
	8	10,518	65	37.11	13.71	0.92	3.76
	10	10,138	66	31.19	11.88	0.90	3.75
Reading	3	10,576	60	39.64	10.69	0.91	3.19
	4	10,526	60	39.18	9.97	0.90	3.21
	5	10,575	60	40.75	10.56	0.91	3.17
	6	10,369	60	41.11	10.42	0.91	3.19
	7	10,625	60	41.96	10.13	0.90	3.16
	8	10,539	60	41.26	10.49	0.91	3.23
	10	10,163	60	40.92	10.15	0.89	3.30
Science	4	10,536	61	39.40	9.47	0.86	3.49
	8	10,531	61	37.34	10.09	0.88	3.53
	10	10,155	61	33.91	10.99	0.90	3.41

For mathematics, the reliability coefficients ranged from 0.90 to 0.92; for reading, from 0.89 to 0.91; and for science, from 0.86 to 0.90. Because different grades and content areas have different test designs (e.g.,

the number of items varies by test), it is inappropriate to make inferences about the quality of one test by comparing its reliability to that of another test from a different grade and/or content area.

7.2 2011–12 SUBGROUP RELIABILITY

The reliability coefficients discussed in the previous section were based on the overall population of students who took the 2011–12 Montana CRT. Appendix N presents reliabilities for various subgroups of interest. Subgroup Cronbach's α 's were calculated using the formula defined above based only on the members of the subgroup in question in the computations; values are only calculated for subgroups with 10 or more students. For mathematics, subgroup reliabilities ranged from 0.70 to 0.94; for reading, from 0.84 to 0.92; and for science, from 0.77 to 0.91.

For several reasons, the results of this section should be interpreted with caution. First, inherent differences between grades and content areas preclude making valid inferences about the quality of a test based on statistical comparisons with other tests. Second, reliabilities are dependent not only on the measurement properties of a test, but on the statistical distribution of the studied subgroup. For example, it can be readily seen in Appendix N that subgroup sample sizes may vary considerably, which results in natural variation in reliability coefficients. Additionally, α , which is a type of correlation coefficient, may be artificially depressed for subgroups with little variability (Draper & Smith, 1998). Third, there is no industry standard to interpret the strength of a reliability coefficient, and this is particularly true when the population of interest is a single subgroup.

7.3 REPORTING SUBCATEGORY RELIABILITY

Of even more interest are reliabilities for the reporting subcategories within Montana CRT content areas, described in Chapter 3. Cronbach's α coefficients for subcategories were calculated via the same formula defined previously using just the items of a given subcategory in the computations. Results are presented in Appendix N. Once again, as expected, because they are based on a subset of items rather than the full test, computed subcategory reliabilities were lower (sometimes substantially so) than were overall test reliabilities, and interpretations should take this into account.

For mathematics, subcategory reliabilities ranged from 0.52 to 0.82; for reading, from 0.58 to 0.79; and for science, from 0.12 to 0.73. The subcategory reliabilities were lower than those based on the total test and approximately to the degree one would expect based on classical test theory. Qualitative differences between grades and content areas once again preclude valid inferences about the quality of the full test based on statistical comparisons among subtests.

7.4 INTERRATER CONSISTENCY

Chapter 4 of this report describes in detail the processes that were implemented to monitor the quality of the hand-scoring of student responses for short-answer and constructed-response items. One of these processes was double-blind scoring: approximately 2% of student responses were randomly selected and scored independently by two different scorers. Results of the double-blind scoring were used during scoring to identify scorers who required retraining or other intervention and are presented here as evidence of the reliability of the Montana CRT. A summary of the interrater consistency results is presented in Table 7-2 below. Results in the table are collapsed across the hand-scored items by subject, grade, and number of score categories (two for short-answer items and five for constructed-response items). The table shows the number of included scores, the percent exact agreement, the percent adjacent agreement, the correlation between the first two sets of scores, and the percent of responses that required a third score. This same information is provided at the item level in Appendix O.

**Table 7-2. 2011–12 Montana CRT: Summary of Interrater Consistency Statistics
Collapsed across Items by Subject and Grade**

<i>Subject</i>	<i>Grade</i>	<i>Number of</i>		<i>Percent</i>		<i>Correlation</i>	<i>Percent of Third Scores</i>
		<i>Score Categories</i>	<i>Included Scores</i>	<i>Exact</i>	<i>Adjacent</i>		
Mathematics	3	2	643	99.22	0.78	0.98	0.00
		5	447	87.92	10.51	0.95	1.57
	4	2	640	96.72	3.28	0.93	0.00
		5	431	85.61	13.23	0.95	1.16
	5	2	649	99.38	0.62	0.99	0.00
		5	439	87.24	12.30	0.96	0.46
	6	2	642	98.91	1.09	0.98	0.00
		5	421	86.94	12.11	0.96	0.95
	7	2	649	98.46	1.54	0.97	0.00
		5	428	84.11	13.55	0.94	2.10
	8	2	647	98.76	1.24	0.98	0.00
		5	417	77.46	19.66	0.92	2.88
	10	2	613	99.84	0.16	1.00	0.00
		5	403	80.40	16.13	0.91	3.47
Reading	3	5	446	65.25	32.96	0.80	1.57
	4	5	441	63.49	34.47	0.74	1.81
	5	5	460	63.04	34.78	0.77	1.52
	6	5	430	58.14	37.67	0.75	3.49
	7	5	445	59.78	38.43	0.76	1.80
	8	5	438	65.30	34.02	0.83	0.68
	10	5	415	59.28	35.90	0.76	4.82
Science	4	5	424	66.27	27.59	0.83	5.90
	8	5	442	65.84	30.54	0.87	3.62
	10	5	414	69.08	28.26	0.80	2.66

7.5 RELIABILITY OF PERFORMANCE-LEVEL CATEGORIZATION

While related to reliability, the accuracy and consistency of classifying students into performance categories are even more important statistics in a standards-based reporting framework (Livingston & Lewis, 1995). After the performance levels were specified and students were classified into those levels, empirical analyses were conducted to determine the statistical accuracy and consistency of the classifications. For the Montana CRT, students are classified into one of four performance levels: Novice (N), Nearing Proficiency (NP), Proficient (P), or Advanced (A). This section of the report explains the methodologies used to assess the reliability of classification decisions, and results are given.

Accuracy refers to the extent to which decisions based on test scores match decisions that would have been made if the scores did not contain any measurement error. Accuracy must be estimated because errorless test scores do not exist. Consistency measures the extent to which classification decisions based on test scores match the decisions based on scores from a second, parallel form of the same test. Consistency can be evaluated directly from actual responses to test items if two complete and parallel forms of the test are given to the same group of students. In operational test programs, however, such a design is usually impractical. Instead, techniques have been developed to estimate both the accuracy and consistency of classification decisions based on a single administration of a test. The Livingston and Lewis (1995) technique was used for the 2011–12 Montana CRT because it is easily adaptable to all types of testing formats, including mixed format tests.

The accuracy and consistency estimates reported in Appendix P make use of “true scores” in the classical test theory sense. A true score is the score that would be obtained if a test had no measurement error. Of course, true scores cannot be observed and so must be estimated. In the Livingston and Lewis method, estimated true scores are used to categorize students into their “true” classifications.

For the 2011–12 Montana CRT, after various technical adjustments (described in Livingston & Lewis, 1995), a four by four contingency table of accuracy was created for each content area and grade, where cell $[i, j]$ represented the estimated proportion of students whose true score fell into classification i (where $i = 1$ to 4) and whose observed score fell into classification j (where $j = 1$ to 4). The sum of the diagonal entries (i.e., the proportion of students whose true and observed classifications matched) signified overall accuracy.

To calculate consistency, true scores were used to estimate the joint distribution of classifications on two independent, parallel test forms. Following statistical adjustments per Livingston and Lewis (1995), a new four by four contingency table was created for each content area and grade and populated by the proportion of students who would be categorized into each combination of classifications according to the two (hypothetical) parallel test forms. Cell $[i, j]$ of this table represented the estimated proportion of students whose observed score on the first form would fall into classification i (where $i = 1$ to 4) and whose observed score on the second form would fall into classification j (where $j = 1$ to 4). The sum of the diagonal entries

(i.e., the proportion of students categorized by the two forms into exactly the same classification) signified overall consistency.

Another way to measure consistency is to use Cohen’s (1960) coefficient κ (kappa), which assesses the proportion of consistent classifications after removing the proportion of consistent classifications that would be expected by chance. It is calculated using the following formula:

$$\kappa = \frac{(\text{Observed agreement}) - (\text{Chance agreement})}{1 - (\text{Chance agreement})} = \frac{\sum_i C_{ii} - \sum_i C_i.C_i}{1 - \sum_i C_i.C_i},$$

where

C_i is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on the first hypothetical parallel form of the test;

C_i is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on the second hypothetical parallel form of the test;

C_{ii} is the proportion of students whose observed performance level would be Level i (where $i = 1-4$) on both hypothetical parallel forms of the test.

Because κ is corrected for chance, its values are lower than other consistency estimates.

7.5.1 Decision Accuracy and Consistency Results

The decision accuracy and consistency analyses described above are provided in Table P-1 of Appendix P. The table includes overall accuracy and consistency indices, including kappa. Accuracy and consistency values conditional upon performance level are also given. For these calculations, the denominator is the proportion of students associated with a given performance level. For example, the conditional accuracy value is 0.84 for Novice for mathematics grade 3. This figure indicates that among the students whose true scores placed them in this classification, 84 percent would be expected to be in this classification when categorized according to their observed scores. Similarly, a consistency value of 0.77 indicates that 77 percent of students with observed scores in the Novice level would be expected to score in this classification again if a second, parallel test form were used.

For some testing situations, the greatest concern may be decisions around level thresholds. For example, in testing done for NCLB accountability purposes, the primary concern is distinguishing between students who are proficient and those who are not yet proficient. For the 2011–12 Montana CRT, Table P-2 in Appendix P provides accuracy and consistency estimates at each cutpoint, as well as false positive and false negative decision rates. (A false positive is the proportion of students whose observed scores were above the cut and whose true scores were below the cut. A false negative is the proportion of students whose observed scores were below the cut and whose true scores were above the cut.)

The above indices are derived from Livingston and Lewis’s (1995) method of estimating the accuracy and consistency of classifications. It should be noted that Livingston and Lewis discuss two versions of the accuracy and consistency tables. A standard version performs calculations for forms parallel to the form

taken. An “adjusted” version adjusts the results of one form to match the observed score distribution obtained in the data. The tables use the standard version for two reasons: (1) this “unadjusted” version can be considered a smoothing of the data, thereby decreasing the variability of the results; and (2) for results dealing with the consistency of two parallel forms, the unadjusted tables are symmetrical, indicating that the two parallel forms have the same statistical properties. This second reason is consistent with the notion of forms that are parallel; that is, it is more intuitive and interpretable for two parallel forms to have the same statistical distribution.

Descriptive statistics relating to the decision accuracy and consistency (DAC) of the 2011–12 Montana CRT tests can be derived from Table P-1. For mathematics, overall accuracy ranged from 0.78 to 0.80, overall consistency ranged from 0.70 to 0.73, and the kappa statistic ranged from 0.57 to 0.61. For reading, overall accuracy ranged from 0.81 to 0.86, overall consistency ranged from 0.74 to 0.80, and the kappa statistic ranged from 0.59 to 0.66. Finally, for science, overall accuracy ranged from 0.76 to 0.78, overall consistency ranged from 0.67 to 0.69, and the kappa statistic ranged from 0.51 to 0.56. Note that, as with other methods of evaluating reliability, DAC statistics calculated based on small groups can be expected to be lower than those calculated based on larger groups. For this reason, the values presented in Appendix P should be interpreted with caution. In addition, it is important to remember that it is inappropriate to compare DAC statistics between grades and content areas.

CHAPTER 8. SCORE REPORTING

The Montana CRT is designed to measure student performance against Montana’s content standards. Consistent with this purpose, results on the CRT were reported in terms of performance levels that describe student performance in relation to these established state standards. There are four performance levels: Novice, Nearing Proficiency, Proficient, and Advanced. (Performance-level distributions are given in Appendix L.) Students receive a separate performance-level classification (based on total scaled score) in each content area.

State results were provided to the OPI via a secure Web site. Reading, mathematics, and science reporting data for the 2011–12 Montana CRT were made available to systems and schools online via the Montana Analysis and Reporting System (MARS) on May 25, 2012. Student reports were delivered to parents on September 4, 2012. Student reports were also posted online to be accessible to schools. System test coordinators and teachers were also provided with copies of the *Guide to the 2012 Criterion-Referenced Test and CRT-Alternate Assessment Reports* to assist them in understanding the connection between the assessment and the classroom. The guide provides information about the assessment and the use of assessment results.

School- and system-level results are reported as the number and percentages of students attaining each performance level at each grade level tested. As described below, decision rules were formulated in early 2012 by the OPI and Measured Progress to identify students who, during the reporting process, were to be excluded from school- and system-level reports. (A copy of these decision rules is included in this report as Appendix A.) State-level summary reports were also produced.

The reports described in the sections that follow are separated into two categories. The first set of reports described is static reports, which are provided online as PDF documents; student reports are also provided on paper. The static reports are the following:

- Student Report (paper and online)
- School, System, and State Summary Reports (online)

The remaining reports are interactive reports, provided via MARS (see sections 9.3 and 9.4 below):

- Class Roster and Item-Level Reports
- Performance-Level Summary
- Released Items Summary Data
- Longitudinal Data Report

Sample Report Shells are included as Appendix Q.

8.1 DECISION RULES

As mentioned above, to ensure that reported results for the 2011–12 Montana CRT are accurate relative to collected data and other pertinent information, a document that delineates analysis and reporting rules was created. These decision rules were observed in the analyses of Montana CRT test data and in reporting the test results. Moreover, these rules are the main reference for quality assurance checks.

The decision rules document used for reporting results of the 2012 administration of the Montana CRT is found in Appendix A.

The rules primarily describe the inclusion/exclusion of students at the school, system, and state levels of aggregation. The document also describes rules as they pertain to individual reports. Finally, it describes the classification of students based on their school type or other information provided by the state through the student demographic file (AIM) or collected on the answer booklet.

8.2 STATIC REPORTS

8.2.1 Student Report

The student report is produced for each parent of a student who took or was eligible to take the Montana CRT. The report is shipped to systems and posted online for school/system access.

The student report gives the results for each content area tested. At grades 3, 5, 6, and 7, the content areas are reading and mathematics. At grades 4, 8, and 10, the content areas are reading, mathematics, and science. The student reports give the earned performance level and scaled score for each subject. The report also provides a comparison of the student's performance to that of the state as a whole for each subject. The report contains the results for each subject at the content standard level. The number of points earned by the student in each content standard is reported, as well as the range of points earned by students who achieve proficiency.

8.2.2 Summary Reports

The summary report is produced at the school, system, and state levels. The report is produced for each content area in the grade level. For grades 3, 5, 6, and 7, the content areas are reading and mathematics. For grades 4, 8, and 10, the content areas are reading, mathematics, and science. The report consists of three sections: Distribution of Scores, Subtest Results, and Results for Subgroups of Students.

The Distribution of Scores section of the report contains a breakdown of the performance of included students (as described in the decision rules document) into different scaled score intervals. The number and percent of students that fall into each scaled score interval is shown. There is an overall percentage reported for students that fall into each of the four performance levels (Novice, Nearing Proficiency, Proficient, and Advanced). In the School Summary Report, the calculations are done at the school, system, and state levels.

The System Summary Report contains results at the system and state levels. The State Summary Report contains only state-level results.

The Subtest Results section of the report summarizes the average points earned in the different content standards by included students (as described in the decision rules document) in the school, system, and state. The average points earned are compared to the total possible points for each content standard.

The Results for Subgroups of Students section of the report summarizes the performance of included students (as described in the decision rules document) broken down by various reporting categories. For each reporting category, the number of tested (included) students is reported, as well as the percentage of students in each of the four performance levels. In the School Summary Report, this is reported at the school, system, and state levels. In the System Summary Report, the data are reported at the system and state levels. In the State Summary Report, the data are reported at state level only.

The list of reporting categories is as follows:

- All Students
- Gender
- Ethnicity (American Indian or Alaska native, Asian, Hispanic, Black or African American, Native Hawaiian or Other Pacific Islander, White)
- Special Education
- Students with a 504 Plan
- Title I (optional)
- Tested with Standard Accommodation
- Tested with Nonstandard Accommodation
- Alternate Assessment (results are not given for this category on the Montana CRT Summary reports)
- Migrant
- Gifted/Talented
- LEP/ELL
- Former LEP Student
- LEP Student Enrolled for First Time in a U.S. School
- Free/Reduced Lunch

Data are suppressed if there are less than 10 tested (included) in a reporting category at a given aggregation level. New for 2012, data are suppressed in the Distribution of Scores and the Subtest Results sections if there are less than 10 tested (included) in a school or system.

The data for the reporting categories were provided by information coded on the students' answer booklets by teachers and/or data supplied by the state through an AIM export. Due to relatively low numbers

of students in certain reporting categories, school personnel are advised, under FERPA guidelines, to treat these pages confidentially.

8.3 MONTANA ANALYSIS AND REPORTING SYSTEM

Using advanced Web technology, the Montana Analysis and Reporting System (MARS) gives Montana educators and administrators the ability to filter data based on test year, grade level, content area, standard, and student subgroup. This allows administrators to isolate cross-sections of the results and identify areas of strong or poor performance.

The confidential nature of the data in MARS necessitates the strict enforcement of site security. All transmissions are done over Secure Socket Layers (SSL). A system of user role definitions and permissions dictates the scope of access granted to individual users. Organizations (system or school levels) are given administrative power to grant or deny access to their data within the system, and they have the ability to disable users. Personnel using MARS may be granted permission to view students' results at an organizational level, or only a select group as defined by the administrator. Predefined reports are included in the system, as is the ability to render and print additional copies.

8.3.1 User Accounts

In MARS, principals have the ability to create unique user accounts by assigning specific usernames and passwords to educators in their school such as teachers, curriculum coordinators, or special education coordinators. Once the accounts have been created, individual students may be assigned to each user account. After users have received their usernames and passwords, they are able to log in to their accounts and access the interactive reports, which will be populated only with the subgroup of students assigned to them.

Information about the interactive reports and setting up user accounts is available in the *Analysis & Reporting System User Manual* that is available for download on the MARS system.

8.4 INTERACTIVE REPORTS

As mentioned above, there are four interactive reports that are available from MARS: Roster Report, Performance-Level Summary, Released Items Summary Data, and Longitudinal Data. Each of these interactive reports is described in the following sections. Sample interactive reports are provided in Appendix R. To access these four interactive reports, the user clicks the interactive tab on the home page of the system and selects the report desired from the drop down menu. Next, the user applies basic filtering options, such as the name of the district or school and the grade level/content area test, to open the specific report. At this point, the user has the option of printing the report for the entire grade level or applying advanced filtering

options to select a subgroup of students to analyze. Advanced filtering options include gender, ethnicity, limited English proficient (LEP), IEP, migrant, and plan 504. All interactive reports, with the exception of the Longitudinal Data Report, allow the user to provide a custom title for the report.

8.4.1 Roster Report

The Montana CRT Roster Report provides a roster of all students in a school and provides performance on the common items that are released to the public, one report per content area. For all grades and content areas, the student names and identification numbers are listed as row headers down the left side of the report. The items are listed as column headers in the same order they appeared in the released item document.

For each item, the following are shown:

- the depth of knowledge (DOK) code
- the item type
- the correct response key for multiple-choice items
- the total possible points
- content standard

For each student, multiple-choice items are marked either with a plus sign (+), indicating that the student chose the correct multiple-choice response, or a letter (from A to D), indicating the incorrect response chosen by the student. For short-answer and constructed-response items, the number of points earned is shown. All responses to released items are shown in the report, regardless of the student's participation status. The columns on the right side of the report show the Total Test results, broken into several categories. Subcategory Points Earned columns show points earned by the student in each content area subcategory relative to total possible points. A Total Points Earned column is a summary of all points earned and total possible points in the content area. The last two columns show the student's scaled score and performance level. Students reported as Not Tested are given a code in the performance-level column to indicate the reason the student did not test. It is important to note that not all items used to compute student scores are included in this report, only released items. At the bottom of the report, the average percentage correct for each multiple-choice item and average scores for the short-answer and constructed-response items are shown for the school, district, and state. When advanced filtering criteria are applied by the user, the School and District Percent Correct/Average Score rows at the bottom of the report are blanked out and only the Group row and the State row for the group selected will contain data. This report can be saved, printed, or exported as a PDF.

The Montana CRT roster is confidential and should be kept secure within the school and district. FERPA requires that access to individual student results be restricted to the student, the student's parents/guardians, and authorized school personnel.

8.4.2 Performance-Level Summary

The Performance-Level Summary provides a visual display of the percentages of students in each performance level for a selected grade/content area. The four performance levels (Novice, Nearing Proficiency, Proficient, and Advanced) are represented by various colors in a pie chart. A separate table is also included below the chart that shows the number and percentage of students in each performance level. This report can be saved, printed, or exported as a PDF or JPG file.

8.4.3 Item Analysis Data

The Released Items Summary Data report is a school-level report that provides a summary of student responses to the released items for a selected grade/content area. The report is divided into two sections by item type (multiple-choice and open-response). For multiple-choice items, the total number/percent of students who answered the item correctly and the number of students who chose each incorrect option or provided an invalid response are reported. An invalid response on a multiple-choice item is defined as “the item was left blank” or “the student selected more than one option for the item.” For open-response items, point value and average score for the item are reported. Users are also able to view the actual released items within this report. If a user clicks on a particular magnifying glass icon next to a released item number, a pop-up box will open displaying the released item.

8.4.4 Longitudinal Data Report

The longitudinal data report is a confidential student-level report that provides individual student performance data for multiple test administrations. Results are reported for a student going back to academic year 2006–07. The state-assigned student identification number is used to link students across test administrations. Student performance on future test administrations will be included on this report over time. This report can be saved, printed, or exported as a PDF file.

8.5 INTERPRETIVE MATERIALS AND WORKSHOPS

An interpretive guide to the CRT reports is provided on the OPI web site: <http://opi.mt.gov/>.

8.6 QUALITY ASSURANCE

Quality assurance measures are embedded throughout the entire process of analysis and reporting. The data processor, data analyst, and psychometrician assigned to work on the Montana CRT implement quality control checks of their respective computer programs and intermediate products. Moreover, when data are handed off to different functions within the Data Services and Static Reporting (DSSR) and Psychometrics and Research (P&R) departments, the sending function verifies that the data are accurate

before handoff. Additionally, when a function receives a data set, the first step is to verify the data for accuracy.

Another type of quality assurance measure is parallel processing. Different exclusions that determine whether each student receives scaled scores and/or is included in different levels of aggregation are parallel processed. Using the decision rules document, two data analysts independently write a computer program that assigns students' exclusions. For each content area and grade combination, the exclusions assigned by each data analyst are compared across all students. Only when 100% agreement is achieved can the rest of data analysis be completed.

Another level of quality assurance involves the procedures implemented by the quality assurance group to check the accuracy of reported data. Using a sample of schools and districts, the quality assurance group verifies that reported information is correct. The step is conducted in two parts: (1) verify that the computed information was obtained correctly through appropriate application of different decision rules, and (2) verify that the correct data points populate each cell in the Montana CRT reports. The selection of sample schools and districts for this purpose is very specific and can affect the success of the quality control efforts. There are two sets of samples selected that may not be mutually exclusive.

The first set includes those that satisfy the following criteria:

- One-school district
- Two-school district
- Multi-school district

The second set of samples includes districts or schools that have unique reporting situations as indicated by decision rules. This second set is necessary to ensure that each rule is applied correctly. The second set includes those that satisfy the following criteria:

- Private school
- School with excluded (not tested) students

The quality assurance group uses a checklist to implement its procedures. After the checklist is completed, sample reports are circulated for psychometric checks and program management review.

CHAPTER 9. VALIDITY

Because interpretations of test scores, and not a test itself, are evaluated for validity, the purpose of the 2011–12 *Montana CRT Technical Report* is to describe several technical aspects of the Montana CRT tests in support of score interpretations (AERA, 1999). Each chapter contributes an important component in the investigation of score validation: test development and design; test administration; scoring, scaling, and equating; item analyses; reliability; and score reporting.

As stated in the overview chapter, *Standards for Educational and Psychological Testing* (AERA et al., 1999) provides a framework for describing sources of evidence that should be considered when constructing a validity argument. The evidence around test content, response processes, internal structure, relationship to other variables, and consequences of testing speak to different *aspects* of validity but are not distinct *types* of validity. Instead, each contributes to a body of evidence about the comprehensive validity of score interpretations.

Evidence on test content validity is meant to determine how well the assessment tasks represent the curriculum and standards for each content area and grade level. Content validation is informed by the item development process, including how the test blueprints and test items align to the curriculum and standards. Viewed through this lens provided by the Standards, evidence based on test content was extensively described in Chapters 2 and 3. Item alignment with Montana content standards; item bias, sensitivity and content appropriateness review processes; adherence to the test blueprint; use of multiple item types; use of standardized administration procedures, with accommodated options for participation; and appropriate test administration training are all components of validity evidence based on test content. As discussed earlier, all CRT questions are aligned by Montana educators to specific Montana content standards, and undergo several rounds of review for content fidelity and appropriateness. Items are presented to students in multiple formats (constructed-response, short-answer, and multiple-choice). Finally, tests are administered according to state-mandated standardized procedures, with allowable accommodations, and all test proctors are required to attend annual training sessions.

The scoring information in Chapter 4 describes the steps taken to train and monitor hand-scorers, as well as quality control procedures related to scanning and machine scoring. To speak to student response processes, however, additional studies would be helpful and might include an investigation of students' cognitive methods using think-aloud protocols.

Evidence based on internal structure is presented in great detail in the discussions of item analyses, reliability, and scaling and equating in Chapters 5 through 7. Technical characteristics of the internal structure of the assessments are presented in terms of classical item statistics (item difficulty, item-test correlation), differential item functioning analyses, dimensionality analyses, reliability, standard errors of measurement, and item response theory parameters and procedures. Each test is equated to the same grade and content area test from the prior year in order to preserve the meaning of scores over time. In general, item difficulty and

discrimination indices were in acceptable and expected ranges. Very few items were answered correctly at near-chance or near-perfect rates. Similarly, the positive discrimination indices indicate that most items were assessing consistent constructs, and students who performed well on individual items tended to perform well overall.

Evidence based on the consequences of testing is addressed in the scaled scores information in **Chapter 6** and the reporting information in **Chapter 8**, as well as in the test interpretation guide, which is a separate document that is referenced in the discussion of reporting. Each of these chapters speaks to the efforts undertaken to promote accurate and clear information provided to the public regarding test scores. Scaled scores offer the advantage of simplifying the reporting of results across content areas, grade levels, and subsequent years. Performance levels provide users with reference points for mastery at each grade level, which is another useful and simple way to interpret scores. Several different standard reports are provided to stakeholders. In addition, a data analysis tool is provided to each school system to allow educators the flexibility to customize reports for local needs. Additional evidence of the consequences of testing could be supplemented with broader investigation of the impact of testing on student learning.

To further support the validation of the assessment program, additional studies might be considered to provide evidence regarding the relationship of CRT results to other variables including the extent to which scores from the CRT converge with other measures of similar constructs, and the extent to which they diverge from measures of different constructs. Relationships among measures of the same or similar constructs can sharpen the meaning of scores and appropriate interpretations by refining the definition of the construct.

The evidence presented in this report supports inferences of student achievement on the content represented on the Montana content standards for reading, mathematics, and science for the purposes of program and instructional improvement and as a component of school accountability.

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APPENDICES

APPENDIX A—ANALYSIS AND REPORTING DECISION RULES

**Analysis and Reporting Decision Rules
Montana Comprehensive Assessment System (MontCAS) CRT and CRT-Alternate
Spring 11-12 Administration**

This document details rules for analysis and reporting. The final student level data set used for analysis and reporting is described in the “Data Processing Specifications.” This document is considered a draft until the Montana Office of Public Instruction (OPI) signs off. If there are rules that need to be added or modified after said sign-off, OPI sign off will be obtained for each rule. Details of these additions and modifications will be in the Addendum section.

I. General Information
A. Tests Administered

Grade	Subject	Items included in Raw Score		IABS Reporting Categories (Standards) (Not Applicable for CRT-Alternate)
		CRT	CRT-Alt	
03	Reading Math	Common	All	Cat2
04	Reading Math	Common	All	Cat2
	Science	Common	All	Cat3
05	Reading Math	Common	All	Cat2
06	Reading Math	Common	All	Cat2
07	Reading Math	Common	All	Cat2
08	Reading Math	Common	All	Cat2
	Science	Common	All	Cat3
10	Reading Math	Common	All	Cat2
	Science	Common	All	Cat3

- B. Reports Produced
1. Student Labels (Printed)
 2. Student Report (Printed and posted online)
 3. Roster & Item Level Report (CRT-Alt: posted online; CRT:Interactive System)
 - by grade, subject and class/group
 4. Summary Report (Online)
 - Consists of sections:

- I. Distribution of Scores
- II. Subtest Results
- III. Results for Subgroups of Students
 - by grade, subject and school
 - by grade, subject and system
 - by grade, subject (state level)

C. Files Produced

1. One state file for each grade (Format: comma delimited format)
 - a. Consists of student level results
 - b. Alternately assessed students are in separate files by grade.
 - c. Naming conventions
 - i. CRT All subjects- Studentdatafile[2 digit grade].csv
 - ii. CRT-Alternate All subjects- altStudentdatafile[2 digit grade].csv
 - d. File layout: Studentdatafilelayout.xls and altstudentdatafilelayout.xls
2. System level files (Format: Excel ; Online)
 - a. Consists of student level results for each system for each grade. Contains all subjects tested at that grade.
 - b. Naming convention: Studentdatafile[2 digit grade].xls
 - c. File Layout: Systemstudentdatafilelayout.xls
3. School level file (Format: Excel; Online)
 - a. Consists of student level results for each school and grade. Contains all subjects tested at that grade.
 - b. Naming convention: Studentdatafile[2 digit grade].xls
 - c. File Layout: Systemstudentdatafilelayout.xls
4. Historical files (Format: comma delimited format)
 - a. Consists of student level results and test metadata. This year, files will be delivered for years 2006-2007 through 2010-2011, as well as the current year.
 - b. Previous years' files will be delivered before the current year's. Schedule is to be determined.
 - c. Contains all students included in CRT state files.
 - d. Naming conventions
 - i. Rawdata.csv
 - ii. Scoreddata.csv
 - iii. Plusdata.csv
 - iv. Testmetadata.csv
 - e. File layout: Rawdatalayout.xls, Scoreddatalayout.xls, Plusdatalayout.xls, Testmetadatalayout.xls

D. School Type

Schtype	Source	Description	Included in Aggregations		
			School	System	State
“Pras”	Data file provided by state	Private Accredited School. They are their own system	Yes. Same information for school & system but both sets of reports produced	Yes. Same information for school & system but both sets of reports produced	No
“Prnas”	Data file provided by state	Private non-accredited school. They are their own system	Yes. Same information for school & system but both sets of reports produced	Yes. Same information for school & system but both sets of reports produced	No
“SNE”	Scanned data/ updated by OPI	Student not enrolled	No.	No.	No.
“Oth”		Non-private school	Yes	Yes	Yes

E. Other Information

1. CRT are constructed with a combination of common and embedded field test items.
2. The CRT-Alternate consists of a set of 5 performance tasklets. The number of items in each tasklet varies.
3. Braille Students:
 - a. See Appendix A.1 for a list of the items not included in the Braille form.
 - b. If a student is identified as taking the Braille test, these items are not included in the student’s raw score. The student is scaled on a separate form based on the items that are available to him or her. See the Calculations section for more information.

II. Student Participation/Exclusions

A. Test Attempt Rules

1. A valid response to a multiple choice item is A, B, C, or D. An asterisk (multiple marks) is not considered a valid response. A valid score for an open response item is a non-blank score.
2. Incomplete (CRT): The student has exactly one (1) valid response to common items.

3. Incomplete (CRT-Alternate): The student has fewer than three (3) scores across all tasklets.
 4. The student is classified as Did Not Participate (DNP) in CRT if the student does not have any valid responses for that subject in either CRT or CRT-Alternate and has no not tested reason.
- B. Not Tested Reasons
1. If a student is marked First year LEP regardless of items attempted the student is considered first year LEP for reporting purposes. Reading is optional for first year in U.S schools LEP students.
- C. Student Participation Status
1. The following students are excluded from all aggregations.
 - a. Foreign Exchange Students (FXS).
 - b. Homeschooled students (schtype='SNE').
 - c. Student in school less than 180 hours (PSNE).
 - d. DNP (for that subject)
 - e. First year in U.S schools LEP*(regardless of how many items were attempted)
 - f. CRT only: Student tested with Non-Standard Accommodations (NSA for that subject)*
 - g. Alt (Alt='1')

* These students are aggregated on the Disaggregated report in their respective rows.
 2. If any of the non-standard accommodations are bubbled the student is considered tested with non-standard accommodations (NSA) in that subject.
 3. If the student has not been in that school for the entire academic year the student is excluded from school level aggregations (NSAY).
 4. If the student has not been in that system for the entire academic year the student is excluded from system and school level aggregations (NDAY).
 5. If the student took the alternate assessment the student is not counted as participating in the general assessment. Alternate Assessment students receive their results on an Alternate Assessment Student Report. They are reported according to participation rules stated in this document.
 6. (CRT-Alternate) If the teacher halted the administration of the assessment after the student scored zero (0) for three (3) consecutive items within tasklets , the student is classified as Halted in that subject. If the student was halted within a tasklet then the rest of the items within the tasklet are blanked out and do not count toward the student's score. If the other tasklets are complete then those items will be counted toward the student's score.

7. If the student took the Braille form of the test the raw scores are not included in raw score school, system or state averages. They are not included in group averages on the interactive roster.

D. Student Participation Summary

Participation Status	Part. Flag	Raw score	Scaled Score	Perf. level	Included on Roster	Included in aggregations		
						Sch	Sys	Sta
FXS	E	✓	✓	✓				
SNE	E	✓	✓	✓				
PSNE	E	✓	✓	✓				
NSA(by subject) Applies to CRT only	A	✓	✓	✓	✓	Only included in count and percents on Disaggregated report for nonstandard accommodations.		
First year in U.S schools LEP	A	✓	See Report Specific Rules	See Report Specific Rules	✓			
NSAY only	B	✓	✓	✓	✓		✓	✓
NDAY	C	✓	✓	✓	✓			✓
ALT*	A	✓	✓	✓	✓	See footnote below		
Incomplete	A	✓	✓	✓	✓			
DNP (Non-Participants)	F	✓	✓	✓	✓			
Halted(CRT-Alt only by subject)	D	✓	✓	✓	✓	✓	✓	✓
Tested	Z	✓	✓	✓	✓	✓	✓	✓

* They are included in summary data only for alternate assessment reports (according to participation rules).

If a student has conflicting participation statuses the following hierarchy is applied to determine how the student is reported:

F (Student attempted no items and is not alt and cannot be classified as first-year LEP)

E (FXS, SNE or PSNE)

- A (NSA, first year in U.S schools LEP, ALT or INC)
- C (NDAY)
- B (NSAY)
- D (Halted; applies to CRT-Alt only)
- Z (completed CRT or CRT-Alt and none of the above conditions apply)

III. Calculations

A. Raw Scores

1. (CRT) Raw scores are calculated using the scores on common multiple choice and open response items.
2. (CRT-Alternate) Raw score is the sum of the individual item scores.

B. Scaling

1. Scaling is accomplished by defining the unique set of test forms for each grade/subject combination. This is accomplished as follows:
 - a. Translate each form and position into the unique item number assigned to the form/position.
 - b. Order the items by
 - I. Type- multiple choice, short-answer, constructed-response
 - II. Form-common, then by ascending form number.
 - III. Position
 - c. If an item number is on a form, then set the value for that item number to '1', otherwise set to '.'. Set the exception field to '0' to indicate this is an original test form.
 - d. If an item number contains an 'X' (item is not included in scaling) then set the item number to '.'. Set the exception field to '1' to indicate this is not an original test form.
 - e. Compress all of the item numbers together into one field in the order defined in step II to create the test for the student.
 - f. Select the distinct set of tests from the student data and order by the exception field and the descending test field.
 - g. Check to see if the test has already been assigned a scale form by looking in the daScaleForm table. If the test exists then assign the existing scale form. Otherwise assign the next available scale form number. All scale form numbering starts at 01 and increments by 1 up to 99.
2. Psychometrics provides a lookup table for each scale form. These lookup tables are used to assign scaled scores, performance levels and standard errors.
3. The scaled score cuts for all three subjects and all grades have been fixed and are the same as last year for the CRT.
4. Students excluded from aggregations at the state level are excluded from psychometric files.

C. CRT-Alternate: The classcode is created using the following steps:

1. The following students are not included when creating the class codes.
 - SNE
 - FXS
 - PSNE
2. The dataset (by grade) is sorted by schcode and class/group name
3. The records are then numbered consecutively starting at 1. This number is then padded with zeros (in front) to create a 3 digit number.

D. Performance Level coding:

Numeric Performance Level	Performance level Name	Abbreviation
1(lowest)	Novice	N
2	Nearing Proficiency	NP
3	Proficient	P
4(highest)	Advanced	A

E. Rounding Table

Calculation	Rounded (to the nearest)
Static Reports: Percents and averages	Whole number
Item averages : Multiple choice items	The average is multiplied by 100 and rounded to the nearest whole number.
Item averages: Open response items	Open-response item averages are rounded to the nearest tenth.

F. Minimum N size

1. The number of included students (N) in a subject is the number of students in the school/system/state minus FXS minus PRAS minus PRNAS minus PSNE minus SNE minus First year LEP minus Incomplete minus NSA minus DNP.
2. Minimum N size is 10.
3. School/system reports are produced regardless of N-size, except no reports are generated if N=0.

G. The common items are used in reporting the average number of points for each standard.

H. Assignment of rperlevel

1. If the student is marked as taking the CRT-Alt then rperflevel='A', otherwise
2. If the student is classified as did not participate (DNP) then rperflevel='D', otherwise
3. If the student is Incomplete in a subject and not marked first year LEP rperflevel='I', otherwise
4. If the student is incomplete in Reading or has not attempted any items in Reading and is marked first year LEP rperflevel='L' for all subjects, otherwise
5. If the student does not meet any of the above conditions then rperflevel=perflevel.

IV. Report Specific Rules

A. Student Label

1. If a student is First year LEP and incomplete in Reading, the Reading performance level is 'LEP'. The reading scaled score is blank.
2. If a student is First year LEP, the math and science performance levels are the name of the earned performance level and the scaled scores are the student's earned score.
3. If the student is not first year LEP, the performance level name corresponding to the student's earned score is displayed.
4. If the student is First year LEP but is not incomplete in Reading then the student receives his earned scaled score and performance level.
5. If the student is DNP the student receives a student label. The student receives scaled score =200 and performance level=Novice.
6. The student's name is formatted as Lname, Fname.
7. The student's name is uppercase.
8. The school and system names are title case.
9. The labels are sorted alphabetically by Lname, Fname within school and grade.
10. Test date is 2012.
11. Performance level name from section III.D above is shown on the label if the student receives a performance level.

B. Student Report

1. State performance will always appear on the student report, regardless of the student's status.
 - a. A bar on the student report will indicate the percentage of students who appear in each performance level for each subject.
2. If a student is First year LEP and incomplete in Reading, the student will receive the note "Student is Limited English Proficient (LEP). Your student is in his or her first year in a United States school. For further information please contact your school principal or testing director."
3. If the student is First year LEP but is not incomplete in Reading then the student receives his earned scaled score and performance level.

4. If a student is First year LEP, the math and science performance levels are the name of the earned performance level and the scaled score is the student's earned score.
5. If the student is not first year LEP, the performance level name corresponding to the student's earned score is displayed.
6. If the student is incomplete the student receives the scores with the note "Your student did not complete the 2012 CRT. For further information please contact your school principal or testing director."
7. If the student is NSA the student receives his scores with the note "Your student was administered the 2012 CRT with a non-standard testing accommodation. For further information please contact your school principal or testing director."
8. If there is no last name or first name for the student, the name displayed is "Name Not Provided".
9. Alt students who are halted receive their scores and performance level and the note "Teacher halted the administration of one or more of the five tasklets after the student scored a 0 for three consecutive items within a tasklet on two different test administrations. Any completed tasklets have been scored and are reflected in the student's scaled score."
10. If the student is DNP the student receives a Student Report. The student receives scaled score =200 and performance level =Novice. The standards will not be reported. The student receives the note "Student did not participate."
11. If the student had a testing irregularity the student receives the note "A test administration irregularity has affected your student's results. For further information please contact your school principal or testing director."
12. Total Points Possible, Student percent of points earned, and Average state percent are suppressed for students who took Braille test (Braille='1') or who used JAWS (JAWS='1'). This suppression is applied only to the standards which contain the items not on the student's form.
13. For each scored subject, the student report will show a bar with the subject scaled score, as well as an error bar showing the low and high scaled scores, adjusted so these scores are equidistant from the scaled score.
14. Only content standards that apply to the student are printed.
15. The following standards are not reported for either CRT or CRT-Alt:
 - a. Reading standard 3
 - b. Mathematics standard 1
 - c. Science standards 5 and 6
16. (Alt only) Do not suppress standard data regardless of the number of total possible points.
17. (Alt only) Given aggregate data are at the state level only, data are not suppressed based on total number of students.

C. Roster & Item Level Report-Alternate Assessment only

1. If a student is First year LEP and the student is not incomplete in Reading:

- a. The math (and science) performance level is the abbreviation of the earned performance level and the scaled score is the student's earned score.
 - b. The reading performance level is the abbreviation of the earned performance level and the scaled score is the student's earned score.
 - c. The student is excluded from Reading, Math and Science aggregations.
2. If the student is First year LEP and incomplete in Reading
 - a. The student's Reading, Math (and Science) performance levels are 'LEP'
 - b. The student's math (and science) scaled score is the student's earned scaled score and the reading scaled score is blank.
 - c. The student's responses for all subjects are displayed.
 - d. The student is excluded from Math, Reading (and Science) aggregations.
3. If the student is not first year LEP, the performance level abbreviation corresponding to the student's earned score is displayed.
4. If the student is incomplete the student receives the scores with a footnote (†) "Student did not complete the assessment."
5. There is no last name or first name for the student, the name displayed is "Name Not Provided". These students appear at the bottom of the roster.
6. If class/group information is missing the roster is done at the school level.
7. Results for Alternate Assessment students are reported only on their class/group/school's alternate *Roster & Item Level Report*.
8. Within each demonstration school the class is 'DEM'.
9. Only the standards reported on the Summary report are reported on the roster.
10. The student's are sorted by lname, fname
11. Student names are formatted Lname, Fname.
12. Student names are uppercase.
13. Performance level abbreviation from section III.D is placed the performance level column if the student receives are performance level.
14. If the student is NSAY='1' or NDAY='1' then the appropriate footnote is placed beside the first name. ¥ "Not in school and/or system for full academic year."
15. If [subject]halted='1' for any subject then the appropriate footnote is placed beside the first name. § "Teacher halted the administration of one or more of the five tasklets after the student scored a 0 for three consecutive items within a tasklet on two different test administrations. Any completed tasklets have been scored and are reflected in the student's scaled score."
16. Data are not suppressed regardless of the number of students included.
17. Standard data are not suppressed regardless of the number of total possible points.

D. Interactive Roster – CRT only

1. Students who are DNP in a subject are reported with scaled score=200 and performance level='DNP'.
2. Students who are Incomplete in a subject are reported with their earned scaled score and performance level='INC' on the interactive roster.
3. Students who are first-year LEP and who complete the reading test are reported with their earned scaled score and performance level and are included in school, system and state level aggregations for all subjects unless otherwise excluded based on completeness in math or science.
4. Students who are first-year LEP and who do not complete the reading test are reported with their earned scaled score and performance level='LEP' for all subjects. These students are excluded from school, system and state level aggregations.
5. Students who participated in Alternate assessment are listed on the rosters. Their scaled score is blank and the performance level='ALT'. These students are not included in aggregations.
6. The items are reported using the released item number.
7. Students who took the Braille form are not included in any rawscore aggregations. These students have a scaleform other than 01.
8. The following students will have included set to 0 in tblscoreditem (these students are excluded from performance level aggregations):
 - a. The student did not participate in the subject (partstatus='F')
 - b. The student has partstatus='E'
 - c. The student is LEPfirst (LEPfirst='1' regardless of how many items attempted)
 - d. The student is incomplete in the subject.
 - e. The student took the alternate assessment (alt='1')
 - f. Student took the subject with nonstandard accommodations (NSA).
 - g. Student is NSAY (NSAY='1').
 - h. Student is NDAY (NDAY='1').
9. If the student took the Braille form (Braille='1'), included is set to 2. These students are excluded from raw score aggregations.
10. If students do not fall into any of the categories in numbers 8 and 9 above, included is set to '1'.
11. If partstatus='E' for any subject then interactive='0' otherwise interactive='1'. Students with interactive='0' are not available in the interactive site.
12. State level item averages do not include students with school type PRAS, PRNAS or SNE.
13. District level item averages do not include students who are marked nday='1'.
14. Only students whose partstatus is not 'E' for any subject are included in tblStuLongitudinal.
15. The filter column in tblItemAveragesLookup is the concatenation of the gender,ethnic,iep,lep,econdis,migrant and plan504 fields in that order.

16. RepType='0' for all records in tblItemAverages.

E. Summary Report

1. Section I (Distribution of Scores)
 - a. Distribution of Scores will be suppressed and left blank for systems/schools with N less than 10.
2. Section II (Subtest Results) Students with scaleform other than 01 are not included in Subtest Results.
 - a. Subtest Results will be suppressed and left blank for systems/schools with N less than 10.
 - b. A footnote reading “Results are suppressed when less than ten (10) students were assessed.” will appear at the bottom of the first page of the report.
 - c. (Alt only) If the number of total possible points is less than 5 for any Standard, place a dash (“—”) in the school, system, and state cells for that standard. A footnote will appear below this section reading “—There were too few score points to report on this standard, or no items on the test measured this standard.”
3. Section III (Results for Subgroups of Students)
 - a. Performance level results for subgroups with N less than 10 are suppressed, and the footnote “* Less than 10 students were assessed.” will appear. N is always reported.
 - b. CRT only: Count of students who are considered NSA for that subject excluding those students who are incomplete, nsay (at school level), nday (at school and system level) or FXS or SNE or PSNE or First year LEP or alt (general assessment report).
 - c. Count of First year LEP students excludes those students who are nsay (at school level), nday (at school or system level) or incomplete or FXS or SNE or PSNE or NSA or alt (general assessment).

V. Data File Rules

1. The following students are not included in the state file:
 - a. Alternate Assessment students (in CRT)
 - b. Homeschooled students (SNE)
 - c. Student is in school less than 180 hours (PSNE)
2. If the student receives a performance level ‘LEP’ on the student report in Reading, the student receives LEP for the Reading performance level in the state files.
3. Alt students who are halted are marked ‘1’ in the halted field for that subject.
4. Students who take the Braille form of the test are flagged Braille='1' in the state and system level files.
5. In the system **and school** level files only the released scored items are included.
6. The following students are not included in the system level files:

- a. Alternate Assessment students (in CRT)
 - b. Foreign Exchange students (FXS='1')
 - c. Homeschooled students (SNE)
 - d. Student is in school less than 180 hours (PSNE)
7. The following students are not included in the previous year school level files:
- a. Alternate Assessment students (in CRT)
 - b. Foreign Exchange students (FXS='1')
 - c. Homeschooled students (SNE)
 - d. Student is in school less than 180 hours (PSNE)
8. (Alt only) Standard data are not suppressed based on the number of total possible points.

VI. PDF file naming conventions to be used by Report Programmer

- 1. Printed Reports
 - a. Labels
MT La [grade].pdf
 - b. Student Report (Parent Copy)
#####[systemcode]MT Sr [grade] (Parent Copy).pdf
 - c. Student Report (School Copy)
#####[systemcode]MT Sr [grade] (School Copy).pdf
- 2. Web Reports
 - a. School Summary Reports
MT Su Sch [3 character subject][grade].pdf
 - b. System Summary Reports
MT Su Dis [3 character subject][grade].pdf
 - c. State Summary Reports
MT Su Sta [3 character subject][grade].pdf

VII. Shipping Product Code Summary

- 1. School (ReportFor='1')

Grade	Report Name	ReportType	Subject	ContentCode	Quantity
03	Student Labels (CRT)	03	Reading and Math	00	1 set for each school
04	Student Labels (CRT)	03	Reading, Math and Science	00	1 set for each school
05	Student Labels (CRT)	03	Reading and Math	00	1 set for each school

Grade	Report Name	ReportType	Subject	ContentCode	Quantity
06	Student Labels (CRT)	03	Reading and Math	00	1 set for each school
07	Student Labels (CRT)	03	Reading and Math	00	1 set for each school
08	Student Labels (CRT)	03	Reading Math and Science	00	1 set for each school
10	Student Labels (CRT)	03	Reading Math and Science	00	1 set for each school
03	Student Report (CRT)	02	Reading and Math	00	1 for each student
04	Student Report (CRT)	02	Reading Math and Science	00	1 for each student
05	Student Report (CRT)	02	Reading Math	00	1 for each student
06	Student Report (CRT)	02	Reading and Math	00	1 for each student
07	Student Report (CRT)	02	Reading and Math	00	1 for each student
08	Student Report (CRT)	02	Reading Math and Science	00	1 for each student

Grade	Report Name	ReportType	Subject	ContentCode	Quantity
10	Student Report (CRT)	02	Reading Math and Science	00	1 for each student
03	Student Labels (CRT-Alt)	07	Reading and Math	00	1 set for each school
04	Student Labels (CRT-Alt)	07	Reading, Math and Science	00	1 set for each school
05	Student Labels (CRT-Alt)	07	Reading and Math	00	1 set for each school
06	Student Labels (CRT-Alt)	07	Reading and Math	00	1 set for each school
07	Student Labels (CRT-Alt)	07	Reading and Math	00	1 set for each school
08	Student Labels (CRT-Alt)	07	Reading Math and Science	00	1 set for each school
10	Student Labels (CRT-Alt)	07	Reading Math and Science	00	1 set for each school
03	Student Report (CRT-Alt)	08	Reading and Math	00	1 for each student

Grade	Report Name	ReportType	Subject	ContentCode	Quantity
04	Student Report (CRT-Alt)	08	Reading Math and Science	00	1 for each student
05	Student Report (CRT-Alt)	08	Reading Math	00	1 for each student
06	Student Report (CRT-Alt)	08	Reading and Math	00	1 for each student
07	Student Report (CRT-Alt)	08	Reading and Math	00	1 for each student
08	Student Report (CRT-Alt)	08	Reading Math and Science	00	1 for each student
10	Student Report (CRT-Alt)	08	Reading Math and Science	00	1 for each student
00	Interp. Guide	04		00	1 per school

Appendix A

1. Items not available on the Braille form

Grade	Form	Content	Positon	Reporting Category
3	FT	Reading	14	
3	00	Math	25	2
3	FT	Math	34	
3	FT	Math	57	
3	FT	Math	73	
4	00	Reading	15	2
4	00	Science	39	2
4	00	Science	55	3
5	00	Reading	60	2

5	00	Math	31	4
5	00	Math	72	6
6	00	Math	23	2
6	00	Math	72	4

CRT/CRT-Alternate Addenda

- Braille table updated 05/01/2012 – Grade 06 Position 23 Math (not Reading) could not be translated to Braille
- At least one student has a damaged item. This item could not be scored. Braille decision rules will be applied to students with damaged items. Damaged items' raw scores will be set to 'X'. They will have a score form other than '01' and will be excluded from raw score aggregations.
- State summary reports are not produced
- The summary reports will be named as described below. This naming convention allows unique names for each PDF generated.
- [Contract Nick Name][Report Name][Grade][Subject]_[District/School Code].pdf
Where
Contract Nick Name - Montana1112, MTA1112
Report Name - SummarySystem, SummarySchool
Grade - 03-08, 10
Subject - Mat, Rea, Sci

Data File Deliverables: Files Produced

- CRT State Level Data Files
 - Results Data File
 - All Grades combined
 - Layout: Studentdatafilelayout.xls
 - Filename: Studentdatafile.csv
 - Raw Data
 - All Grades combined
 - Layout: Rawdatalayout.xls
 - Filename: RawData.csv
 - Plus Data
 - All grades combined
 - Layout: Plusdatalayout.xls
 - Filename: Plusdata.csv
 - Scored Data
 - All grades combined
 - Layout: Scoreddatalayout.xls
 - Filename: Scoreddata.csv
 - Test Meta-Data
 - All grades combined
 - Layout: Testmetadatalayout.xls
 - TestMetaData.csv

- CRT – Alternate State Level Data File
 - Results Data File
 - All Grades combined
 - Layout: AltStateStudentDataFileLayout.xls
 - Filename: Altstudentdatafile.csv
- CRT System and School Slice Data files (no changes)
- CRT-Alternate System and School Slice Data files (no changes)

Common Core Addenda

The purpose of this section is to outline the decision rules for the common core tests.

- Reading test form identifies the Reading Common Core test
- Math test form identifies the Math Common Core test
- Reading participation status and decision rules will be used for Common Core Reading tests
- Math participation status and decision rules will be used for the Common Core Mathematics
- Students whose form could not be identified are not included in Common Core analysis and reporting
- Student data for open response items will not be released in May. The data will be available for the September release. Open response header data will be included in the May release.
- Only item level related data will be reported for common core tests. Raw scores, performance levels and scaled scores are not calculated for the common core.
- Item scores will be available on MARS via the interactive tab only

Note: Braille students with an item that could not be administered on the Braille test – on the student report suppress the student’s raw score for content standards that contain the excluded item.

APPENDIX B—PARTICIPATION RATES

Table B-1. 2011–12 Montana CRT: Summary of Participation by Demographic Category – Mathematics

<i>Description</i>	<i>Number Tested</i>	<i>Percent</i>
Special Education	7,672	10.45
Title 1	27,180	37.03
Low Income	31,781	43.30
American Indian or Alaskan Native	9,050	12.33
Asian	738	1.01
Hispanic	2,722	3.71
Black or African American	965	1.31
White, Non-Hispanic	59,621	81.24
Native Hawaiian/Other Pacific Islander	236	0.32
Female	35,661	48.59
Male	37,674	51.33
Limited English Proficient	1,872	2.55
Migrant	186	0.25
Plan 504	541	0.74
All Students	73,392	100.00

Table B-2. 2011–12 Montana CRT: Summary of Participation by Demographic Category – Reading

<i>Description</i>	<i>Number Tested</i>	<i>Percent</i>
Special Education	7,646	10.42
Title 1	26,742	36.45
Low Income	31,759	43.28
American Indian or Alaskan Native	9,059	12.35
Asian	735	1.00
Hispanic	2,719	3.71
Black or African American	961	1.31
White, Non-Hispanic	59,604	81.23
Native Hawaiian/Other Pacific Islander	236	0.32
Female	35,647	48.58
Male	37,671	51.34
Limited English Proficient	1,870	2.55
Migrant	186	0.25
Plan 504	544	0.74
All Students	73,375	100.00

Table B-3. 2011–12 Montana CRT: Summary of Participation by Demographic Category – Science

<i>Description</i>	<i>Number Tested</i>	<i>Percent</i>
Special Education	3,145	10.07
Title 1	110	0.35
Low Income	12,674	40.59
American Indian or Alaskan Native	3,635	11.64
Asian	311	1.00
Hispanic	1,111	3.56
Black or African American	367	1.18
White, Non-Hispanic	25,670	82.22
Native Hawaiian/Other Pacific Islander	105	0.34
Female	15,195	48.67
Male	16,006	51.26
Limited English Proficient	708	2.27
Migrant	66	0.21
Plan 504	267	0.86
All Students	31,223	100.00

APPENDIX C—ACCOMMODATION FREQUENCIES

Table C-1. 2011–12 Montana CRT: Numbers of Students Tested with Accommodations by Accommodation Type and Grade – Mathematics

<i>Accommodation Code</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>	<i>Grade 6</i>	<i>Grade 7</i>	<i>Grade 8</i>	<i>Grade 10</i>
MATAccom01	148	167	203	158	93	99	56
MATAccom02	320	322	356	315	252	263	148
MATAccom04	126	124	135	107	71	82	48
MATAccom05	1,246	1,248	1,224	1,143	790	764	453
MATAccom06	246	270	284	185	172	109	29
MATAccom07	765	810	720	522	324	237	188
MATAccom08	766	778	738	504	307	242	201
MATAccom09	3	2	6	0	0	3	1
MATAccom10	12	2	3	7	3	1	3
MATAccom12	3	4	0	1	2	3	0
MATAccom13	2	3	2	0	4	0	1
MATAccom14	5	2	3	0	1	0	1
MATAccom15	5	5	2	1	3	0	0
MATAccom16	1	1	4	4	3	1	0
MATAccom17	0	0	0	0	0	0	0
MATAccom18	3	3	2	1	3	3	0
MATAccom19	111	136	145	80	57	34	5
MATAccom20	10	6	6	2	2	1	1
MATAccom21	1	3	2	2	4	2	0
MATAccom22	1,081	1,060	873	685	435	399	205
MATAccom23	4	7	10	5	8	6	0
MATAccom24	68	88	72	78	37	45	26
MATAccom25	98	115	117	108	80	80	58
MATAccom26	1	4	2	2	0	0	3
MATAccom27	6	5	7	3	3	3	7
MATAccom28	0	5	0	7	1	0	15
MATAccom30	0	0	0	0	0	0	0
MATAccom32	0	0	0	0	0	0	0

Table C-2. 2011–12 Montana CRT: Accommodations – Mathematics

<i>Accommodation</i>	<i>Description</i>
MATAccom01	Change in Administration Time: Test is administered at a time of day or a day of the week based on student needs.
MATAccom02	Session Duration: Test is administered in appropriate blocks of time for individual student needs, followed by rest breaks.
MATAccom04	Individual Administration: Test is administered in a one-to-one situation.
MATAccom05	Small Group Administration: Test is administered to a small group of students.
MATAccom06	Reduce Distracters: Student is seated at a carrel or other physical arrangement that reduces visual distractions.
MATAccom07	Alternative Setting: Test is administered to a student in a different setting.
MATAccom08	Change in Personnel: Test is administered by other personnel known to the student (e.g., LEP, Title I, special education teacher).
MATAccom09	Home Setting: Test is administered to the student by school personnel in their home.
MATAccom10	Front Row Seating: Student is seated at the front of the classroom when taking the test.

continued

<i>Accommodation</i>	<i>Description</i>
MATAccom12	Magnification: Student used equipment to magnify test materials.
MATAccom13	Student (not groups of students) wears equipment to reduce environmental noises.
MATAccom14	Template: Student uses a template. An example is a piece of card stock that has a window cut out that enables the student to focus by isolating lines of text or items.
MATAccom15	Amplification: Student uses amplification equipment (e.g., hearing aid or auditory trainer) while taking test.
MATAccom16	Writing Tools: Student uses a typewriter or word processor (without activating spell check).
MATAccom17	Voice Activation: Student speaks response into computer equipped with voice-activation software.
MATAccom18	Bilingual Dictionary: Student uses a bilingual dictionary.
MATAccom19	Dictation: Student dictates answers to a test administrator who records them in the Answer Booklet.
MATAccom20	Writing Tools: Student marks or writes answers with the assistance of a technology device or special equipment.
MATAccom21	Assistive Technology: Another form of assistive technology routinely used by the student (that does not change intent or test content).
MATAccom22	Oral Presentation: The test administrator must read the test items and answer choices word-for-word. Before reading aloud, the test administrator should advise students that each item and answer choice will be read aloud in exactly the order as presented. Students should also be advised that items, including answer choices, will be repeated at the end of a session in case the students wish to review/check their work.
MATAccom23	Test Interpretation: Tests, including directions, are interpreted for students who are deaf or hearing-impaired.
MATAccom24	Test Directions with Verification: An administrator gives test directions with verification (by using a highlighter) so that student understands them.
MATAccom25	Test Directions Support: An administrator assists student in understanding test directions, including giving directions in native language.
MATAccom26	Braille: Braille version of the test was used by the student.
MATAccom27	Large Print: A large-print version of the test is used by student.
MATAccom28	Other: With verification from the OPI in advance of the testing window, some other approved accommodation is used by student.
MATAccom30	Student uses a calculator, number chart, arithmetic table, or manipulative on the no calculator sections of the mathematics test.
MATAccom32	With verification from the OPI in advance of the testing window, some other approved accommodation is used by the student.

Table C-3. 2011–12 Montana CRT: Numbers of Students Tested with Accommodations by Accommodation Type and Grade – Reading

<i>Accommodation Code</i>	<i>Grade 3</i>	<i>Grade 4</i>	<i>Grade 5</i>	<i>Grade 6</i>	<i>Grade 7</i>	<i>Grade 8</i>	<i>Grade 10</i>
REAAccom01	145	169	193	155	94	91	56
REAAccom02	309	318	374	331	258	266	149
REAAccom04	118	122	117	108	73	78	47
REAAccom05	1,242	1,243	1,228	1,136	782	769	461
REAAccom06	251	272	278	182	177	122	31
REAAccom07	778	816	722	515	324	241	198
REAAccom08	789	796	730	500	321	250	205
REAAccom09	2	2	2	1	0	3	1
REAAccom10	11	3	3	7	3	1	3
REAAccom12	3	5	1	1	2	3	1
REAAccom13	2	3	2	0	4	0	2
REAAccom14	7	4	6	1	3	0	1
REAAccom15	4	4	3	1	3	0	0
REAAccom16	1	1	5	10	7	6	5
REAAccom17	0	0	0	0	0	0	0
REAAccom18	3	3	3	2	3	3	1
REAAccom19	166	188	198	110	79	41	8
REAAccom20	10	6	7	2	2	1	2
REAAccom21	1	2	1	2	4	1	0
REAAccom22	953	889	788	629	424	341	214
REAAccom23	4	7	10	6	8	6	0
REAAccom24	62	95	71	79	40	46	23
REAAccom25	91	105	109	109	81	83	61
REAAccom26	1	4	3	2	0	0	1
REAAccom27	6	3	8	3	5	3	4
REAAccom28	0	1	1	4	3	0	11
REAAccom29	0	0	0	0	0	0	0
REAAccom31	0	0	0	0	0	0	0

Table C-4. 2011–12 Montana CRT: Accommodations – Reading

<i>Accommodation</i>	<i>Description</i>
REAAccom01	Change in Administration Time: Test is administered at a time of day or a day of the week based on student needs.
REAAccom02	Session Duration: Test is administered in appropriate blocks of time for individual student needs, followed by rest breaks.
REAAccom04	Individual Administration: Test is administered in a one-to-one situation.
REAAccom05	Small Group Administration: Test is administered to a small group of students.
REAAccom06	Reduce Distracters: Student is seated at a carrel or other physical arrangement that reduces visual distractions.
REAAccom07	Alternative Setting: Test is administered to a student in a different setting.
REAAccom08	Change in Personnel: Test is administered by other personnel known to the student (e.g., LEP, Title I, special education teacher).
REAAccom09	Home Setting: Test is administered to the student by school personnel in their home.
REAAccom10	Front Row Seating: Student is seated at the front of the classroom when taking the test.

Continued

<i>Accommodation</i>	<i>Description</i>
REAAccom12	Magnification: Student used equipment to magnify test materials.
REAAccom13	Student (not groups of students) wears equipment to reduce environmental noises.
REAAccom14	Template: Student uses a template. An example is a piece of card stock that has a window cut out that enables the student to focus by isolating lines of text or items.
REAAccom15	Amplification: Student uses amplification equipment (e.g., hearing aid or auditory trainer) while taking test.
REAAccom16	Writing Tools: Student uses a typewriter or word processor (without activating spell check).
REAAccom17	Voice Activation: Student speaks response into computer equipped with voice-activation software.
REAAccom18	Bilingual Dictionary: Student uses a bilingual dictionary.
REAAccom19	Dictation: Student dictates answers to a test administrator who records them in the Answer Booklet.
REAAccom20	Writing Tools: Student marks or writes answers with the assistance of a technology device or special equipment.
REAAccom21	Assistive Technology: Another form of assistive technology routinely used by the student (that does not change intent or test content).
REAAccom22	Oral Presentation: Only the questions and answer choices may be read aloud to the student. It is advised that the questions be read aloud to the student before he/she reads each passage. After the student has read the passage, the test administrator must read the questions and answer choices word-for-word one at a time in exactly the order as presented.
REAAccom23	Test Interpretation: Tests, including directions, are interpreted for students who are deaf or hearing-impaired.
REAAccom24	Test Directions with Verification: An administrator gives test directions with verification (by using a highlighter) so that student understands them.
REAAccom25	Test Directions Support: An administrator assists student in understanding test directions, including giving directions in native language.
REAAccom26	Braille: Braille version of the test was used by the student.
REAAccom27	Large Print: A large-print version of the test is used by student.
REAAccom28	Other: With verification from the OPI in advance of the testing window, some other approved accommodation is used by student.
REAAccom29	Reading passages are read aloud to student, or student uses text-reader software for reading passages.
REAAccom31	Other: With verification from the OPI in advance of the testing window, some other approved accommodation is used by student.

Table C-5. 2011–12 Montana CRT: Numbers of Students Tested with Accommodations by Accommodation Type and Grade – Science

<i>Accommodation Code</i>	<i>Grade 4</i>	<i>Grade 8</i>	<i>Grade 10</i>
SCIAccom01	159	95	59
SCIAccom02	310	266	145
SCIAccom04	117	80	49
SCIAccom05	1,141	743	458
SCIAccom06	267	116	30
SCIAccom07	755	232	195
SCIAccom08	728	247	209
SCIAccom09	1	3	1
SCIAccom10	3	1	3
SCIAccom12	4	0	0
SCIAccom13	3	0	0
SCIAccom14	3	0	1
SCIAccom15	6	0	0
SCIAccom16	3	6	1
SCIAccom17	2	0	0
SCIAccom18	3	3	1
SCIAccom19	180	41	7
SCIAccom20	7	1	1
SCIAccom21	3	1	1
SCIAccom22	984	396	232
SCIAccom23	3	5	0
SCIAccom24	94	45	23
SCIAccom25	108	82	61
SCIAccom26	4	0	1
SCIAccom27	3	3	2
SCIAccom28	2	0	13
SCIAccom33	0	0	0

Table C-6. 2011–12 Montana CRT: Accommodations – Science

<i>Accommodation</i>	<i>Description</i>
SCIAccom01	Change in Administration Time: Test is administered at a time of day or a day of the week based on student needs.
SCIAccom02	Session Duration: Test is administered in appropriate blocks of time for individual student needs, followed by rest breaks.
SCIAccom04	Individual Administration: Test is administered in a one-to-one situation.
SCIAccom05	Small Group Administration: Test is administered to a small group of students.
SCIAccom06	Reduce Distracters: Student is seated at a carrel or other physical arrangement that reduces visual distractions.
SCIAccom07	Alternative Setting: Test is administered to a student in a different setting.
SCIAccom08	Change in Personnel: Test is administered by other personnel known to the student (e.g., LEP, Title I, special education teacher).
SCIAccom09	Home Setting: Test is administered to the student by school personnel in their home.
SCIAccom10	Front Row Seating: Student is seated at the front of the classroom when taking the test.

continued

<i>Accommodation</i>	<i>Description</i>
SCIAccom12	Magnification: Student used equipment to magnify test materials.
SCIAccom13	Student (not groups of students) wears equipment to reduce environmental noises.
SCIAccom14	Template: Student uses a template. An example is a piece of card stock that has a window cut out that enables the student to focus by isolating lines of text or items.
SCIAccom15	Amplification: Student uses amplification equipment (e.g., hearing aid or auditory trainer) while taking test.
SCIAccom16	Writing Tools: Student uses a typewriter or word processor (without activating spell check).
SCIAccom17	Voice Activation: Student speaks response into computer equipped with voice-activation software.
SCIAccom18	Bilingual Dictionary: Student uses a bilingual dictionary.
SCIAccom19	Dictation: Student dictates answers to a test administrator who records them in the Answer Booklet.
SCIAccom20	Writing Tools: Student marks or writes answers with the assistance of a technology device or special equipment.
SCIAccom21	Assistive Technology: Another form of assistive technology routinely used by the student (that does not change intent or test content).
SCIAccom22	Oral Presentation: The test administrator must read the test items and answer choices word-for-word and in exactly the order as presented.
SCIAccom23	Test Interpretation: Tests, including directions, are interpreted for students who are deaf or hearing-impaired.
SCIAccom24	Test Directions with Verification: An administrator gives test directions with verification (by using a highlighter) so that student understands them.
SCIAccom25	Test Directions Support: An administrator assists student in understanding test directions, including giving directions in native language.
SCIAccom26	Braille: Braille version of the test was used by the student.
SCIAccom27	Large Print: A large-print version of the test is used by student.
SCIAccom28	Other: With verification from the OPI in advance of the testing window, some other approved accommodation is used by student.
SCIAccom33	Other: With verification from the OPI in advance of the testing window, some other approved accommodation is used by student.

APPENDIX D—ITEM REVIEW COMMITTEE MEMBERS

**Table D-1. 2011–12 Montana CRT: Passage Review Committee Members
November 30–December 1, 2011**

<i>Name</i>	<i>Position</i>
Marilyn Beers	Teacher
Joel Carlson	Elementary Title Math Teacher
Richard Desch	Curriculum Coordinator
Kathy Gaul	4th Grade Teacher
Keith Grebetz	High School English Teacher
Dana Haring	Middle School English Teacher & Department Head
Janet Hegedus	Title 1 Dept Chair–Reading
Linda Jones	8th Grade English
Linda Kehr	Substitute Teacher
Shelly Moen	4th Grade Teacher
Cindy Noland	LA Teacher–High School
Dalene Normand	Teacher
Diana Sherman	ESL Teacher
Carol Shipley	Teacher

**Table D-2. 2011–12 Montana CRT: Item Review Committee Members
April 16–17, 2012**

<i>Name</i>	<i>Position</i>
Marilyn Beers	Teacher
Steve Bell	Broadfield Science Teacher
Jeffrey Bennett	Teacher
Linda Burrington	High School Math Teacher
Frankie Cansler	English Teacher
Joni Carroll	Teacher
Karla Clark	Librarian
Marilyn Clark	3/4 Grade Teacher
Colleen Davies	6th Grade Teacher
Richard Desch	Curriculum Coordinator
Pam Diamond	8th Grade Lang Arts
Laura Elliott	Special Education Teacher
Sandy Fox	5th Grade Teacher
Kathy Gaul	Teacher
Keith Grebetz	High School English Teacher
Heidi Hanks	6th Grade Teacher
Janet Hegedus	Title 1 Dept Chair-Reading
Linda Horst	8th Grade Math Teacher
Erik Johnson	Math Teacher
Linda Jones	8th Grade English
Linda Kehr	Substitute Teacher
Kristin Long	3rd Grade Teacher
Mary Lyndes	Teacher
Linda Marsh	County Superintendent
Talia Martin	Math Teacher
Anika McCauley	Teacher
Pamela Nell	6th-8th Science Instructor
Kevin Newman	Science Teacher

continued

<i>Name</i>	<i>Position</i>
Dalene Normand	3rd Grade Teacher
Ronda Pacheco	4th Grade Teacher
Bette Paskey	6th Grade Math Teacher
Will Pereira	Teacher, Earth Science & Wildlife Biology
Virginia Poole	6th Grade Teacher
Sunny Day Real Bird	Middle School Math Teacher
Lori Sarrazin	Math Teacher—Grades 7,8,10
Michele Schaub	Teacher
Heather Schneiter	5th Grade Teacher
Diana Sherman	ESL Teacher
Jennifer Tresch	Classroom Teacher
Debra Westrom	3-5 Librarian
Elizabeth Zurmuehlen	Mathematics Teacher

**Table D-3. 2011–12 Montana CRT: Bias Item Review Committee Members
April 18, 2012**

<i>Name</i>	<i>Position</i>
Alexander Ator	Principal/Math
Marilyn Beers	Teacher
Rodney Bird	Teacher
Lee Coble	Science Teacher
Richard Desch	Curriculum Coordinator
Pam Diamond	Language Arts Teacher
Janet Hegedus	Title 1 Dept Chair—Reading
Jennifer Hudson	6th Grade Math Teacher
Carol Paul	Title Teacher on Special Assignment
Analicia Pianca	Teacher
Michele Schaub	3rd Grade Teacher
Carol Shipley	Teacher
Joan Svennungsen	Language Arts
Patti Vennes	Teacher
Karla Clark	Teacher

**Table D-4. 2011–12 Montana CRT: Benchmarking Committee Members
May 8–10, 2012**

<i>Name</i>	<i>Content</i>
Beckie Frisbee	Math
Heidi Hanks	Math
Linda Jones	Reading
Nina Miller	Science
Bette Paskey	Math
Michele Schaub	Reading
Paul Tackes	Science
Holly McEwen	Reading
Jim Vennes	Reading

**Table D-5. 2011–12 Montana CRT: Item Statistical Review Committee Members
June 26–27, 2012**

<i>Name</i>	<i>Position</i>
Marilyn Beers	Teacher
Steve Bell	Broadfield Science Teacher
Shelby Blixt	Teacher
Tim Bolten	8th Grade Math
Stacey Boujoukos	8th Grade Teacher
Frankie Cansler	Teacher
Joni Carroll	Teacher
Mike Coon	Teacher
Cynthia Davidson-Martin	K-12 Counselor/ Test Coordinator
Pam Diamond	8th Grade Lang Arts
Beckie Frisbee	
Kathy Gaul	4th Grade Teacher
Keith Grebetz	High School English
Dana Haring	ELA Teacher/ Department Head
Janet Hegedus	Reading Teacher/ Dept Chair
Robin Hehn	Science Teacher
Jennifer Hudson	Gr. 6 Math Teacher
Karen Hutchison	Science Teacher/ Department Head
Carol Idland	4th Grade Teacher
Linda Jones	8th Grade English
Mary Lyndes	Teacher
Linda Marsh	County Superintendent
Talia Martin	Math Teacher
Kristi Messing	Resource Rm. Gr 6
Dalene Normand	3rd Grade
Michele Schaub	3rd Grade Teacher
Diana Sherman	ESL Teacher
Elizabeth Tomlinson	Teacher English

APPENDIX E—ITEM-LEVEL CLASSICAL STATISTICS

Table E-1. 2011–12 Montana CRT: Item Level Classical Test Theory Statistics – Mathematics Grade 3

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
60940	MC	0.91	0.28	0	173744	MC	0.36	0.32	1
60974	MC	0.79	0.38	0	59328	MC	0.50	0.36	1
173747	MC	0.78	0.46	0	76860	MC	0.91	0.42	0
173822	MC	0.61	0.44	1	173749	MC	0.73	0.49	0
76881	MC	0.75	0.34	0	138775	MC	0.55	0.46	1
173867	MC	0.31	0.29	1	138791	MC	0.67	0.44	0
43022	MC	0.72	0.40	1	76904	MC	0.82	0.30	1
76781	MC	0.70	0.46	1	173708	SA	0.66	0.48	0
173835	MC	0.46	0.37	1	76778	MC	0.82	0.40	0
139013	MC	0.69	0.38	1	173736	MC	0.74	0.39	0
60923	MC	0.73	0.56	1	175524	MC	0.70	0.54	1
76750	MC	0.33	0.30	2	138999	MC	0.69	0.47	0
60952	MC	0.81	0.50	1	173854	MC	0.56	0.29	0
59333	MC	0.84	0.33	1	59350	MC	0.40	0.41	1
138776	MC	0.64	0.44	1	76840	MC	0.62	0.37	1
43062	MC	0.76	0.29	0	77008	MC	0.68	0.43	1
43103	MC	0.60	0.29	1	60938	MC	0.89	0.35	1
61040	MC	0.86	0.34	1	139031	MC	0.58	0.38	1
77039	SA	0.77	0.41	1	138822	MC	0.88	0.37	1
139049	SA	0.71	0.49	0	60944	MC	0.89	0.39	1
43261	CR	0.70	0.51	1	173758	MC	0.71	0.49	1
138892	MC	0.92	0.29	0	77019	MC	0.74	0.52	1
139029	MC	0.87	0.25	0	138826	MC	0.27	0.33	1
173743	MC	0.87	0.34	1	60273	MC	0.92	0.39	1
76981	MC	0.74	0.49	0	34701	MC	0.86	0.39	1
173797	MC	0.40	0.46	1	43154	MC	0.49	0.42	1
173873	MC	0.74	0.37	0	138908	CR	0.35	0.52	1
60921	MC	0.66	0.40	1					
43130	MC	0.52	0.24	1					
138768	MC	0.60	0.46	1					
60335	MC	0.67	0.44	1					
138782	MC	0.76	0.42	0					
76992	MC	0.71	0.37	0					

Table E-2. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 4

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
173428	MC	0.94	0.27	0	76943	MC	0.78	0.30	0
35195	MC	0.86	0.43	0	76837	MC	0.66	0.38	0
62326	MC	0.77	0.29	0	76788	MC	0.43	0.35	0
62222	MC	0.65	0.46	0	76941	MC	0.76	0.33	0
76892	MC	0.54	0.53	0	62294	MC	0.34	0.34	0
34897	MC	0.56	0.28	0	139780	MC	0.66	0.43	0
43340	MC	0.67	0.47	0	139886	MC	0.76	0.28	0
44584	MC	0.26	0.33	0	62405	MC	0.67	0.52	0

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
61829	MC	0.75	0.49	0	62135	MC	0.75	0.42	2
62381	MC	0.80	0.45	1	43199	SA	0.54	0.53	1
173321	SA	0.72	0.51	0	62259	MC	0.94	0.33	0
61779	SA	0.74	0.42	1	140053	MC	0.75	0.33	0
76921	CR	0.52	0.63	1	34951	MC	0.71	0.28	0
139540	MC	0.89	0.34	0	140142	MC	0.62	0.48	0
76959	MC	0.84	0.34	0	76819	MC	0.68	0.48	0
43367	MC	0.68	0.39	0	43334	MC	0.75	0.28	0
76888	MC	0.66	0.42	0	173424	MC	0.62	0.30	0
139934	MC	0.58	0.39	0	173340	MC	0.57	0.54	0
173815	MC	0.48	0.36	0	34877	MC	0.59	0.46	0
35207	MC	0.61	0.42	0	61817	MC	0.79	0.27	0
43304	MC	0.83	0.34	0	62302	MC	0.70	0.28	0
76814	MC	0.61	0.34	0	77042	MC	0.49	0.39	0
76926	MC	0.82	0.23	0	35218	MC	0.72	0.32	0
173785	MC	0.71	0.40	0	76830	MC	0.85	0.40	0
76824	MC	0.43	0.39	0	35220	MC	0.70	0.49	0
76834	MC	0.41	0.47	0	173418	MC	0.63	0.42	0
76937	MC	0.82	0.26	0	76856	MC	0.66	0.38	1
61798	MC	0.52	0.35	0	62146	MC	0.58	0.45	2
139588	MC	0.82	0.50	0	77065	CR	0.62	0.59	0
173331	MC	0.70	0.28	0					
43332	MC	0.52	0.26	0					

Table E-3. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 5

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
43559	MC	0.84	0.31	0	77278	CR	0.44	0.66	1
140864	MC	0.73	0.40	0	140791	MC	0.59	0.37	0
77249	MC	0.59	0.43	0	34423	MC	0.48	0.41	0
43433	MC	0.60	0.40	0	140697	MC	0.63	0.45	0
60072	MC	0.47	0.44	0	77200	MC	0.80	0.34	0
140937	MC	0.70	0.52	0	77185	MC	0.79	0.45	0
77210	MC	0.67	0.43	0	60422	MC	0.76	0.34	0
77172	MC	0.80	0.46	0	59848	MC	0.73	0.47	0
140782	MC	0.49	0.46	0	140784	MC	0.61	0.33	0
60417	MC	0.70	0.33	0	173589	MC	0.60	0.43	0
60843	MC	0.91	0.27	0	140801	MC	0.35	0.32	0
59840	MC	0.77	0.41	0	43469	MC	0.52	0.38	0
60371	MC	0.82	0.33	0	59814	MC	0.67	0.38	0
140833	MC	0.62	0.38	0	140781	MC	0.56	0.58	0
140762	MC	0.83	0.24	0	43581	MC	0.67	0.24	0
140842	MC	0.74	0.30	0	173573	MC	0.66	0.47	0
140850	MC	0.48	0.35	0	34749	MC	0.45	0.44	0
43532	MC	0.42	0.52	1	140953	MC	0.52	0.25	0
140971	SA	0.62	0.38	0	77191	MC	0.70	0.26	0
77294	SA	0.52	0.48	0	173631	MC	0.70	0.30	1

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
140970	SA	0.49	0.44	0	77174	MC	0.45	0.43	0
43486	MC	0.60	0.37	0	34636	MC	0.38	0.36	0
77182	MC	0.59	0.42	0	77265	MC	0.43	0.30	0
77214	MC	0.70	0.21	0	140947	MC	0.50	0.40	0
77388	MC	0.75	0.40	0	59810	MC	0.60	0.47	0
77222	MC	0.23	0.29	0	77177	MC	0.80	0.33	0
34735	MC	0.44	0.24	0	60544	MC	0.79	0.38	0
77211	MC	0.63	0.45	0	140807	MC	0.67	0.50	1
34420	MC	0.71	0.42	0	59908	MC	0.68	0.39	1
34367	MC	0.36	0.14	0	146613	CR	0.60	0.58	0

Table E-4. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 6

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
141154	MC	0.66	0.32	0	140815	MC	0.45	0.32	0
141152	MC	0.32	0.27	0	141337	MC	0.37	0.31	0
174477	MC	0.47	0.55	0	77471	MC	0.32	0.25	0
140983	MC	0.61	0.28	0	77167	MC	0.80	0.49	0
77347	MC	0.61	0.47	0	77449	MC	0.54	0.37	0
77443	MC	0.75	0.20	0	34542	MC	0.45	0.39	1
140985	MC	0.76	0.45	0	44066	MC	0.81	0.38	0
141157	MC	0.32	0.31	0	61136	MC	0.49	0.35	0
174474	MC	0.48	0.53	0	77359	MC	0.56	0.34	0
77378	MC	0.57	0.52	0	44070	MC	0.70	0.34	0
141319	MC	0.87	0.31	0	141274	MC	0.53	0.28	0
141167	MC	0.55	0.37	0	43447	MC	0.71	0.39	0
140994	MC	0.53	0.45	1	77614	MC	0.75	0.36	0
77373	MC	0.57	0.50	1	141325	MC	0.63	0.30	0
43904	SA	0.41	0.39	0	44019	MC	0.52	0.33	0
174613	SA	0.72	0.34	0	34543	MC	0.48	0.49	0
174610	SA	0.69	0.48	1	174494	MC	0.65	0.42	0
174615	CR	0.53	0.68	4	62039	MC	0.63	0.32	0
77445	MC	0.95	0.21	0	61162	MC	0.55	0.36	0
141172	MC	0.61	0.37	0	62060	MC	0.82	0.44	0
141344	MC	0.54	0.45	0	174587	MC	0.87	0.37	0
34842	MC	0.74	0.37	0	61155	MC	0.58	0.57	0
141431	MC	0.66	0.41	0	77459	MC	0.69	0.39	0
77621	MC	0.75	0.52	0	44062	MC	0.41	0.29	0
141349	MC	0.36	0.31	0	44044	MC	0.26	0.39	0
61166	MC	0.80	0.39	0	141301	MC	0.43	0.25	0
77555	MC	0.75	0.26	0	146968	CR	0.49	0.70	1
77434	MC	0.31	0.19	0					
141341	MC	0.31	0.22	0					
61168	MC	0.61	0.25	0					
141406	MC	0.71	0.13	0					
174509	MC	0.77	0.40	0					
141484	MC	0.71	0.47	0					

Table E-5. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 7

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
61206	MC	0.78	0.36	0	86597	MC	0.53	0.36	0
43832	MC	0.85	0.37	0	43654	MC	0.62	0.34	0
61158	MC	0.64	0.43	0	61279	MC	0.87	0.43	0
86297	MC	0.75	0.49	0	142768	MC	0.40	0.48	0
174355	MC	0.59	0.37	0	142817	MC	0.48	0.35	0
142364	MC	0.56	0.46	0	43675	MC	0.56	0.27	1
86681	MC	0.85	0.39	0	43695	MC	0.76	0.32	0
142387	MC	0.50	0.34	0	86473	MC	0.64	0.38	0
174360	MC	0.46	0.45	0	43735	MC	0.82	0.31	0
174331	MC	0.64	0.37	0	88064	MC	0.32	0.16	0
86330	MC	0.57	0.46	0	86545	MC	0.76	0.36	0
43836	MC	0.57	0.36	0	142756	MC	0.80	0.34	0
43896	MC	0.44	0.29	1	86578	MC	0.40	0.27	0
43856	MC	0.51	0.43	1	174441	MC	0.64	0.47	0
86339	SA	0.52	0.51	1	86570	MC	0.47	0.40	0
86350	SA	0.31	0.43	2	61252	MC	0.83	0.35	0
43799	SA	0.73	0.49	1	43680	MC	0.27	0.30	0
86658	CR	0.43	0.49	5	61346	MC	0.49	0.31	0
86464	MC	0.54	0.47	0	61745	MC	0.65	0.44	0
142803	MC	0.62	0.29	0	142713	MC	0.39	0.32	0
61746	MC	0.28	0.37	0	61240	MC	0.60	0.51	0
61264	MC	0.48	0.47	0	86486	MC	0.45	0.47	0
142421	MC	0.66	0.36	0	142647	MC	0.58	0.31	0
142661	MC	0.77	0.40	0	43763	MC	0.65	0.38	0
142420	MC	0.36	0.34	0	142811	MC	0.76	0.39	0
142821	MC	0.85	0.42	0	44211	MC	0.65	0.49	1
142815	MC	0.56	0.39	0	43756	CR	0.39	0.63	1
174533	MC	0.39	0.34	0					
61358	MC	0.82	0.39	0					
86455	MC	0.56	0.46	0					
142376	MC	0.56	0.45	0					
86635	MC	0.86	0.37	0					
86672	MC	0.70	0.37	0					

Table E-6. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 8

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
87598	MC	0.96	0.24	0	144849	MC	0.67	0.43	0
44201	MC	0.72	0.52	0	175599	MC	0.52	0.45	0
35055	MC	0.53	0.47	0	61208	MC	0.34	0.47	0
62856	MC	0.66	0.40	0	62992	MC	0.75	0.44	0
87527	MC	0.63	0.42	0	63279	MC	0.51	0.43	0
144287	MC	0.29	0.35	0	35029	MC	0.48	0.32	1
87588	MC	0.66	0.42	0	87841	SA	0.53	0.56	1
144244	MC	0.58	0.45	0	175672	SA	0.46	0.47	1

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
175810	SA	0.50	0.51	1	44239	MC	0.83	0.35	0
235026	CR	0.49	0.61	7	63047	MC	0.65	0.56	0
44626	MC	0.88	0.29	0	144963	MC	0.71	0.51	0
34993	MC	0.91	0.30	0	144551	MC	0.58	0.42	0
88363	MC	0.47	0.33	0	175765	MC	0.60	0.55	0
44632	MC	0.40	0.43	0	144927	MC	0.70	0.24	0
88864	MC	0.66	0.32	0	35030	MC	0.62	0.53	0
44666	MC	0.56	0.36	0	44243	MC	0.59	0.42	0
34940	MC	0.42	0.31	0	175602	MC	0.67	0.44	0
144374	MC	0.75	0.45	0	88325	MC	0.43	0.46	0
88319	MC	0.33	0.24	0	87821	MC	0.61	0.38	0
144428	MC	0.76	0.28	0	144868	MC	0.39	0.41	0
144854	MC	0.59	0.40	0	175488	MC	0.43	0.37	0
174425	MC	0.56	0.44	0	175605	MC	0.50	0.47	0
44141	MC	0.80	0.45	0	175610	MC	0.39	0.52	0
63138	MC	0.68	0.29	0	72828	MC	0.61	0.54	0
88174	MC	0.53	0.25	0	144424	MC	0.51	0.32	0
144886	MC	0.31	0.19	0	35017	MC	0.48	0.42	0
34976	MC	0.38	0.33	0	175643	MC	0.45	0.41	0
44662	MC	0.49	0.45	0	44149	MC	0.63	0.30	1
63135	MC	0.75	0.45	0	63305	CR	0.55	0.71	1
88848	MC	0.60	0.42	0					

Table E-7. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Mathematics Grade 10

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
174627	MC	0.69	0.36	0	43951	MC	0.32	0.27	0
34477	MC	0.77	0.33	0	44531	MC	0.55	0.37	0
43765	MC	0.56	0.31	0	77604	MC	0.23	0.21	0
77572	MC	0.26	0.52	0	35243	MC	0.42	0.31	0
174633	MC	0.39	0.31	0	77396	MC	0.50	0.28	0
59379	MC	0.51	0.39	0	43877	MC	0.39	0.33	0
174700	MC	0.52	0.44	0	77412	MC	0.30	0.31	0
77529	MC	0.73	0.43	0	77520	MC	0.50	0.33	0
146554	MC	0.37	0.38	0	144825	MC	0.54	0.40	0
43611	MC	0.47	0.34	0	43778	MC	0.49	0.39	0
43629	MC	0.62	0.31	0	43917	MC	0.51	0.38	0
43648	MC	0.27	0.24	0	174717	MC	0.75	0.48	0
34799	MC	0.47	0.32	0	34835	MC	0.37	0.27	0
43737	MC	0.29	0.24	0	145025	MC	0.53	0.29	0
145015	SA	0.74	0.44	1	146548	MC	0.32	0.40	0
144888	SA	0.27	0.51	4	44552	MC	0.56	0.42	0
77632	SA	0.47	0.39	1	61324	MC	0.87	0.36	0
77651	CR	0.41	0.64	8	144904	MC	0.70	0.42	0
35244	MC	0.86	0.30	0	77354	MC	0.59	0.16	0
174637	MC	0.60	0.27	0	43926	MC	0.47	0.48	0
174714	MC	0.19	0.18	0	62368	MC	0.63	0.35	0

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
62279	MC	0.70	0.40	0
145292	MC	0.56	0.41	0
44572	MC	0.59	0.37	0
34488	MC	0.38	0.29	0
77514	MC	0.35	0.33	0
62374	MC	0.76	0.23	0
146565	MC	0.65	0.45	0
34765	MC	0.37	0.41	0
62352	MC	0.60	0.30	0
77407	MC	0.46	0.34	0

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
62230	MC	0.33	0.26	0
145024	MC	0.30	0.23	0
62292	MC	0.38	0.24	0
34856	MC	0.44	0.40	0
77499	MC	0.38	0.17	0
77551	MC	0.51	0.32	0
145993	MC	0.37	0.29	1
144973	CR	0.21	0.52	2

Table E-8. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 3

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
150517	MC	0.81	0.39	0
150524	MC	0.71	0.39	1
150529	MC	0.86	0.38	1
150522	MC	0.88	0.39	1
150552	MC	0.71	0.27	1
150555	MC	0.78	0.24	1
150569	MC	0.90	0.38	2
42895	MC	0.68	0.32	0
42896	MC	0.75	0.44	0
42897	MC	0.44	0.33	1
42899	MC	0.46	0.37	0
42900	MC	0.57	0.37	1
42904	MC	0.59	0.38	1
42903	MC	0.66	0.50	1
42906	MC	0.62	0.32	0
44735	MC	0.74	0.45	0
42910	MC	0.48	0.34	0
42908	MC	0.80	0.49	1
42912	MC	0.93	0.27	2
42913	CR	0.49	0.55	1
177982	MC	0.80	0.48	0
177983	MC	0.85	0.43	0
178006	MC	0.70	0.40	0
178009	MC	0.66	0.39	1
178002	MC	0.83	0.18	2
178018	MC	0.77	0.44	0
178033	MC	0.73	0.37	0
177827	MC	0.61	0.37	0
177828	MC	0.43	0.24	0
177832	MC	0.53	0.28	1

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
177833	MC	0.63	0.37	2
177837	MC	0.60	0.32	0
177836	MC	0.55	0.42	1
177838	MC	0.82	0.49	0
177841	MC	0.87	0.25	0
177844	MC	0.91	0.38	0
177849	MC	0.59	0.43	0
177847	MC	0.62	0.39	1
177850	MC	0.74	0.40	2
177848	MC	0.73	0.48	1
177853	MC	0.66	0.43	1
92698	MC	0.75	0.58	0
92702	MC	0.86	0.39	0
92699	MC	0.67	0.39	1
92704	MC	0.84	0.48	1
92705	MC	0.61	0.53	1
92706	MC	0.37	0.45	2
92708	MC	0.78	0.47	0
92714	MC	0.71	0.43	1
92712	MC	0.74	0.36	1
92716	MC	0.39	0.25	1
92718	MC	0.77	0.38	1
92719	MC	0.63	0.31	2
92721	CR	0.39	0.52	1

Table E-9. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 4

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
178192	MC	0.71	0.29	0	178144	MC	0.74	0.41	0
178208	MC	0.91	0.40	0	178150	MC	0.72	0.31	0
178209	MC	0.87	0.38	0	178151	MC	0.73	0.36	0
178214	MC	0.70	0.33	0	178152	MC	0.85	0.42	0
178211	MC	0.52	0.40	0	178403	MC	0.60	0.39	0
178227	MC	0.45	0.24	0	178405	MC	0.93	0.36	0
178225	MC	0.48	0.39	0	178407	MC	0.69	0.41	0
178241	MC	0.74	0.31	0	178416	MC	0.66	0.34	0
178239	MC	0.56	0.34	0	178415	MC	0.51	0.30	0
178245	MC	0.72	0.37	0	178424	MC	0.71	0.40	0
178251	MC	0.62	0.40	0	178419	MC	0.74	0.37	0
178255	MC	0.73	0.50	0	178372	MC	0.73	0.30	0
178258	MC	0.73	0.39	0	178370	MC	0.71	0.33	0
178273	MC	0.68	0.27	0	178377	MC	0.70	0.40	0
178259	MC	0.64	0.28	0	178395	MC	0.74	0.51	0
178278	MC	0.56	0.23	0	178398	MC	0.63	0.40	0
178295	MC	0.49	0.25	1	178386	MC	0.85	0.49	0
178292	MC	0.82	0.41	0	178396	MC	0.81	0.47	0
178290	MC	0.50	0.31	1	178389	MC	0.64	0.40	0
178298	CR	0.42	0.55	1	178393	MC	0.71	0.49	0
178157	MC	0.78	0.35	0	178394	MC	0.38	0.24	0
178159	MC	0.78	0.21	0	178364	MC	0.58	0.32	0
178166	MC	0.53	0.28	0	178404	MC	0.43	0.18	1
178168	MC	0.69	0.37	0	178418	CR	0.37	0.45	1
178172	MC	0.86	0.39	0					
178171	MC	0.71	0.26	0					
178170	MC	0.79	0.36	0					
178123	MC	0.91	0.40	0					
178132	MC	0.92	0.37	0					
178136	MC	0.82	0.46	0					

Table E-10. 2011–12 Montana CRT: Item Level Classical Test Theory Statistics – Reading Grade 5

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
181973	MC	0.76	0.40	0	176324	MC	0.54	0.39	0
181940	MC	0.85	0.36	0	176332	MC	0.82	0.38	0
181943	MC	0.69	0.44	0	176334	MC	0.64	0.33	0
181949	MC	0.50	0.34	0	176346	MC	0.74	0.36	0
206094	MC	0.83	0.36	0	176354	MC	0.69	0.32	0
206103	MC	0.66	0.34	0	176357	MC	0.71	0.40	1
181944	MC	0.61	0.43	0	176361	MC	0.83	0.40	0
176341	MC	0.95	0.30	0	176364	MC	0.48	0.34	0
176297	MC	0.67	0.31	0	176371	CR	0.50	0.55	1
176300	MC	0.58	0.24	0	151801	MC	0.80	0.38	0
176323	MC	0.72	0.41	0	151828	MC	0.70	0.32	0

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
151803	MC	0.55	0.31	0	176524	MC	0.62	0.39	0
151829	MC	0.88	0.46	0	176529	MC	0.69	0.30	0
151833	MC	0.81	0.33	0	176531	MC	0.85	0.42	0
151837	MC	0.91	0.33	0	176387	MC	0.84	0.49	0
151838	MC	0.66	0.47	0	176385	MC	0.80	0.44	0
176474	MC	0.56	0.31	0	176388	MC	0.62	0.48	0
176482	MC	0.64	0.42	0	176393	MC	0.72	0.38	0
176488	MC	0.80	0.41	0	176394	MC	0.44	0.39	0
176493	MC	0.64	0.31	0	176402	MC	0.66	0.40	0
176490	MC	0.72	0.25	0	176405	MC	0.62	0.38	0
176497	MC	0.89	0.44	0	176425	MC	0.52	0.44	0
176504	MC	0.81	0.27	0	176428	MC	0.69	0.43	0
176507	MC	0.83	0.41	0	176416	MC	0.66	0.46	1
176513	MC	0.78	0.29	0	176432	MC	0.83	0.40	0
176516	MC	0.75	0.45	0	176429	MC	0.60	0.35	0
176523	MC	0.81	0.49	0	176438	CR	0.45	0.58	1

Table E-11. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 6

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
176932	MC	0.72	0.29	0	176974	MC	0.84	0.39	0
176913	MC	0.73	0.26	0	176952	MC	0.63	0.35	0
176923	MC	0.65	0.40	0	176959	MC	0.60	0.35	0
176927	MC	0.46	0.24	0	176970	MC	0.82	0.42	0
176945	MC	0.76	0.42	0	176981	MC	0.61	0.41	0
176942	MC	0.72	0.33	0	176980	MC	0.67	0.30	0
176940	MC	0.83	0.27	0	176983	MC	0.89	0.42	0
177008	MC	0.66	0.35	0	95405	MC	0.59	0.29	0
177011	MC	0.69	0.45	0	95410	MC	0.66	0.37	0
177013	MC	0.94	0.42	0	95421	MC	0.83	0.47	0
177016	MC	0.85	0.49	0	95425	MC	0.84	0.44	0
177027	MC	0.62	0.38	0	95409	MC	0.74	0.34	0
177028	MC	0.74	0.40	0	95431	MC	0.62	0.40	0
177030	MC	0.67	0.45	0	95441	MC	0.77	0.43	0
177023	MC	0.53	0.43	0	177058	MC	0.61	0.30	0
177021	MC	0.77	0.39	0	177068	MC	0.57	0.39	0
177009	MC	0.60	0.38	1	177070	MC	0.51	0.32	0
177049	MC	0.87	0.43	0	177074	MC	0.86	0.33	0
177045	MC	0.74	0.40	0	177088	MC	0.76	0.31	0
177052	CR	0.45	0.53	0	177091	MC	0.86	0.32	0
176870	MC	0.71	0.36	0	177098	MC	0.85	0.40	0
176880	MC	0.71	0.40	0	177115	MC	0.85	0.40	0
176887	MC	0.73	0.30	0	177083	MC	0.68	0.49	0
176889	MC	0.75	0.44	0	177117	MC	0.79	0.52	0
176892	MC	0.82	0.38	0	177121	MC	0.60	0.38	0
176903	MC	0.84	0.36	0	177130	MC	0.67	0.36	0
176910	MC	0.54	0.23	0	177137	CR	0.49	0.52	0

Table E-12. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 7

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
149106	MC	0.63	0.27	0	92345	MC	0.77	0.38	0
149107	MC	0.94	0.31	0	92348	MC	0.67	0.29	0
149111	MC	0.91	0.43	0	92350	MC	0.73	0.41	0
149121	MC	0.73	0.36	0	92347	MC	0.63	0.33	0
149119	MC	0.48	0.31	0	176273	MC	0.71	0.44	0
149110	MC	0.87	0.36	0	176272	MC	0.79	0.48	0
149125	MC	0.92	0.37	0	176276	MC	0.80	0.44	0
148663	MC	0.60	0.37	0	176283	MC	0.51	0.35	0
148645	MC	0.80	0.37	0	176282	MC	0.76	0.28	0
148652	MC	0.85	0.41	0	176292	MC	0.74	0.35	0
148656	MC	0.77	0.39	0	176290	MC	0.87	0.36	0
148661	MC	0.69	0.34	0	176211	MC	0.74	0.32	0
148664	MC	0.60	0.42	0	176216	MC	0.71	0.44	0
236550	MC	0.64	0.41	0	176217	MC	0.77	0.38	0
148670	MC	0.62	0.37	0	176218	MC	0.72	0.30	0
148697	MC	0.84	0.44	0	176219	MC	0.75	0.43	0
148681	MC	0.68	0.45	0	177549	MC	0.60	0.37	0
148733	MC	0.77	0.36	0	176221	MC	0.61	0.27	0
148723	MC	0.61	0.27	0	176234	MC	0.65	0.30	0
148742	CR	0.51	0.56	0	176230	MC	0.84	0.35	0
176307	MC	0.72	0.35	0	176241	MC	0.74	0.44	1
176310	MC	0.69	0.35	0	176238	MC	0.72	0.36	0
176312	MC	0.62	0.31	0	176235	MC	0.88	0.52	0
176318	MC	0.86	0.31	0	176250	CR	0.50	0.50	1
176317	MC	0.87	0.39	0					
176319	MC	0.72	0.24	0					
176322	MC	0.76	0.32	0					
92341	MC	0.63	0.35	0					
92342	MC	0.66	0.47	0					
92343	MC	0.75	0.37	0					

Table E-13. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 8

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
176907	MC	0.81	0.27	0	177119	MC	0.57	0.30	0
176914	MC	0.82	0.35	0	177131	MC	0.60	0.31	0
176933	MC	0.68	0.32	0	177135	MC	0.67	0.43	0
176943	MC	0.77	0.39	0	177136	MC	0.64	0.30	0
176956	MC	0.79	0.32	0	177158	MC	0.42	0.30	0
176958	MC	0.87	0.42	0	177141	MC	0.54	0.37	0
176960	MC	0.87	0.35	0	177146	MC	0.75	0.19	0
177095	MC	0.54	0.26	0	177155	MC	0.61	0.29	0
177112	MC	0.82	0.42	0	177159	CR	0.52	0.58	0
177116	MC	0.67	0.32	0	178102	MC	0.87	0.38	0
177123	MC	0.57	0.32	0	176875	MC	0.81	0.34	0

continued

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
178079	MC	0.71	0.41	0	177012	MC	0.58	0.41	0
176891	MC	0.80	0.46	0	177018	MC	0.61	0.18	0
176904	MC	0.83	0.45	0	177020	MC	0.76	0.44	0
178082	MC	0.87	0.44	0	177037	MC	0.66	0.46	1
176900	MC	0.75	0.21	0	177031	MC	0.77	0.37	0
149317	MC	0.73	0.41	0	177035	MC	0.79	0.52	0
149322	MC	0.78	0.41	0	177038	MC	0.73	0.42	0
152507	MC	0.90	0.31	0	177046	MC	0.50	0.24	0
149321	MC	0.82	0.35	0	177055	MC	0.77	0.45	0
152490	MC	0.72	0.47	0	177048	MC	0.56	0.44	0
152479	MC	0.64	0.34	0	177050	MC	0.58	0.32	0
149324	MC	0.78	0.37	0	177051	MC	0.73	0.49	0
177002	MC	0.84	0.31	0	177057	MC	0.62	0.40	0
176998	MC	0.76	0.33	0	177060	MC	0.77	0.39	0
177000	MC	0.83	0.49	0	177065	MC	0.69	0.45	1
177004	MC	0.66	0.45	0	177073	CR	0.49	0.59	1

Table E-14. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Reading Grade 10

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
177247	MC	0.73	0.43	0	149802	MC	0.63	0.34	0
177250	MC	0.68	0.21	0	149813	MC	0.74	0.29	0
177252	MC	0.86	0.37	0	149822	MC	0.68	0.27	0
177254	MC	0.50	0.21	0	149839	MC	0.51	0.42	0
177253	MC	0.74	0.32	0	149838	MC	0.65	0.40	0
177256	MC	0.79	0.38	0	149858	MC	0.70	0.46	0
177255	MC	0.61	0.27	0	149862	MC	0.80	0.27	0
177220	MC	0.83	0.43	0	177170	MC	0.77	0.43	0
177221	MC	0.83	0.39	0	177173	MC	0.91	0.47	0
177225	MC	0.66	0.28	0	177171	MC	0.77	0.30	0
177228	MC	0.76	0.41	0	177175	MC	0.76	0.36	0
177230	MC	0.68	0.28	0	177178	MC	0.79	0.20	0
177231	MC	0.53	0.41	0	177180	MC	0.83	0.39	0
177232	MC	0.82	0.35	0	177181	MC	0.78	0.44	0
177224	MC	0.70	0.39	0	177196	MC	0.75	0.38	0
177234	MC	0.61	0.26	0	177197	MC	0.66	0.28	0
177240	MC	0.76	0.28	0	177198	MC	0.75	0.38	0
177241	MC	0.66	0.31	0	177200	MC	0.78	0.53	0
177235	MC	0.61	0.30	0	177202	MC	0.67	0.41	0
177242	CR	0.52	0.60	1	177203	MC	0.68	0.37	0
177185	MC	0.86	0.24	0	177207	MC	0.79	0.47	0
177186	MC	0.74	0.30	0	177199	MC	0.68	0.34	0
177191	MC	0.55	0.23	0	177214	MC	0.63	0.32	0
177189	MC	0.73	0.35	0	177215	MC	0.46	0.30	1
177193	MC	0.59	0.27	0	177209	MC	0.68	0.37	0
177190	MC	0.64	0.37	0	177213	MC	0.77	0.44	1
177195	MC	0.80	0.28	0	177218	CR	0.50	0.57	2

Table E-15. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Science Grade 4

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
120582	MC	0.96	0.20	0	60156	MC	0.71	0.32	0
75824	MC	0.75	0.22	0	120162	MC	0.62	0.39	0
120568	MC	0.81	0.32	0	60106	MC	0.74	0.29	0
76285	MC	0.84	0.35	0	56422	MC	0.61	0.30	0
159635	MC	0.63	0.18	0	75908	MC	0.74	0.20	0
75690	MC	0.52	0.29	0	53958	MC	0.36	0.18	1
166767	MC	0.81	0.22	0	75493	MC	0.95	0.26	0
76405	MC	0.64	0.28	0	166761	MC	0.87	0.28	0
60062	MC	0.63	0.27	0	166779	MC	0.75	0.37	0
75407	MC	0.51	0.29	0	166777	MC	0.65	0.36	0
52571	MC	0.37	0.29	0	120548	MC	0.72	0.35	0
166253	MC	0.55	0.32	0	75828	MC	0.71	0.43	0
159619	MC	0.50	0.31	0	120014	MC	0.72	0.30	0
55789	MC	0.79	0.42	0	75782	MC	0.48	0.17	0
120167	MC	0.81	0.39	0	134742	MC	0.67	0.18	0
119984	MC	0.71	0.29	0	166239	MC	0.72	0.25	0
76283	MC	0.53	0.29	1	134675	MC	0.68	0.44	0
56126	CR	0.59	0.44	1	166229	MC	0.62	0.45	0
75788	MC	0.90	0.22	0	75425	MC	0.73	0.41	0
120572	MC	0.78	0.39	0	57863	MC	0.57	0.29	0
119971	MC	0.85	0.35	0	76401	MC	0.60	0.29	0
159626	MC	0.50	0.20	0	75408	MC	0.52	0.23	0
60053	MC	0.80	0.38	0	75884	MC	0.60	0.40	0
76291	MC	0.75	0.32	0	60127	MC	0.49	0.25	1
76278	MC	0.74	0.40	0	75427	CR	0.30	0.45	1
119973	MC	0.61	0.35	0					
75717	MC	0.65	0.25	0					
159624	MC	0.69	0.29	0					
76399	MC	0.59	0.38	0					
75768	MC	0.81	0.27	0					

Table E-16. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Science Grade 8

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
158535	MC	0.88	0.33	0	75920	MC	0.59	0.22	0
89798	MC	0.92	0.13	0	89764	MC	0.36	0.30	0
54339	MC	0.81	0.35	0	89588	MC	0.55	0.42	0
122035	MC	0.58	0.28	0	158485	MC	0.65	0.38	0
125949	MC	0.74	0.33	0	89719	MC	0.69	0.51	0
158576	MC	0.48	0.33	0	56842	MC	0.83	0.29	0
158493	MC	0.37	0.35	0	54264	MC	0.80	0.38	0
125947	MC	0.77	0.23	0	158582	MC	0.63	0.32	0
158553	MC	0.43	0.24	0	121193	MC	0.59	0.31	0
53303	MC	0.87	0.32	0	121212	MC	0.33	0.19	0
158528	MC	0.61	0.32	0	134553	MC	0.72	0.49	0
158559	MC	0.31	0.18	0	122748	MC	0.37	0.18	0
134455	MC	0.53	0.36	0	122725	MC	0.60	0.36	0
125959	MC	0.72	0.38	0	121617	MC	0.68	0.43	0
158540	MC	0.46	0.23	0	55031	MC	0.41	0.23	0
122762	MC	0.50	0.33	0	121184	MC	0.63	0.42	0
89216	MC	0.60	0.29	0	122722	MC	0.42	0.19	0
121233	CR	0.65	0.52	1	54750	MC	0.79	0.43	0
122713	MC	0.94	0.29	0	158569	MC	0.50	0.30	0
89420	MC	0.83	0.35	0	122710	MC	0.50	0.22	0
121229	MC	0.67	0.26	0	121222	MC	0.70	0.41	0
158518	MC	0.82	0.41	0	89513	MC	0.84	0.26	1
122039	MC	0.71	0.37	0	89762	MC	0.50	0.29	0
89772	MC	0.46	0.25	0	56814	MC	0.81	0.40	1
89274	MC	0.43	0.24	0	89539	CR	0.40	0.53	2
122730	MC	0.77	0.43	0					
158580	MC	0.67	0.28	0					
89884	MC	0.62	0.43	0					
134459	MC	0.66	0.34	0					
158538	MC	0.51	0.27	0					

Table E-17. 2011–12 Montana CRT: Item-Level Classical Test Theory Statistics – Science Grade 10

<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>	<i>Item Number</i>	<i>Item Type</i>	<i>Difficulty</i>	<i>Discrimination</i>	<i>Percent Omitted</i>
119799	MC	0.84	0.34	0	75442	MC	0.58	0.43	0
158427	MC	0.71	0.51	0	158619	MC	0.54	0.30	0
119855	MC	0.58	0.30	0	134512	MC	0.61	0.26	0
158429	MC	0.40	0.32	0	130556	MC	0.79	0.44	0
158601	MC	0.49	0.42	0	119664	MC	0.41	0.27	0
75804	MC	0.50	0.43	0	75452	MC	0.49	0.33	1
75445	MC	0.37	0.24	0	159462	MC	0.81	0.45	0
130550	MC	0.88	0.41	0	158595	MC	0.59	0.32	0
75440	MC	0.52	0.46	0	134795	MC	0.50	0.30	0
158424	MC	0.63	0.51	0	56086	MC	0.51	0.41	0
158423	MC	0.52	0.32	0	158621	MC	0.41	0.26	0
158433	MC	0.53	0.49	0	158437	MC	0.54	0.32	1
158629	MC	0.74	0.45	0	75433	MC	0.51	0.37	0
75645	MC	0.37	0.15	0	119674	MC	0.56	0.25	1
52926	MC	0.68	0.29	0	134479	MC	0.53	0.38	1
53755	MC	0.70	0.46	0	75807	MC	0.50	0.35	0
52286	MC	0.73	0.40	1	55209	MC	0.38	0.22	1
75882	CR	0.23	0.51	3	53745	MC	0.76	0.39	1
75739	MC	0.74	0.38	0	158596	MC	0.39	0.31	1
158432	MC	0.60	0.20	0	134499	MC	0.65	0.43	1
158604	MC	0.58	0.35	0	158617	MC	0.52	0.34	1
119955	MC	0.47	0.39	0	159476	MC	0.71	0.42	1
159459	MC	0.43	0.31	0	75632	MC	0.50	0.41	1
158449	MC	0.79	0.47	0	55771	MC	0.81	0.45	1
159433	MC	0.80	0.41	0	158450	CR	0.38	0.53	2
159438	MC	0.77	0.43	0					
158426	MC	0.62	0.37	0					
120064	MC	0.79	0.31	0					
75979	MC	0.43	0.19	0					
130592	MC	0.64	0.46	0					

APPENDIX F—ITEM-LEVEL SCORE DISTRIBUTIONS

Table F-1. 2011–12 Montana CRT: Item-Level Score Distributions for Constructed-Response Items by Subject and Grade

Subject	Grade	Total Possible Points	Item Number	Percent of Students at Score Point				
				0	1	2	3	4
Mathematics	3	4	43261	3.56	5.16	20.10	49.23	21.39
		4	138908	38.77	14.86	18.98	16.78	9.69
	4	4	76921	12.67	25.79	18.27	22.23	20.06
		4	77065	10.22	18.76	15.58	23.13	31.82
	5	4	77278	23.45	7.49	48.12	4.49	15.09
		4	146613	4.46	23.83	14.70	39.83	16.79
	6	4	174615	21.24	7.09	20.61	25.93	21.05
		4	146968	28.24	6.51	23.79	23.55	17.35
	7	4	86658	28.24	8.41	28.65	14.18	15.49
		4	43756	34.62	9.73	32.37	7.94	14.12
	8	4	235026	19.98	7.16	25.89	23.49	16.26
		4	63305	21.28	14.73	16.10	14.92	31.77
	10	4	77651	25.78	14.92	18.16	18.69	14.13
		4	144973	46.83	30.32	12.50	5.02	3.01
Reading	3	4	42913	3.94	31.04	33.83	22.54	7.81
		4	92721	14.99	32.19	36.37	12.43	3.04
	4	4	178298	12.15	27.74	39.62	16.48	3.38
		4	178418	11.43	41.67	35.14	9.54	1.63
	5	4	176371	5.42	25.43	39.99	20.48	8.11
		4	176438	8.20	30.32	38.51	18.05	4.22
	6	4	177052	10.06	26.49	41.28	17.02	4.74
		4	177137	7.71	23.70	38.12	23.14	6.99
	7	4	148742	5.45	23.36	38.91	24.84	7.09
		4	176250	5.95	23.04	40.49	23.18	6.81
	8	4	177159	4.97	22.22	38.19	25.78	8.48
		4	177073	10.67	23.16	32.60	23.53	9.12
	10	4	177242	7.90	20.18	36.94	23.68	10.29
		4	177218	6.26	25.67	35.99	20.90	9.56
Science	4	4	56126	20.52	7.10	12.81	34.50	24.47
		4	75427	22.70	38.82	31.80	4.57	1.40
	8	4	121233	6.01	12.99	20.76	33.22	26.42
		4	89539	26.11	22.36	21.54	20.16	8.31
	10	4	75882	34.24	36.93	19.99	5.52	0.04
		4	158450	12.20	43.59	21.26	17.44	3.25

APPENDIX G—NUMBER OF ITEMS CLASSIFIED INTO DIFFERENTIAL ITEM FUNCTIONING CATEGORIES

Table G-1. 2011–12 Montana CRT: Number of Items Classified as “Low” or “High” DIF, Overall and by Group Favored – Mathematics

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number “Low”			Number “High”			
					Total	Favoring		Total	Favoring		
						Reference	Focal		Reference	Focal	
3	MC	Male	Female	55	2	2	0	0	0	0	
		White	Hispanic	55	4	3	1	0	0	0	
			Native American	55	5	4	1	0	0	0	
		No Disability	Disability	55	1	1	0	0	0	0	
		Not Low Income	Low Income	55	2	2	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	55	12	9	3	3	3	0	
		OR	Male	Female	5	0	0	0	0	0	0
			White	Hispanic	5	0	0	0	0	0	0
				Native American	5	0	0	0	0	0	0
	No Disability		Disability	5	0	0	0	0	0	0	
	Not Low Income		Low Income	5	0	0	0	0	0	0	
	Not Limited English Proficient		Limited English Proficient	5	1	1	0	0	0	0	
	4	MC	Male	Female	55	4	3	1	0	0	0
			White	Hispanic	55	6	5	1	1	1	0
				Native American	55	3	3	0	1	1	0
No Disability			Disability	55	2	2	0	0	0	0	
Not Low Income			Low Income	55	0	0	0	0	0	0	
Not Limited English Proficient			Limited English Proficient	55	12	10	2	3	3	0	
OR			Male	Female	5	1	0	1	0	0	0
			White	Hispanic	5	0	0	0	0	0	0
				Native American	5	0	0	0	0	0	0
		No Disability	Disability	5	1	1	0	0	0	0	
		Not Low Income	Low Income	5	0	0	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	5	0	0	0	0	0	0	
5		MC	Male	Female	55	4	3	1	0	0	0
			White	Hispanic	55	2	1	1	0	0	0
				Native American	55	1	1	0	0	0	0
	No Disability		Disability	55	3	1	2	0	0	0	
	Not Low Income		Low Income	55	0	0	0	0	0	0	
	Not Limited English Proficient		Limited English Proficient	55	13	10	3	6	4	2	

continued

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number "Low"			Number "High"		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
5	OR	Male	Female	5	1	0	1	0	0	0
		White	Hispanic	5	0	0	0	0	0	0
			Native American	5	0	0	0	0	0	0
		No Disability	Disability	5	0	0	0	0	0	0
		Not Low Income	Low Income	5	0	0	0	0	0	0
	Not Limited English Proficient	Limited English Proficient	5	3	3	0	0	0	0	
6	MC	Male	Female	55	7	4	3	2	2	0
		White	Hispanic	55	4	4	0	0	0	0
			Native American	55	2	2	0	0	0	0
		No Disability	Disability	55	8	7	1	1	0	1
		Not Low Income	Low Income	55	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	55	13	9	4	6	4	2
	OR	Male	Female	5	1	0	1	0	0	0
		White	Hispanic	5	1	1	0	0	0	0
			Native American	5	0	0	0	0	0	0
		No Disability	Disability	5	1	1	0	1	1	0
Not Low Income		Low Income	5	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	5	0	0	0	1	1	0	
7	MC	Male	Female	55	8	6	2	2	2	0
		White	Hispanic	55	1	1	0	0	0	0
			Native American	55	4	3	1	0	0	0
		No Disability	Disability	55	5	4	1	0	0	0
		Not Low Income	Low Income	55	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	55	15	10	5	4	3	1
	OR	Male	Female	5	1	0	1	0	0	0
		White	Hispanic	5	1	1	0	0	0	0
			Native American	5	1	1	0	0	0	0
		No Disability	Disability	5	2	2	0	0	0	0
Not Low Income		Low Income	5	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	5	1	1	0	0	0	0	

continued

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number "Low"			Number "High"		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
8	MC	Male	Female	54	12	9	3	2	2	0
		White	Hispanic	54	4	4	0	0	0	0
			Native American	54	1	1	0	0	0	0
		No Disability	Disability	54	5	3	2	2	2	0
		Not Low Income	Low Income	54	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	54	13	9	4	8	7	1
	OR	Male	Female	5	2	0	2	0	0	0
		White	Hispanic	5	0	0	0	0	0	0
			Native American	5	0	0	0	0	0	0
		No Disability	Disability	5	4	4	0	0	0	0
Not Low Income		Low Income	5	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	5	2	1	1	1	1	0	
10	MC	Male	Female	55	6	4	2	1	1	0
		White	Hispanic	55	4	2	2	0	0	0
			Native American	55	3	2	1	0	0	0
		No Disability	Disability	55	13	10	3	0	0	0
		Not Low Income	Low Income	55	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	55	0	0	0	0	0	0
	OR	Male	Female	5	2	1	1	0	0	0
		White	Hispanic	5	0	0	0	0	0	0
			Native American	5	1	1	0	0	0	0
		No Disability	Disability	5	4	3	1	0	0	0
Not Low Income		Low Income	5	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	5	0	0	0	0	0	0	

Table G-2. 2011–12 Montana CRT: Number of Items Classified as “Low” or “High” DIF, Overall and by Group Favored – Reading

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number “Low”			Number “High”		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
3	MC	Male	Female	52	2	2	0	0	0	0
		White	Hispanic	52	2	2	0	0	0	0
			Native American	52	3	3	0	0	0	0
		No Disability	Disability	52	3	3	0	0	0	0
		Not Low Income	Low Income	52	0	0	0	0	0	0
	Not Limited English Proficient	Limited English Proficient	52	10	8	2	2	1	1	
	OR	Male	Female	2	0	0	0	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	0	0	0	0	0	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0		
4	MC	Male	Female	52	6	4	2	0	0	0
		White	Hispanic	52	5	5	0	0	0	0
			Native American	52	5	5	0	0	0	0
		No Disability	Disability	52	2	1	1	0	0	0
		Not Low Income	Low Income	52	0	0	0	0	0	0
	Not Limited English Proficient	Limited English Proficient	52	10	8	2	7	7	0	
	OR	Male	Female	2	0	0	0	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	0	0	0	0	0	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0		
5	MC	Male	Female	52	3	3	0	0	0	0
		White	Hispanic	52	1	1	0	0	0	0
			Native American	52	8	6	2	1	1	0
		No Disability	Disability	52	3	3	0	0	0	0
		Not Low Income	Low Income	52	0	0	0	0	0	0
Not Limited English Proficient	Limited English Proficient	52	18	12	6	6	4	2		

continued

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number "Low"			Number "High"		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
5	OR	Male	Female	2	2	0	2	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	0	0	0	0	0	0
		Not Low Income	Low Income	2	0	0	0	0	0	0
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	
6	MC	Male	Female	52	4	2	2	0	0	0
		White	Hispanic	52	1	1	0	0	0	0
			Native American	52	3	3	0	0	0	0
		No Disability	Disability	52	4	3	1	0	0	0
		Not Low Income	Low Income	52	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	52	17	14	3	7	7	0
	OR	Male	Female	2	2	0	2	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	2	2	0	0	0	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	
7	MC	Male	Female	52	4	3	1	0	0	0
		White	Hispanic	52	2	2	0	0	0	0
			Native American	52	7	7	0	0	0	0
		No Disability	Disability	52	3	3	0	0	0	0
		Not Low Income	Low Income	52	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	52	16	12	4	6	6	0
	OR	Male	Female	2	2	0	2	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	2	2	0	0	0	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	

continued

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number "Low"			Number "High"			
					Total	Favoring		Total	Favoring		
						Reference	Focal		Reference	Focal	
8	MC	Male	Female	52	6	5	1	1	1	0	
		White	Hispanic	52	4	3	1	0	0	0	
			Native American	52	3	2	1	0	0	0	
		No Disability	Disability	52	11	11	0	0	0	0	
		Not Low Income	Low Income	52	0	0	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	52	13	8	5	8	6	2	
	OR	Male	Female	2	2	0	2	0	0	0	
		White	Hispanic	2	0	0	0	0	0	0	
			Native American	2	0	0	0	0	0	0	
		No Disability	Disability	2	1	1	0	1	1	0	
		Not Low Income	Low Income	2	0	0	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	2	2	2	0	0	0	0	
	10	MC	Male	Female	52	5	3	2	0	0	0
			White	Hispanic	52	4	3	1	0	0	0
			Native American	52	4	4	0	0	0	0	
No Disability			Disability	52	7	7	0	0	0	0	
Not Low Income			Low Income	52	0	0	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	52	0	0	0	0	0	0	
OR		Male	Female	2	2	0	2	0	0	0	
		White	Hispanic	2	0	0	0	0	0	0	
			Native American	2	0	0	0	0	0	0	
		No Disability	Disability	2	2	2	0	0	0	0	
		Not Low Income	Low Income	2	0	0	0	0	0	0	
		Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	

Table G-3. 2011–12 Montana CRT: Number of Items Classified as “Low” or “High” DIF, Overall and by Group Favored – Science

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number “Low”			Number “High”		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
4	MC	Male	Female	53	6	5	1	1	1	0
		White	Hispanic	53	4	4	0	0	0	0
			Native American	53	3	3	0	0	0	0
		No Disability	Disability	53	7	6	1	1	1	0
		Not Low Income	Low Income	53	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	53	16	15	1	6	5	1
	OR	Male	Female	2	0	0	0	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	1	1	0	0	0	0
		No Disability	Disability	2	0	0	0	0	0	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	
8	MC	Male	Female	53	7	5	2	3	3	0
		White	Hispanic	53	4	3	1	0	0	0
			Native American	53	5	4	1	0	0	0
		No Disability	Disability	53	11	7	4	1	1	0
		Not Low Income	Low Income	53	0	0	0	0	0	0
		Not Limited English Proficient	Limited English Proficient	53	16	10	6	11	9	2
	OR	Male	Female	2	0	0	0	1	0	1
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	1	1	0	0	0	0
		No Disability	Disability	2	1	1	0	1	1	0
Not Low Income		Low Income	2	0	0	0	0	0	0	
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	
10	MC	Male	Female	53	9	7	2	0	0	0
		White	Hispanic	53	4	2	2	0	0	0
			Native American	53	4	4	0	0	0	0
		No Disability	Disability	53	6	5	1	3	3	0
		Not Low Income	Low Income	53	0	0	0	0	0	0
			Not Limited English Proficient	Limited English Proficient	53	0	0	0	0	0

continued

Grade	Item Type	Reference Group	Focal Group	Number of Items	Number "Low"			Number "High"		
					Total	Favoring		Total	Favoring	
						Reference	Focal		Reference	Focal
10	OR	Male	Female	2	0	0	0	0	0	0
		White	Hispanic	2	0	0	0	0	0	0
			Native American	2	0	0	0	0	0	0
		No Disability	Disability	2	1	1	0	0	0	0
		Not Low Income	Low Income	2	0	0	0	0	0	0
	Not Limited English Proficient	Limited English Proficient	2	0	0	0	0	0	0	

APPENDIX H—ITEM RESPONSE THEORY CALIBRATION RESULTS

Table H-1. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 3

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
60940	1	0	-1.49328	0.04933	0	0
60974	1	0	-0.78556	0	0	0
173747	1	0	-0.78826	0	0	0
173822	1	0	-0.08088	0	0	0
76881	1	0	-0.63740	0	0	0
173867	1	0	0.72567	0	0	0
43022	1	0	-0.57591	0	0	0
76781	1	0	-0.49440	0	0	0
173835	1	0	0.18631	0	0	0
139013	1	0	-0.29470	0	0	0
60923	1	0	-0.53883	0	0	0
76750	1	0	0.62273	0	0	0
60952	1	0	-0.72208	0	0	0
59333	1	0	-1.07350	0.03127	0	0
138776	1	0	-0.30100	0	0	0
43062	1	0	-0.91107	0.02649	0	0
43103	1	0	-0.38805	0	0	0
61040	1	0	-1.27669	0	0	0
138892	1	0	-1.44228	0.04658	0	0
139029	1	0	-1.14954	0	0	0
173743	1	0	-1.23615	0	0	0
76981	1	0	-0.56377	0	0	0
173797	1	0	0.53359	0	0	0
173873	1	0	-0.64273	0.02044	0	0
60921	1	0	-0.44988	0	0	0
43130	1	0	0.05493	0.01285	0	0
138768	1	0	-0.23126	0	0	0
60335	1	0	-0.32767	0.01566	0	0
138782	1	0	-0.62257	0.02007	0	0
76992	1	0	-0.54838	0.01877	0	0
173744	1	0	0.62805	0.01560	0	0
59328	1	0	0.22587	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
76860	1	0	-1.10556	0.03237	0	0
173749	1	0	-0.44191	0.01713	0	0
138775	1	0	0.01456	0.01298	0	0
138791	1	0	-0.42076	0	0	0
76904	1	0	-0.93709	0	0	0
76778	1	0	-1.04338	0	0	0
173736	1	0	-0.63199	0	0	0
175524	1	0	-0.53342	0	0	0
138999	1	0	-0.37846	0	0	0
173854	1	0	-0.06900	0	0	0
59350	1	0	0.41973	0	0	0
76840	1	0	0.02193	0	0	0
77008	1	0	-0.36136	0.01606	0	0
60938	1	0	-1.38807	0	0	0
139031	1	0	-0.08137	0	0	0
138822	1	0	-1.13404	0	0	0
60944	1	0	-1.39313	0	0	0
173758	1	0	-0.41261	0.01673	0	0
77019	1	0	-0.45144	0.01727	0	0
138826	1	0	0.76182	0	0	0
60273	1	0	-1.19325	0.03549	0	0
243003	1	0	-1.37893	0	0	0
43154	1	0	0.16831	0	0	0
77039	1	0	-0.69549	0	0	0
139049	1	0	-0.44745	0	0	0
173708	1	0	-0.28684	0	0	0

Table H-2. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 3

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
43261	1	0	-0.41717	0	0	0	0	0	0.54564	0	0.71187	0	0.12120	0	-1.37871	0
138908	1	0	0.49439	0	0	0	0	0	-0.16908	0	0.71706	0	-0.17128	0	-0.37670	0

Table H-3. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
173428	1	0	-1.30089	0.05493	0	0	76926	1	0	-0.69514	0	0	0
248048	1	0	-0.81351	0	0	0	173785	1	0	-0.28527	0	0	0
62326	1	0	-0.57038	0	0	0	76824	1	0	0.37010	0	0	0
62222	1	0	-0.02560	0.01491	0	0	76834	1	0	0.58523	0.01326	0	0
76892	1	0	0.18171	0	0	0	76937	1	0	-1.18341	0.04809	0	0
243172	1	0	0.39744	0	0	0	61798	1	0	0.33897	0	0	0
43340	1	0	-0.18907	0	0	0	139588	1	0	-0.43389	0.02146	0	0
44584	1	0	0.91904	0	0	0	173331	1	0	-0.17908	0	0	0
76943	1	0	-0.75407	0	0	0	43332	1	0	0.29201	0.01274	0	0
76837	1	0	-0.11724	0.01602	0	0	62135	1	0	-0.44842	0	0	0
76788	1	0	0.53353	0	0	0	62259	1	0	-1.08266	0.04288	0	0
76941	1	0	-0.30174	0	0	0	140053	1	0	-0.47435	0.02234	0	0
62294	1	0	0.86323	0	0	0	244304	1	0	-0.23539	0	0	0
139780	1	0	-0.05948	0.01529	0	0	140142	1	0	0.17410	0	0	0
139886	1	0	-0.43284	0	0	0	76819	1	0	-0.30906	0	0	0
62405	1	0	-0.02242	0	0	0	43334	1	0	-0.40804	0	0	0
61829	1	0	-0.13674	0	0	0	173424	1	0	-0.15220	0	0	0
62381	1	0	-0.70886	0	0	0	173340	1	0	-0.02384	0	0	0
139540	1	0	-0.92978	0.03618	0	0	34877	1	0	0.13088	0.01350	0	0
76959	1	0	-0.60377	0	0	0	61817	1	0	-0.85300	0.03326	0	0
43367	1	0	-0.17452	0	0	0	62302	1	0	-0.38373	0	0	0
76888	1	0	-0.11474	0	0	0	77042	1	0	0.47659	0	0	0
139934	1	0	0.06595	0	0	0	35218	1	0	-0.41265	0.02101	0	0
173815	1	0	0.43561	0	0	0	76830	1	0	-0.58569	0	0	0
248080	1	0	0.04127	0	0	0	35220	1	0	-0.10912	0	0	0
43304	1	0	-0.85037	0	0	0	173418	1	0	0.06387	0	0	0
76814	1	0	0.08521	0	0	0	76856	1	0	-0.11230	0.01595	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
62146	1	0	0.15177	0.01336	0	0
173321	1	0	-0.16093	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
61779	1	0	-0.39861	0	0	0
43199	1	0	0.19008	0	0	0

Table H-4. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
76921	1	0	0.30493	0	0	0	0	0	0.86091	0	-0.06400	0	-0.16939	0	-0.62752	0
77065	1	0	0.12176	0	0	0	0	0	0.41133	0	-0.09678	0	0.15499	0	-0.46954	0

Table H-5. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 5

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
43559	1	0	-0.98493	0.03214	0	0
140864	1	0	-0.52745	0	0	0
77249	1	0	-0.10064	0	0	0
43433	1	0	-0.08805	0	0	0
60072	1	0	0.24201	0.01267	0	0
140937	1	0	-0.41857	0	0	0
77210	1	0	-0.28335	0.01557	0	0
77172	1	0	-0.70737	0	0	0
140782	1	0	0.19459	0	0	0
60417	1	0	-0.48736	0.01879	0	0
60843	1	0	-1.40760	0	0	0
59840	1	0	-0.52401	0	0	0
60371	1	0	-0.98314	0	0	0
140833	1	0	-0.17262	0.01430	0	0
140762	1	0	-2.04436	0.30204	0	0
140842	1	0	-0.69994	0.02342	0	0
140850	1	0	0.23958	0.01266	0	0
43532	1	0	0.52259	0	0	0
140791	1	0	-0.11263	0.01375	0	0
34423	1	0	0.22660	0.01263	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
140697	1	0	-0.17191	0	0	0
77200	1	0	-0.79501	0	0	0
77185	1	0	-0.63371	0	0	0
60422	1	0	-0.62295	0	0	0
59848	1	0	-0.77732	0	0	0
140784	1	0	-0.20086	0	0	0
173589	1	0	-0.10012	0	0	0
140801	1	0	0.67744	0	0	0
43469	1	0	-0.03110	0	0	0
59814	1	0	-0.33966	0.01635	0	0
140781	1	0	0.04560	0.01281	0	0
43581	1	0	-0.36906	0.01635	0	0
173573	1	0	-0.22546	0.01487	0	0
243040	1	0	0.45952	0	0	0
140953	1	0	0.07774	0.01270	0	0
77191	1	0	-0.65846	0.02241	0	0
173631	1	0	-0.55226	0.02006	0	0
43486	1	0	-0.11986	0.01381	0	0
77182	1	0	-0.15762	0	0	0
77214	1	0	-0.59545	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
77388	1	0	-0.66257	0	0	0
77222	1	0	0.99329	0	0	0
243030	1	0	0.17351	0	0	0
77211	1	0	-0.29177	0	0	0
237156	1	0	-0.40995	0.01744	0	0
34367	1	0	0.57782	0.01327	0	0
77174	1	0	0.30178	0.01285	0	0
242922	1	0	0.17088	0	0	0
77265	1	0	0.58888	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
140947	1	0	0.16363	0.01258	0	0
59810	1	0	0.01636	0	0	0
77177	1	0	-0.07359	0	0	0
60544	1	0	-0.67558	0.02283	0	0
140807	1	0	-0.23093	0.01493	0	0
59908	1	0	-0.48469	0	0	0
140971	1	0	-0.55194	0	0	0
77294	1	0	-0.14883	0	0	0
140970	1	0	0.22961	0	0	0

Table H-6. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 5

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
77278	1	0	0.22460	0	0	0	0	0	0	0	0	0	0	0	0	0
146613	1	0	0.20869	0	0	0	0	0	0.34105	0	0.81543	0	-1.24847	0	0.09199	0

Table H-7. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 6

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
141154	1	0	-0.28576	0	0	0
141152	1	0	0.66528	0	0	0
174477	1	0	0.26132	0	0	0
140983	1	0	-0.21063	0	0	0
77347	1	0	-0.23946	0	0	0
77443	1	0	-0.48293	0	0	0
140985	1	0	-0.71017	0	0	0
141157	1	0	0.50988	0	0	0
174474	1	0	0.21686	0	0	0
77378	1	0	-0.10329	0	0	0
141319	1	0	-1.24105	0	0	0
141167	1	0	-0.03528	0.01301	0	0
140994	1	0	0.04001	0.01276	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
77373	1	0	-0.05365	0	0	0
77445	1	0	-1.83550	0	0	0
141172	1	0	-0.11151	0	0	0
141344	1	0	0.01131	0	0	0
34842	1	0	-0.59332	0	0	0
141431	1	0	-0.29491	0.01528	0	0
77621	1	0	-0.56638	0	0	0
141349	1	0	0.55732	0	0	0
61166	1	0	-0.89924	0	0	0
77555	1	0	-0.77871	0	0	0
77434	1	0	0.33471	0	0	0
141341	1	0	0.69326	0	0	0
61168	1	0	-0.34255	0.01593	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
141406	1	0	-0.62593	0	0	0
174509	1	0	-0.49346	0	0	0
141484	1	0	-0.46185	0	0	0
140815	1	0	0.52655	0	0	0
141337	1	0	0.44237	0	0	0
77471	1	0	0.91720	0.02146	0	0
77167	1	0	-0.58926	0.02045	0	0
77449	1	0	0.00519	0.01286	0	0
34542	1	0	0.25641	0.01301	0	0
44066	1	0	-0.90571	0	0	0
61136	1	0	0.10955	0	0	0
77359	1	0	-0.13578	0	0	0
44070	1	0	-0.64646	0	0	0
141274	1	0	0.11498	0	0	0
43447	1	0	-0.54967	0	0	0
77614	1	0	-0.71178	0	0	0
141325	1	0	-0.25435	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
44019	1	0	0.27745	0	0	0
242542	1	0	0.03209	0	0	0
174494	1	0	-0.27317	0	0	0
62039	1	0	-0.20892	0	0	0
61162	1	0	-0.21394	0	0	0
62060	1	0	-0.94161	0	0	0
174587	1	0	-0.91856	0.02987	0	0
61155	1	0	-0.07428	0	0	0
77459	1	0	-0.40254	0.01684	0	0
44062	1	0	0.48316	0.01471	0	0
44044	1	0	0.88191	0	0	0
141301	1	0	0.43174	0.01421	0	0
43904	1	0	0.28868	0	0	0
174613	1	0	-0.41038	0	0	0
174610	1	0	-0.33008	0	0	0

Table H-8. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 6

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
174615	1	0	0.07850	0	0	0	0	0	-0.20490	0	0.84964	0	-0.00374	0	-0.64101	0
146968	1	0	0.21576	0	0	0	0	0	-0.42503	0	1.15663	0	-0.13496	0	-0.59664	0

Table H-9. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 7

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
61206	1	0	-0.66601	0	0	0
43832	1	0	-1.05834	0	0	0
61158	1	0	-0.18515	0	0	0
86297	1	0	-0.40286	0	0	0
174355	1	0	-0.14637	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
142364	1	0	-0.01801	0	0	0
86681	1	0	-0.82845	0	0	0
142387	1	0	0.12596	0	0	0
174360	1	0	0.29481	0	0	0
174331	1	0	-0.27613	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
86330	1	0	-0.17773	0	0	0
43836	1	0	-0.26535	0	0	0
43896	1	0	0.30345	0	0	0
43856	1	0	0.26950	0	0	0
86464	1	0	-0.07462	0	0	0
142803	1	0	-0.15321	0	0	0
61746	1	0	0.71631	0	0	0
61264	1	0	0.03141	0	0	0
142421	1	0	-0.27076	0	0	0
142661	1	0	-0.77123	0	0	0
142420	1	0	0.60150	0	0	0
142821	1	0	-1.12219	0	0	0
142815	1	0	-0.08074	0	0	0
174533	1	0	0.54132	0	0	0
61358	1	0	-0.75527	0	0	0
86455	1	0	0.02814	0	0	0
142376	1	0	-0.06978	0	0	0
86635	1	0	-0.97244	0	0	0
86672	1	0	-0.44391	0	0	0
86597	1	0	0.20893	0	0	0
43654	1	0	-0.45415	0	0	0
61279	1	0	-1.20479	0	0	0
142768	1	0	0.37513	0.01357	0	0
142817	1	0	0.17522	0.01260	0	0
43675	1	0	-0.41121	0	0	0
43695	1	0	-0.78138	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
86473	1	0	-0.27251	0	0	0
43735	1	0	-0.96908	0	0	0
88064	1	0	0.86655	0	0	0
86545	1	0	-0.64878	0	0	0
142756	1	0	-0.82396	0	0	0
86578	1	0	0.35370	0	0	0
174441	1	0	-0.25247	0	0	0
86570	1	0	0.21825	0.01271	0	0
61252	1	0	-1.01938	0	0	0
43680	1	0	0.61054	0	0	0
61346	1	0	0.22732	0	0	0
61745	1	0	-0.29149	0	0	0
142713	1	0	0.34075	0	0	0
61240	1	0	-0.16728	0	0	0
86486	1	0	0.21389	0	0	0
142647	1	0	0.16242	0	0	0
43763	1	0	-0.29733	0	0	0
142811	1	0	-0.65940	0	0	0
44211	1	0	-0.12585	0	0	0
86339	1	0	0.11454	0	0	0
86350	1	0	0.55030	0	0	0
43799	1	0	-0.40464	0	0	0

Table H-10. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 7

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
86658	1	0	0.19976	0	0	0	0	0	-0.21462	0	0.96166	0	-0.35950	0	-0.38754	0
43756	1	0	0.40970	0.00600	0	0	0	0	-0.19719	0.02109	0.98772	0.02129	-0.82652	0.02331	0.03598	0.02646

Table H-11. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
87598	1	0	-1.67156	0	0	0
44201	1	0	-0.60196	0	0	0
35055	1	0	0.11168	0.01284	0	0
62856	1	0	-0.30427	0	0	0
87527	1	0	-0.33980	0	0	0
144287	1	0	0.74621	0	0	0
87588	1	0	-0.47081	0	0	0
144244	1	0	-0.07108	0	0	0
144849	1	0	-0.28661	0	0	0
175599	1	0	0.10127	0	0	0
61208	1	0	0.61676	0.01521	0	0
62992	1	0	-0.67124	0	0	0
63279	1	0	0.17242	0	0	0
35029	1	0	0.28390	0.01302	0	0
44626	1	0	-1.10838	0	0	0
34993	1	0	-1.02281	0	0	0
88363	1	0	0.38736	0	0	0
44632	1	0	0.41454	0	0	0
88864	1	0	-0.26625	0	0	0
44666	1	0	-0.03029	0	0	0
243716	1	0	0.38001	0	0	0
144374	1	0	-0.59192	0	0	0
88319	1	0	0.46101	0	0	0
144428	1	0	-0.51019	0	0	0
144854	1	0	-0.06196	0	0	0
174425	1	0	-0.04633	0	0	0
44141	1	0	-0.81254	0	0	0
63138	1	0	-0.44599	0	0	0
88174	1	0	-0.17194	0	0	0
144886	1	0	1.98867	0.16090	0	0
34976	1	0	0.63366	0.01537	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
44662	1	0	0.18603	0	0	0
63135	1	0	-0.50768	0	0	0
88848	1	0	-0.12401	0.01380	0	0
44239	1	0	-0.85075	0	0	0
63047	1	0	-0.10835	0	0	0
144963	1	0	-0.55706	0	0	0
144551	1	0	-0.13325	0	0	0
175765	1	0	-0.02040	0	0	0
144927	1	0	-0.25844	0	0	0
244567	1	0	0.14749	0	0	0
44243	1	0	-0.21230	0	0	0
175602	1	0	-0.41117	0	0	0
88325	1	0	0.49697	0	0	0
87821	1	0	-0.03880	0	0	0
144868	1	0	0.58158	0	0	0
175488	1	0	0.38987	0	0	0
175605	1	0	0.20563	0	0	0
175610	1	0	0.44786	0.01382	0	0
72828	1	0	-0.07642	0	0	0
144424	1	0	0.11701	0	0	0
244528	1	0	0.17657	0	0	0
175643	1	0	0.35083	0.01327	0	0
44149	1	0	-0.47353	0	0	0
87841	1	0	0.16343	0	0	0
175672	1	0	0.17983	0	0	0
175810	1	0	0.13190	0	0	0

Table H-12. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
248854	1	0	0.26691	0	0	0	0	0	-0.12113	0	1.02194	0	-0.19180	0	-0.70902	0
63305	1	0	-0.00261	0	0	0	0	0	0.14242	0	0.24237	0	-0.11735	0	-0.26744	0

Table H-13. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Mathematics Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
174627	1	0	-0.35598	0.01687	0	0
241018	1	0	-0.92157	0	0	0
43765	1	0	-0.01581	0	0	0
77572	1	0	0.88137	0	0	0
174633	1	0	0.40356	0	0	0
59379	1	0	0.06250	0	0	0
174700	1	0	-0.03456	0	0	0
77529	1	0	-0.40047	0	0	0
146554	1	0	0.42946	0.01470	0	0
43611	1	0	0.21619	0	0	0
43629	1	0	-0.26633	0	0	0
43648	1	0	0.99458	0.02617	0	0
34799	1	0	0.20720	0.01270	0	0
43737	1	0	0.95437	0.02505	0	0
249038	1	0	-1.10164	0	0	0
174637	1	0	-0.21437	0.01447	0	0
174714	1	0	1.03210	0	0	0
43951	1	0	0.58600	0	0	0
44531	1	0	-0.10736	0	0	0
77604	1	0	0.91737	0	0	0
249034	1	0	0.34485	0	0	0
77396	1	0	0.11993	0	0	0
43877	1	0	0.39238	0	0	0
77412	1	0	0.73717	0	0	0
77520	1	0	0.06698	0	0	0
144825	1	0	-0.09444	0	0	0
43778	1	0	0.24470	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
43917	1	0	0.05989	0	0	0
174717	1	0	-0.39260	0.01764	0	0
34835	1	0	0.40710	0	0	0
145025	1	0	-0.00231	0	0	0
146548	1	0	0.66998	0	0	0
44552	1	0	-0.04238	0.01277	0	0
61324	1	0	-0.76601	0.02894	0	0
144904	1	0	-0.54862	0	0	0
77354	1	0	-0.22189	0	0	0
43926	1	0	0.15036	0	0	0
62368	1	0	-0.13645	0	0	0
62279	1	0	-0.43420	0	0	0
145292	1	0	-0.10928	0	0	0
44572	1	0	-0.32279	0	0	0
241082	1	0	0.33720	0	0	0
77514	1	0	0.44269	0	0	0
62374	1	0	-0.59152	0	0	0
146565	1	0	-0.25832	0	0	0
243053	1	0	0.68593	0	0	0
62352	1	0	-0.17018	0	0	0
77407	1	0	0.16411	0	0	0
62230	1	0	0.44201	0	0	0
145024	1	0	0.47674	0	0	0
62292	1	0	0.34143	0	0	0
34856	1	0	0.24679	0	0	0
77499	1	0	0.80085	0.02124	0	0
77551	1	0	0.02590	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
145993	1	0	0.53619	0.01621	0	0
145015	1	0	-0.41016	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
144888	1	0	0.87750	0	0	0
77632	1	0	0.19846	0	0	0

Table H-14. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Mathematics Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
77651	1	0	0.27620	0	0	0	0	0	-0.01883	0	0.32209	0	0.09809	0	-0.40135	0
144973	1	0	0.72954	0	0	0	0	0	0.45118	0	-0.02452	0	-0.12591	0	-0.30074	0

Table H-15. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 3

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
150517	1	0	-0.75138	0	0	0
150524	1	0	-0.55565	0	0	0
150529	1	0	-1.01151	0	0	0
150522	1	0	-1.19455	0	0	0
150552	1	0	-0.53481	0	0	0
150555	1	0	-0.78894	0	0	0
150569	1	0	-1.06029	0	0	0
42895	1	0	-0.35075	0	0	0
42896	1	0	-0.56931	0	0	0
42897	1	0	0.21287	0	0	0
42899	1	0	-0.06854	0	0	0
42900	1	0	-0.28022	0	0	0
42904	1	0	-0.27767	0	0	0
42903	1	0	-0.48678	0	0	0
42906	1	0	-0.37602	0	0	0
44735	1	0	-0.49373	0	0	0
42910	1	0	0.15262	0	0	0
42908	1	0	-1.04518	0	0	0
42912	1	0	-1.72304	0	0	0
177982	1	0	-0.74852	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
177983	1	0	-0.99704	0	0	0
178006	1	0	-0.28261	0	0	0
178009	1	0	-0.21464	0	0	0
178002	1	0	-1.11231	0	0	0
178018	1	0	-0.61196	0	0	0
178033	1	0	-0.38320	0	0	0
177827	1	0	-0.25162	0	0	0
177828	1	0	0.32178	0	0	0
177832	1	0	0.03805	0	0	0
177833	1	0	-0.25534	0	0	0
177837	1	0	-0.05446	0	0	0
177836	1	0	0.06098	0	0	0
177838	1	0	-0.90514	0	0	0
177841	1	0	-1.05664	0	0	0
177844	1	0	-1.25195	0	0	0
177849	1	0	-0.09873	0	0	0
177847	1	0	-0.17065	0	0	0
177850	1	0	-0.53625	0	0	0
177848	1	0	-0.30581	0	0	0
177853	1	0	-0.38904	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
92698	1	0	-0.60722	0	0	0
92702	1	0	-1.01410	0	0	0
92699	1	0	-0.31575	0	0	0
92704	1	0	-0.96038	0	0	0
92705	1	0	0.02490	0	0	0
92706	1	0	0.54166	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
92708	1	0	-0.63804	0	0	0
92714	1	0	-0.42598	0.01728	0	0
92712	1	0	-0.40799	0	0	0
92716	1	0	0.26123	0	0	0
92718	1	0	-0.64240	0	0	0
92719	1	0	-0.24000	0	0	0

Table H-16. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 3

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
42913	1	0	0.20256	0	0	0	0	0	1.72092	0	0.21512	0	-0.72217	0	-1.21387	0
92721	1	0	0.47678	0	0	0	0	0	1.35504	0	0.31837	0	-0.47784	0	-1.19557	0

Table H-17. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
178192	1	0	-0.13037	0	0	0
178208	1	0	-1.01981	0	0	0
178209	1	0	-0.72625	0	0	0
178214	1	0	-0.06449	0	0	0
178211	1	0	0.40730	0	0	0
178227	1	0	0.64364	0	0	0
178225	1	0	0.51907	0.01247	0	0
178241	1	0	-0.20994	0	0	0
178239	1	0	0.30870	0	0	0
178245	1	0	-0.11961	0	0	0
178251	1	0	0.12257	0	0	0
178255	1	0	-0.15724	0	0	0
178258	1	0	-0.19564	0	0	0
178273	1	0	-0.10448	0	0	0
178259	1	0	0.14258	0	0	0
178278	1	0	0.28087	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
178295	1	0	0.31510	0	0	0
178292	1	0	-0.60237	0	0	0
178290	1	0	0.24428	0	0	0
178157	1	0	-0.35392	0	0	0
178159	1	0	-0.21261	0	0	0
178166	1	0	0.35966	0	0	0
178168	1	0	-0.03665	0	0	0
178172	1	0	-0.79237	0	0	0
178171	1	0	0.03652	0	0	0
178170	1	0	-0.23456	0	0	0
178123	1	0	-0.91100	0	0	0
178132	1	0	-1.09541	0	0	0
178136	1	0	-0.43077	0	0	0
178144	1	0	-0.27270	0	0	0
178150	1	0	-0.34857	0	0	0
178151	1	0	-0.17580	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
178152	1	0	-0.68265	0	0	0
178403	1	0	0.18226	0	0	0
178405	1	0	-1.13873	0	0	0
178407	1	0	-0.12086	0	0	0
178416	1	0	0.05030	0	0	0
178415	1	0	0.46467	0	0	0
178424	1	0	-0.12418	0	0	0
178419	1	0	-0.29839	0	0	0
178372	1	0	-0.29648	0	0	0
178370	1	0	-0.15581	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
178377	1	0	-0.34991	0	0	0
178395	1	0	-0.35526	0	0	0
178398	1	0	0.03490	0	0	0
178386	1	0	-0.65578	0	0	0
178396	1	0	-0.56616	0	0	0
178389	1	0	0.07741	0	0	0
178393	1	0	-0.20081	0	0	0
178394	1	0	0.65689	0	0	0
178364	1	0	0.29441	0	0	0
178404	1	0	0.54757	0	0	0

Table H-18. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
178298	1	0	0.63104	0	0	0	0	0	1.42937	0	0.60607	0	-0.75946	0	-1.27598	0
178418	1	0	0.88709	0	0	0	0	0	1.41782	0	0.36541	0	-0.66014	0	-1.12308	0

Table H-19. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 5

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
181973	1	0	-0.47090	0	0	0
181940	1	0	-0.74366	0	0	0
181943	1	0	-0.15823	0	0	0
181949	1	0	0.40529	0	0	0
206094	1	0	-0.67692	0	0	0
206103	1	0	-0.18479	0	0	0
181944	1	0	-0.03188	0	0	0
176341	1	0	-1.30293	0	0	0
176297	1	0	-0.19708	0	0	0
176300	1	0	-0.07451	0	0	0
176323	1	0	-0.27426	0	0	0
176324	1	0	0.05614	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
176332	1	0	-0.59184	0	0	0
176334	1	0	0.00792	0	0	0
176346	1	0	-0.36892	0	0	0
176354	1	0	-0.24473	0	0	0
176357	1	0	-0.33192	0	0	0
176361	1	0	-0.66787	0	0	0
176364	1	0	0.42258	0	0	0
151801	1	0	-0.64110	0	0	0
151828	1	0	-0.15099	0	0	0
151803	1	0	0.02681	0	0	0
151829	1	0	-0.80002	0	0	0
151833	1	0	-0.70419	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
151837	1	0	-0.97619	0	0	0
151838	1	0	-0.16064	0	0	0
176474	1	0	0.06354	0	0	0
176482	1	0	-0.21056	0	0	0
176488	1	0	-0.50374	0	0	0
176493	1	0	-0.16492	0	0	0
176490	1	0	-0.23246	0	0	0
176497	1	0	-0.96844	0	0	0
176504	1	0	-0.70773	0	0	0
176507	1	0	-0.91033	0	0	0
176513	1	0	-0.54699	0	0	0
176516	1	0	-0.44688	0	0	0
176523	1	0	-0.57459	0	0	0
176524	1	0	0.00767	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
176529	1	0	-0.26707	0	0	0
176531	1	0	-0.90017	0	0	0
176387	1	0	-0.99708	0	0	0
176385	1	0	-0.74922	0	0	0
176388	1	0	-0.19950	0	0	0
176393	1	0	-0.41170	0	0	0
176394	1	0	0.44528	0	0	0
176402	1	0	-0.10549	0	0	0
176405	1	0	-0.09310	0	0	0
176425	1	0	0.26617	0	0	0
176428	1	0	-0.15464	0	0	0
176416	1	0	-0.25784	0	0	0
176432	1	0	-0.87800	0	0	0
176429	1	0	0.16333	0	0	0

Table H-20. 2011-12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 5

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
176371	1	0	0.16540	0	0	0	0	0	1.41028	0	0.44292	0	-0.73478	0	-1.11842	0
176438	1	0	0.39658	0	0	0	0	0	1.04489	0	0.58562	0	-0.49524	0	-1.13527	0

Table H-21. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 6

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
176932	1	0	-0.36688	0	0	0
176913	1	0	-0.23381	0	0	0
176923	1	0	-0.15552	0	0	0
176927	1	0	0.41745	0	0	0
176945	1	0	-0.46041	0	0	0
176942	1	0	-0.31507	0	0	0
176940	1	0	-0.74323	0	0	0
177008	1	0	-0.23002	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
177011	1	0	-0.04143	0	0	0
177013	1	0	-1.31029	0	0	0
177016	1	0	-0.68685	0	0	0
177027	1	0	0.01429	0	0	0
177028	1	0	-0.29492	0	0	0
177030	1	0	-0.04254	0	0	0
177023	1	0	0.41811	0	0	0
177021	1	0	-0.52178	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
177009	1	0	0.12805	0	0	0
177049	1	0	-0.92137	0	0	0
177045	1	0	-0.28367	0	0	0
176870	1	0	-0.21401	0	0	0
176880	1	0	-0.44818	0	0	0
176887	1	0	-0.32402	0	0	0
176889	1	0	-0.39924	0	0	0
176892	1	0	-0.49009	0	0	0
176903	1	0	-0.61638	0	0	0
176910	1	0	0.15830	0	0	0
176974	1	0	-0.83120	0	0	0
176952	1	0	-0.06049	0	0	0
176959	1	0	0.09117	0	0	0
176970	1	0	-0.85155	0	0	0
176981	1	0	0.01204	0	0	0
176980	1	0	-0.12729	0	0	0
176983	1	0	-1.03666	0	0	0
95405	1	0	0.03074	0	0	0
95410	1	0	-0.32600	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
95421	1	0	-0.95272	0	0	0
95425	1	0	-0.75742	0	0	0
95409	1	0	-0.66596	0	0	0
95431	1	0	-0.19745	0	0	0
95441	1	0	-0.57596	0	0	0
177058	1	0	0.01340	0	0	0
177068	1	0	0.21731	0	0	0
177070	1	0	0.33174	0	0	0
177074	1	0	-0.87125	0	0	0
177088	1	0	-0.58012	0	0	0
177091	1	0	-0.97507	0	0	0
177098	1	0	-0.96853	0	0	0
177115	1	0	-0.85171	0	0	0
177083	1	0	-0.28948	0	0	0
177117	1	0	-0.35730	0.01962	0	0
177121	1	0	-0.03982	0	0	0
177130	1	0	-0.16803	0	0	0

Table H-22. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 6

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
177052	1	0	0.57813	0	0	0	0	0	1.12784	0	0.53911	0	-0.46675	0	-1.20020	0
177137	1	0	0.23721	0	0	0	0	0	1.48842	0	0.34042	0	-0.39763	0	-1.43121	0

Table H-23. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 7

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
149106	1	0	-0.36725	0	0	0
149107	1	0	-1.40945	0	0	0
149111	1	0	-1.04200	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
149121	1	0	-0.19784	0	0	0
149119	1	0	0.05964	0	0	0
149110	1	0	-0.93605	0	0	0

continued

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
149125	1	0	-1.15623	0	0	0
148663	1	0	-0.05581	0	0	0
148645	1	0	-0.53047	0	0	0
148652	1	0	-0.83485	0	0	0
148656	1	0	-0.44933	0	0	0
148661	1	0	-0.18403	0	0	0
148664	1	0	0.06435	0	0	0
236550	1	0	-0.06145	0.01485	0	0
148670	1	0	0.09662	0	0	0
148697	1	0	-0.58429	0	0	0
148681	1	0	-0.24621	0	0	0
148733	1	0	-0.48579	0	0	0
148723	1	0	0.07013	0	0	0
176307	1	0	-0.43116	0	0	0
176310	1	0	-0.15079	0	0	0
176312	1	0	-0.14101	0	0	0
176318	1	0	-0.79741	0	0	0
176317	1	0	-0.93673	0	0	0
176319	1	0	-0.39326	0	0	0
176322	1	0	-0.33039	0	0	0
92341	1	0	-0.19500	0	0	0
92342	1	0	-0.33226	0	0	0
92343	1	0	-0.53159	0	0	0
92345	1	0	-0.48423	0	0	0
92348	1	0	-0.21041	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
92350	1	0	-0.50886	0	0	0
92347	1	0	-0.29641	0	0	0
176273	1	0	-0.45223	0	0	0
176272	1	0	-0.62470	0	0	0
176276	1	0	-0.72465	0	0	0
176283	1	0	0.33764	0	0	0
176282	1	0	-0.59388	0	0	0
176292	1	0	-0.47540	0	0	0
176290	1	0	-0.92206	0	0	0
176211	1	0	-0.37519	0	0	0
176216	1	0	-0.22799	0	0	0
176217	1	0	-0.71271	0	0	0
176218	1	0	-0.30917	0	0	0
176219	1	0	-0.45051	0	0	0
177549	1	0	0.01773	0	0	0
176221	1	0	-0.07926	0	0	0
176234	1	0	-0.31237	0	0	0
176230	1	0	-0.84493	0	0	0
176241	1	0	-0.54821	0	0	0
176238	1	0	-0.33062	0	0	0
176235	1	0	-1.12053	0	0	0

Table H-24. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 7

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
148742	1	0	0.39455	0	0	0	0	0	1.29233	0	0.50085	0	-0.51409	0	-1.27909	0
176250	1	0	0.47183	0	0	0	0	0	1.30010	0	0.42708	0	-0.35381	0	-1.37337	0

Table H-25. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
176907	1	0	-0.46298	0	0	0
176914	1	0	-0.40615	0	0	0
176933	1	0	0.08113	0	0	0
176943	1	0	-0.21413	0	0	0
176956	1	0	-0.34801	0	0	0
176958	1	0	-0.40615	0	0	0
176960	1	0	-0.75699	0	0	0
177095	1	0	0.50646	0	0	0
177112	1	0	-0.35433	0	0	0
177116	1	0	0.13793	0	0	0
177123	1	0	0.34031	0	0	0
177119	1	0	0.16241	0	0	0
177131	1	0	0.18896	0	0	0
177135	1	0	0.11590	0	0	0
177136	1	0	0.39114	0	0	0
177158	1	0	0.86192	0	0	0
177141	1	0	0.41929	0	0	0
177146	1	0	-0.14634	0	0	0
177155	1	0	0.43251	0	0	0
178102	1	0	-0.64954	0	0	0
176875	1	0	-0.37067	0	0	0
178079	1	0	-0.00497	0	0	0
176891	1	0	-0.34544	0	0	0
176904	1	0	-0.54931	0	0	0
178082	1	0	-0.75720	0	0	0
176900	1	0	-0.24298	0	0	0
149317	1	0	-0.19115	0	0	0
149322	1	0	-0.31974	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
152507	1	0	-1.04115	0	0	0
149321	1	0	-0.60484	0	0	0
152490	1	0	-0.09851	0	0	0
152479	1	0	0.10130	0.01580	0	0
149324	1	0	-0.27047	0	0	0
177002	1	0	-0.39353	0	0	0
176998	1	0	-0.39418	0	0	0
177000	1	0	-0.54557	0	0	0
177004	1	0	-0.03185	0	0	0
177012	1	0	0.35902	0	0	0
177018	1	0	0.35608	0	0	0
177020	1	0	-0.19345	0	0	0
177037	1	0	0.09815	0	0	0
177031	1	0	-0.34076	0	0	0
177035	1	0	-0.45480	0	0	0
177038	1	0	-0.11480	0	0	0
177046	1	0	0.63536	0	0	0
177055	1	0	-0.39550	0	0	0
177048	1	0	0.57271	0	0	0
177050	1	0	0.22356	0	0	0
177051	1	0	-0.00091	0	0	0
177057	1	0	0.32399	0	0	0
177060	1	0	-0.24879	0	0	0
177065	1	0	-0.12790	0	0	0

Table H-26. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
177159	1	0	0.33857	0	0	0	0	0	1.35742	0	0.50129	0	-0.42203	0	-1.43668	0
177073	1	0	0.35168	0	0	0	0	0	1.01116	0	0.39373	0	-0.37966	0	-1.02523	0

Table H-27. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Reading Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
177247	1	0	-0.38914	0	0	0
177250	1	0	0.20015	0	0	0
177252	1	0	-0.38419	0	0	0
177254	1	0	0.46214	0	0	0
177253	1	0	-0.09426	0	0	0
177256	1	0	-0.34005	0	0	0
177255	1	0	0.22198	0	0	0
177220	1	0	-0.41917	0	0	0
177221	1	0	-0.59728	0	0	0
177225	1	0	0.10865	0	0	0
177228	1	0	-0.26800	0	0	0
177230	1	0	0.07567	0	0	0
177231	1	0	0.50873	0	0	0
177232	1	0	-0.53962	0	0	0
177224	1	0	0.01559	0	0	0
177234	1	0	0.16438	0	0	0
177240	1	0	-0.29406	0	0	0
177241	1	0	-0.01945	0	0	0
177235	1	0	0.21836	0	0	0
177185	1	0	-0.73901	0	0	0
177186	1	0	-0.06220	0	0	0
177191	1	0	0.17838	0	0	0
177189	1	0	-0.11376	0	0	0
177193	1	0	0.22630	0	0	0
177190	1	0	-0.17323	0	0	0
177195	1	0	-0.35319	0	0	0
149802	1	0	0.11312	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
149813	1	0	-0.30595	0	0	0
149822	1	0	-0.10248	0	0	0
149839	1	0	0.46494	0	0	0
149838	1	0	0.19228	0	0	0
149858	1	0	-0.06317	0	0	0
149862	1	0	-0.69645	0.03472	0	0
177170	1	0	-0.34186	0	0	0
177173	1	0	-0.96605	0	0	0
177171	1	0	-0.20591	0	0	0
177175	1	0	-0.37704	0	0	0
177178	1	0	-0.45141	0	0	0
177180	1	0	-0.47938	0	0	0
177181	1	0	-0.17844	0	0	0
177196	1	0	-0.30447	0	0	0
177197	1	0	-0.02785	0	0	0
177198	1	0	-0.41717	0	0	0
177200	1	0	-0.40189	0	0	0
177202	1	0	0.07133	0	0	0
177203	1	0	-0.12651	0	0	0
177207	1	0	-0.58972	0	0	0
177199	1	0	-0.10690	0	0	0
177214	1	0	-0.06954	0	0	0
177215	1	0	0.56058	0	0	0
177209	1	0	-0.01820	0	0	0
177213	1	0	-0.35412	0	0	0

Table H-28. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Reading Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
177242	1	0	0.30781	0	0	0	0	0	1.04469	0	0.34533	0	-0.38797	0	-1.00205	0
177218	1	0	0.27628	0	0	0	0	0	1.38478	0	0.30924	0	-0.55824	0	-1.13578	0

Table H-29. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Science Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
120582	1	0	-1.58606	0.07601	0	0
75824	1	0	-0.74175	0	0	0
120568	1	0	-0.74395	0.02695	0	0
76285	1	0	-0.78556	0.02839	0	0
159635	1	0	-0.47777	0.01936	0	0
75690	1	0	0.03502	0	0	0
166767	1	0	-0.81236	0	0	0
76405	1	0	-0.25733	0	0	0
60062	1	0	-0.33476	0.01630	0	0
75407	1	0	0.04987	0.01217	0	0
52571	1	0	0.41328	0.01526	0	0
166253	1	0	-0.10973	0	0	0
159619	1	0	-0.02212	0	0	0
55789	1	0	-0.84454	0	0	0
120167	1	0	-0.56462	0	0	0
119984	1	0	-0.56335	0	0	0
76283	1	0	0.14943	0	0	0
75788	1	0	-1.33406	0.05581	0	0
120572	1	0	-0.73444	0	0	0
119971	1	0	-1.08833	0	0	0
159626	1	0	0.02489	0	0	0
60053	1	0	-0.84336	0	0	0
76291	1	0	-0.84737	0	0	0
76278	1	0	-0.69808	0	0	0
119973	1	0	-0.22089	0	0	0
75717	1	0	-0.45792	0	0	0
159624	1	0	-0.54983	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
76399	1	0	-0.13286	0.01329	0	0
75768	1	0	-0.88021	0.03193	0	0
60156	1	0	-0.63791	0	0	0
120162	1	0	-0.20743	0.01421	0	0
60106	1	0	-0.60897	0.02277	0	0
56422	1	0	-0.23316	0.01458	0	0
75908	1	0	-0.60452	0	0	0
53958	1	0	0.30104	0	0	0
75493	1	0	-1.34817	0.05675	0	0
166761	1	0	-1.01699	0.03781	0	0
166779	1	0	-0.50164	0	0	0
166777	1	0	-0.21393	0	0	0
120548	1	0	-0.56083	0	0	0
75828	1	0	-0.53189	0	0	0
120014	1	0	-0.53667	0	0	0
75782	1	0	0.19055	0	0	0
134742	1	0	-0.69576	0.02539	0	0
166239	1	0	-0.58806	0	0	0
134675	1	0	-0.37925	0	0	0
166229	1	0	-0.16263	0.01362	0	0
75425	1	0	-0.42276	0.01809	0	0
57863	1	0	-0.17730	0	0	0
76401	1	0	-0.20015	0.01411	0	0
75408	1	0	0.02399	0	0	0
75884	1	0	-0.14381	0.01341	0	0
60127	1	0	0.09948	0.01217	0	0

Table H-30. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Science Grade 4

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
56126	1	0	-0.03757	0.00531	0	0	0	0	-0.37558	0.02564	0.42120	0.02734	0.46477	0.01912	-0.51039	0.01547
75427	1	0	0.51734	0	0	0	0	0	1.01353	0	0.27260	0	-0.90232	0	-0.38381	0

Table H-31. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Science Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
158535	1	0	-1.16409	0	0	0
89798	1	0	-1.32937	0	0	0
54339	1	0	-0.80943	0	0	0
122035	1	0	-0.13037	0	0	0
125949	1	0	-0.64829	0	0	0
158576	1	0	0.13669	0	0	0
158493	1	0	0.55687	0	0	0
125947	1	0	-0.57410	0	0	0
158553	1	0	0.22151	0	0	0
53303	1	0	-1.19419	0	0	0
158528	1	0	-0.10879	0	0	0
158559	1	0	0.62408	0	0	0
134455	1	0	0.06061	0.01241	0	0
125959	1	0	-0.62779	0	0	0
158540	1	0	0.26683	0	0	0
122762	1	0	0.00406	0	0	0
89216	1	0	-0.16113	0.01441	0	0
122713	1	0	-1.21487	0.04926	0	0
89420	1	0	-0.74537	0	0	0
121229	1	0	-0.39172	0	0	0
158518	1	0	-0.69631	0	0	0
122039	1	0	-0.51750	0	0	0
89772	1	0	0.25779	0.01252	0	0
89274	1	0	0.38864	0.01366	0	0
122730	1	0	-0.46934	0.02012	0	0
158580	1	0	-0.38748	0.01830	0	0
89884	1	0	-0.22789	0	0	0

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
134459	1	0	-0.27808	0	0	0
158538	1	0	0.10623	0	0	0
75920	1	0	-0.10035	0	0	0
89764	1	0	0.53548	0	0	0
89588	1	0	0.14980	0	0	0
158485	1	0	-0.35305	0	0	0
89719	1	0	-0.39221	0	0	0
56842	1	0	-0.87416	0.03262	0	0
54264	1	0	-0.57285	0	0	0
158582	1	0	-0.23068	0	0	0
121193	1	0	-0.11143	0	0	0
121212	1	0	0.57604	0	0	0
134553	1	0	-0.48640	0	0	0
122748	1	0	0.46837	0	0	0
122725	1	0	-0.14124	0	0	0
121617	1	0	-0.44668	0	0	0
55031	1	0	0.46591	0.01470	0	0
121184	1	0	-0.22855	0	0	0
122722	1	0	0.29146	0	0	0
54750	1	0	-0.50843	0.02106	0	0
158569	1	0	0.13872	0	0	0
122710	1	0	0.13226	0.01223	0	0
121222	1	0	-0.43730	0	0	0
89513	1	0	-1.05606	0	0	0
89762	1	0	0.16335	0	0	0
56814	1	0	-1.02043	0	0	0

Table H-32. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Science Grade 8

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
121233	1	0	-0.21625	0	0	0	0	0	0.46167	0	0.28250	0	-0.03590	0	-0.70828	0
89539	1	0	0.39056	0	0	0	0	0	0.23813	0	0.20392	0	0.09711	0	-0.53917	0

Table H-33. 2011–12 Montana CRT: IRT Parameters for Dichotomous Items – Science Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>
119799	1	0	-1.18690	0	0	0	75979	1	0	0.47291	0	0	0
158427	1	0	-0.44875	0	0	0	130592	1	0	-0.25230	0	0	0
119855	1	0	-0.16938	0	0	0	75442	1	0	-0.06837	0	0	0
158429	1	0	0.26863	0	0	0	158619	1	0	-0.05529	0	0	0
158601	1	0	0.08156	0	0	0	134512	1	0	-0.25487	0	0	0
75804	1	0	0.09878	0	0	0	130556	1	0	-1.10219	0	0	0
75445	1	0	0.41013	0	0	0	119664	1	0	0.35289	0	0	0
130550	1	0	-1.22923	0	0	0	75452	1	0	0.04446	0	0	0
75440	1	0	0.12158	0	0	0	159462	1	0	-0.85720	0	0	0
158424	1	0	-0.18860	0	0	0	158595	1	0	-0.23253	0	0	0
158423	1	0	0.12818	0	0	0	134795	1	0	-0.00848	0	0	0
158433	1	0	0.01638	0.01260	0	0	56086	1	0	0.08502	0	0	0
158629	1	0	-0.59377	0	0	0	158621	1	0	0.32832	0	0	0
75645	1	0	0.29153	0	0	0	158437	1	0	-0.04584	0	0	0
52926	1	0	-0.38499	0	0	0	75433	1	0	-0.05999	0	0	0
53755	1	0	-0.45108	0	0	0	119674	1	0	-0.14317	0	0	0
52286	1	0	-0.59081	0	0	0	134479	1	0	-0.13370	0	0	0
75739	1	0	-0.46933	0	0	0	75807	1	0	-0.13683	0	0	0
158432	1	0	-0.16960	0	0	0	55209	1	0	0.44951	0	0	0
158604	1	0	-0.07795	0	0	0	53745	1	0	-0.70880	0	0	0
119955	1	0	0.04115	0	0	0	158596	1	0	0.42669	0	0	0
159459	1	0	0.17357	0	0	0	134499	1	0	-0.53865	0	0	0
158449	1	0	-0.73226	0	0	0	158617	1	0	0.01016	0	0	0
159433	1	0	-0.71631	0	0	0	159476	1	0	-0.54520	0	0	0
159438	1	0	-0.74792	0	0	0	75632	1	0	0.07224	0	0	0
158426	1	0	-0.25913	0	0	0	55771	1	0	-1.02565	0	0	0
120064	1	0	-0.83395	0	0	0							

Table H-34. 2011–12 Montana CRT: IRT Parameters for Polytomous Items – Science Grade 10

<i>IREF</i>	<i>a</i>	<i>SE (a)</i>	<i>b</i>	<i>SE (b)</i>	<i>c</i>	<i>SE (c)</i>	<i>D0</i>	<i>SE (D0)</i>	<i>D1</i>	<i>SE (D1)</i>	<i>D2</i>	<i>SE (D2)</i>	<i>D3</i>	<i>SE (D3)</i>	<i>D4</i>	<i>SE (D4)</i>
75882	1	0	1.26315	0	0	0	0	0	1.30715	0	0.63052	0	-0.36268	0	-1.57500	0
158450	1	0	0.46625	0	0	0	0	0	1.27686	0	0.01042	0	-0.23877	0	-1.04851	0

APPENDIX I—TEST CHARACTERISTIC CURVES AND TEST INFORMATION FUNCTIONS

Figure I-1. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 3

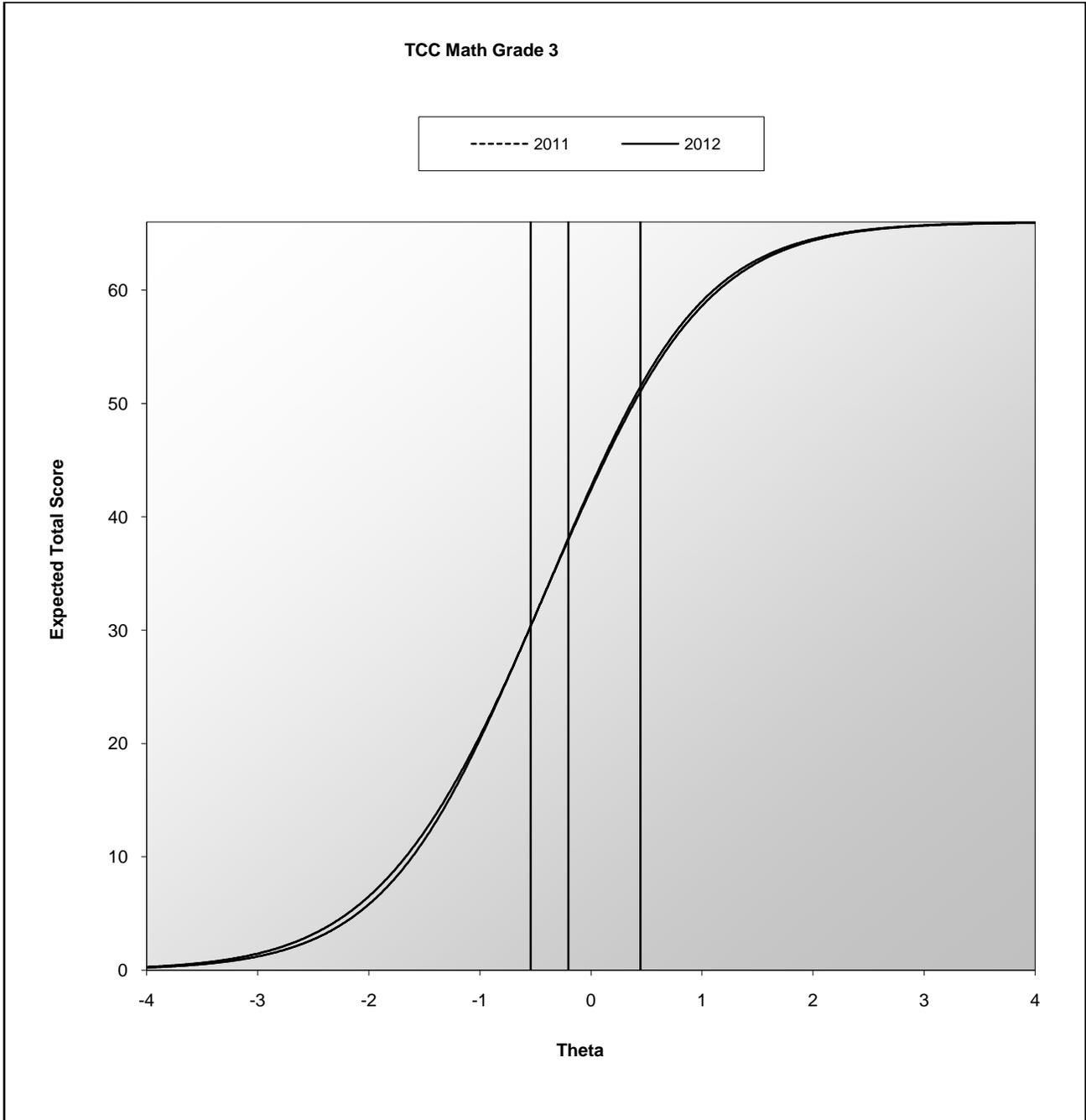


Figure I-2. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 3

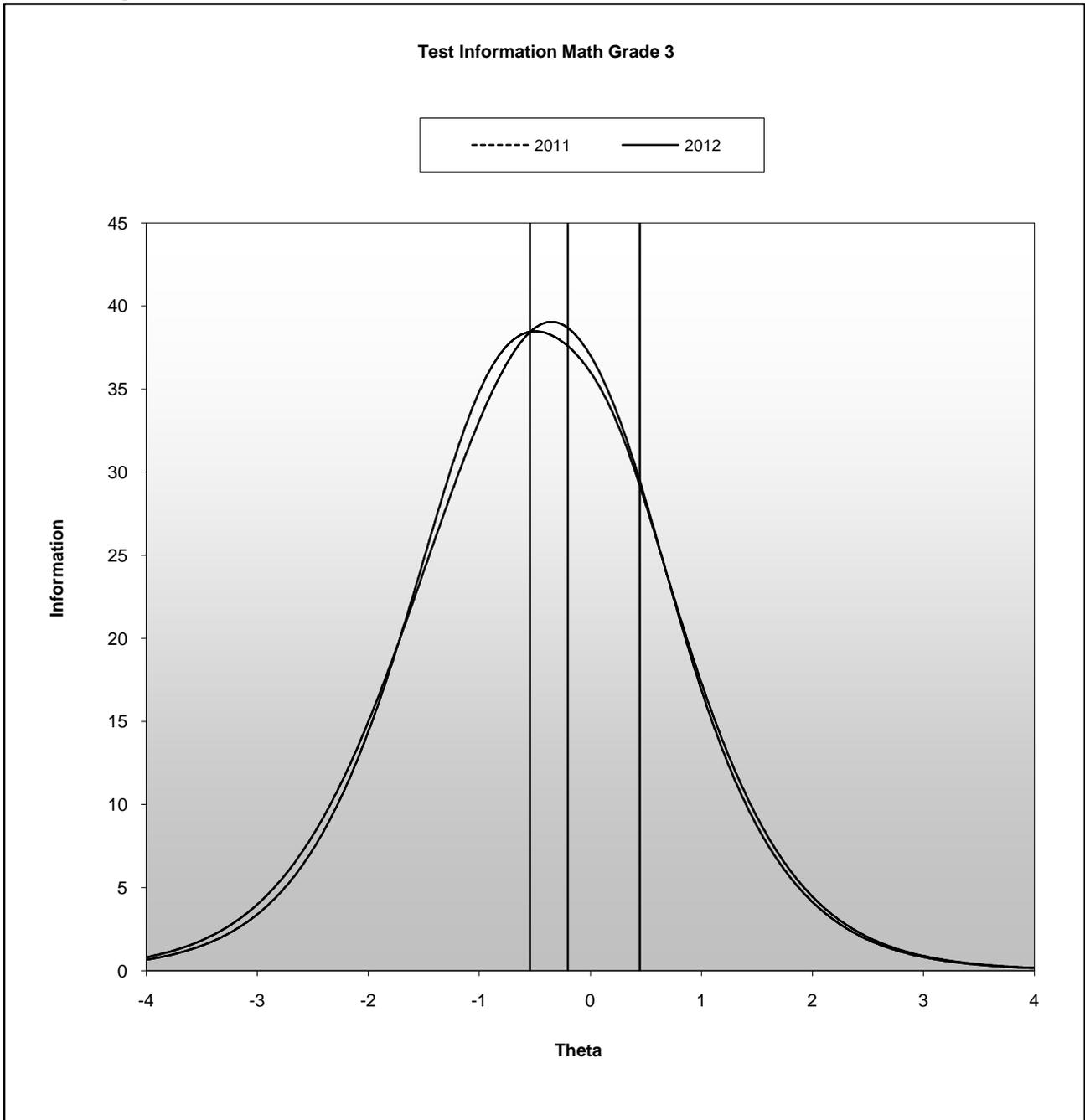


Figure I-3. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 4

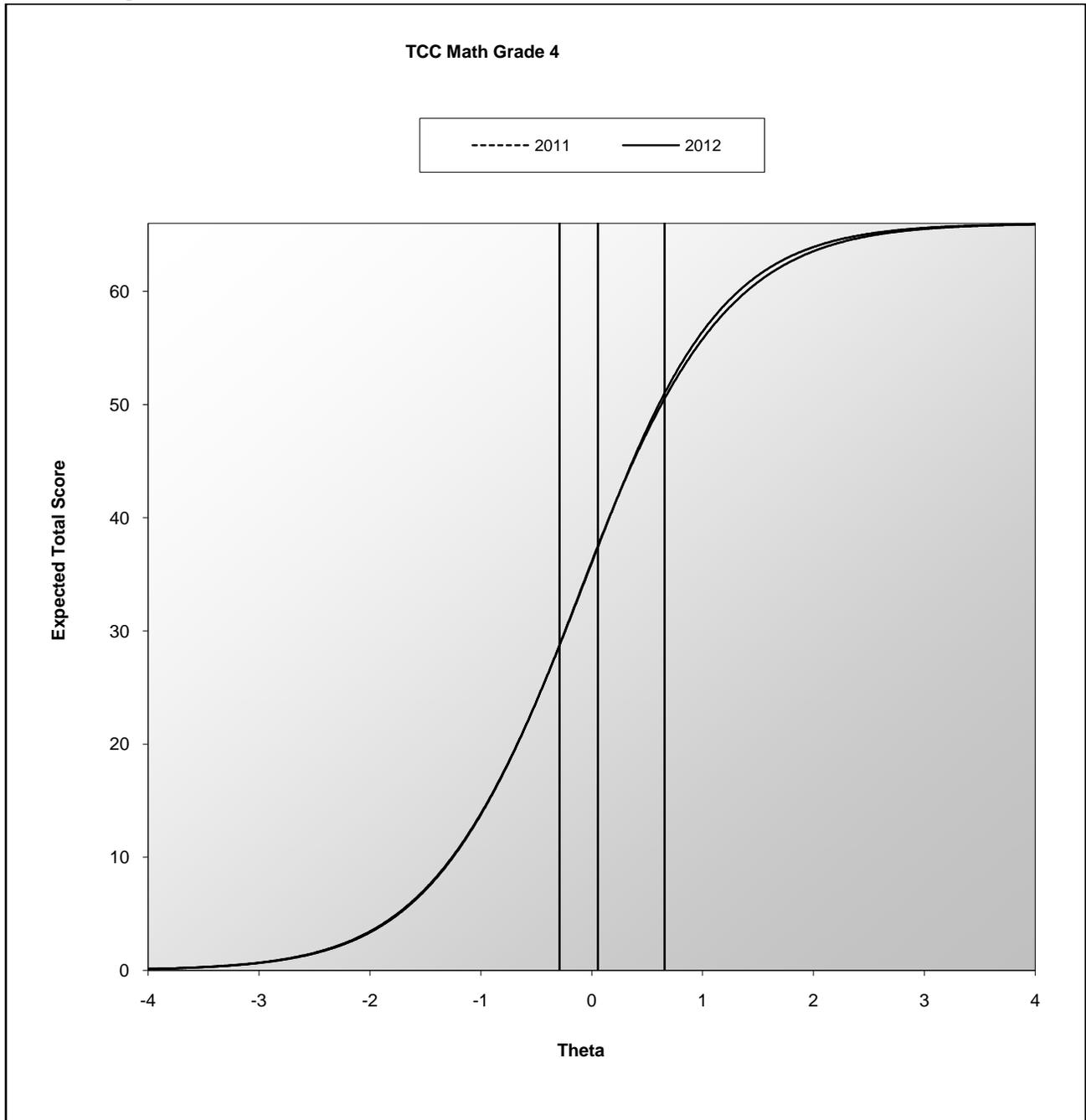


Figure I-4. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 4

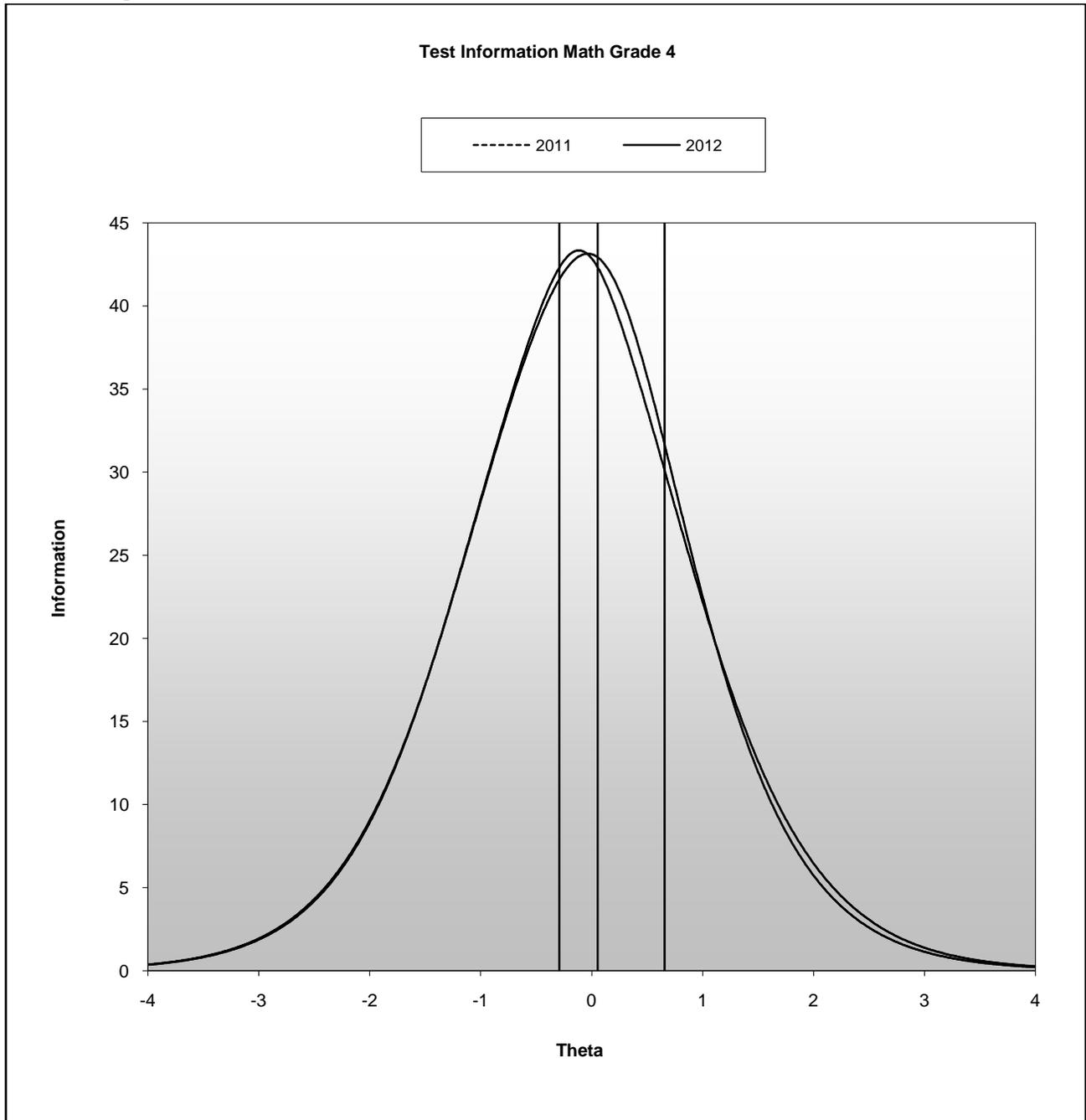


Figure I-5. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 5

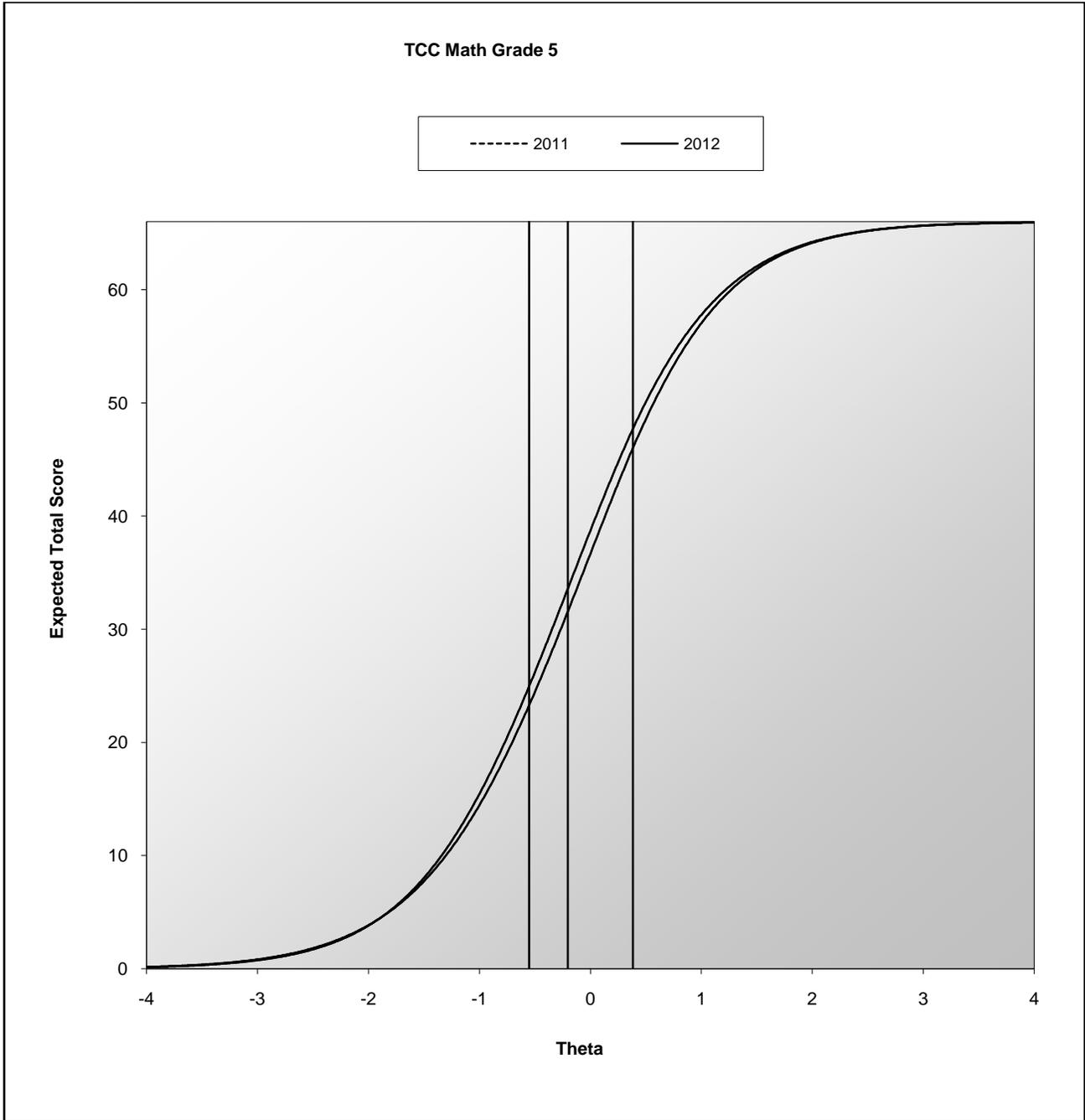


Figure I-6. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 5

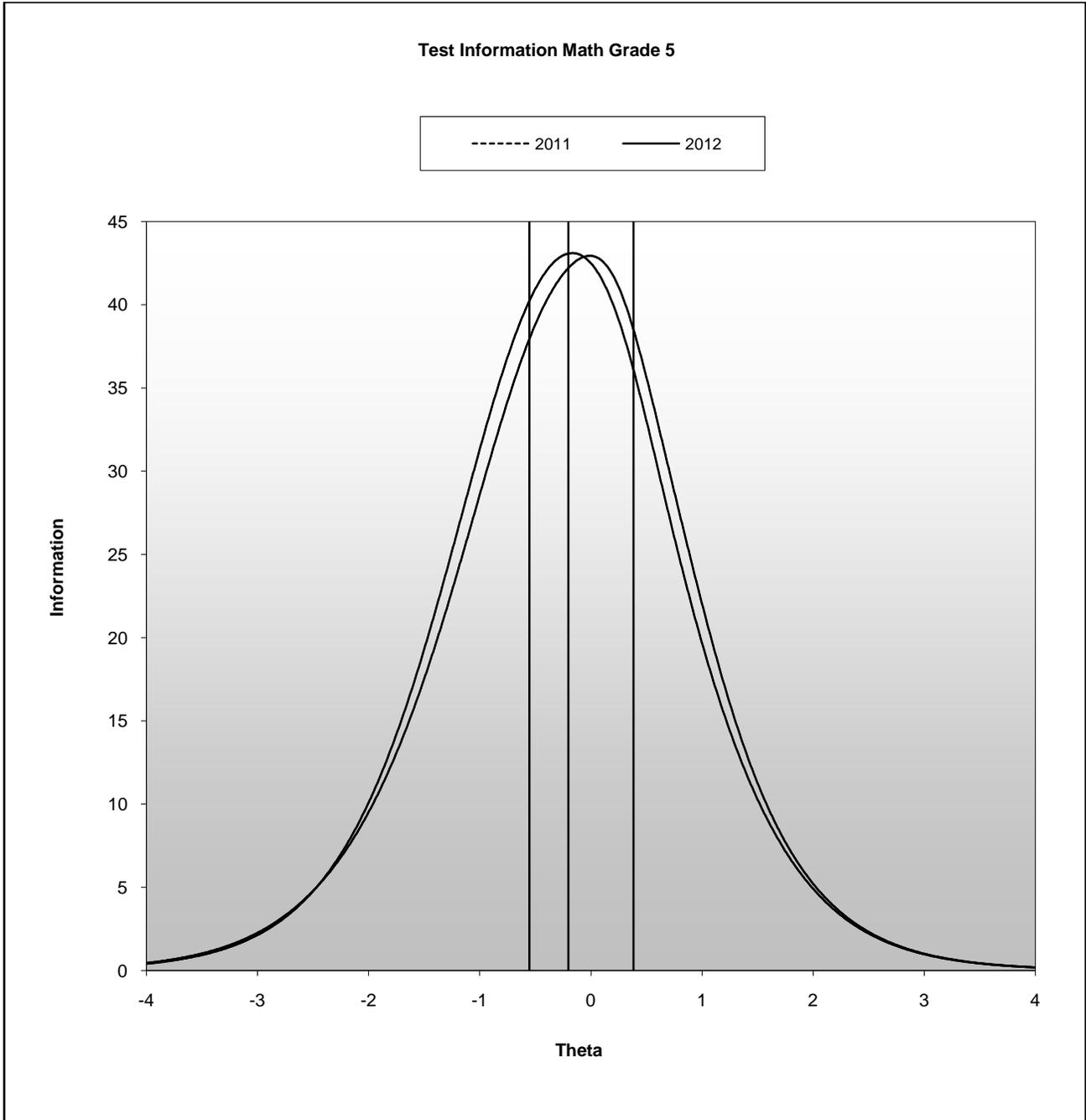


Figure I-7. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 6

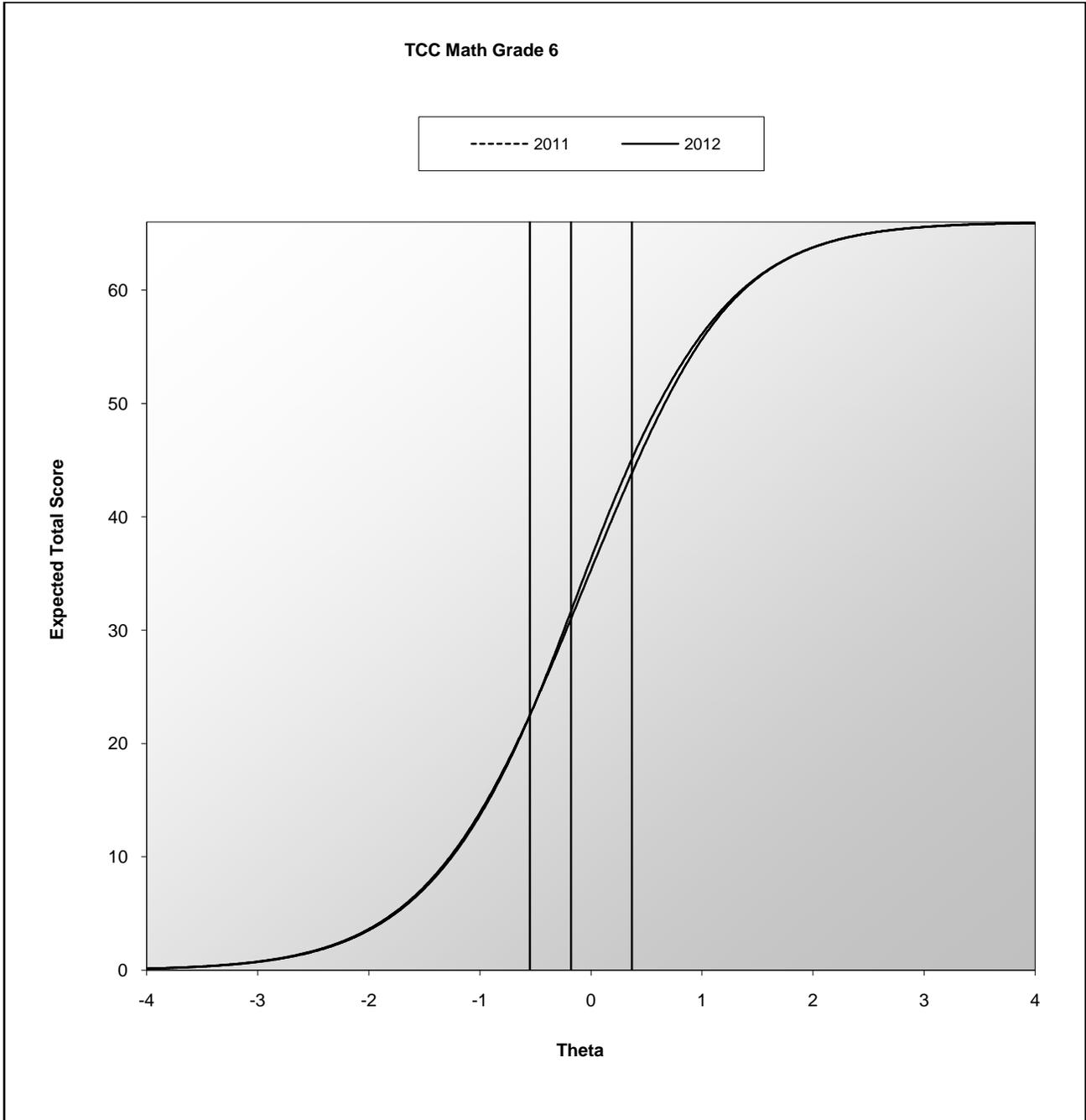


Figure I-8. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 6

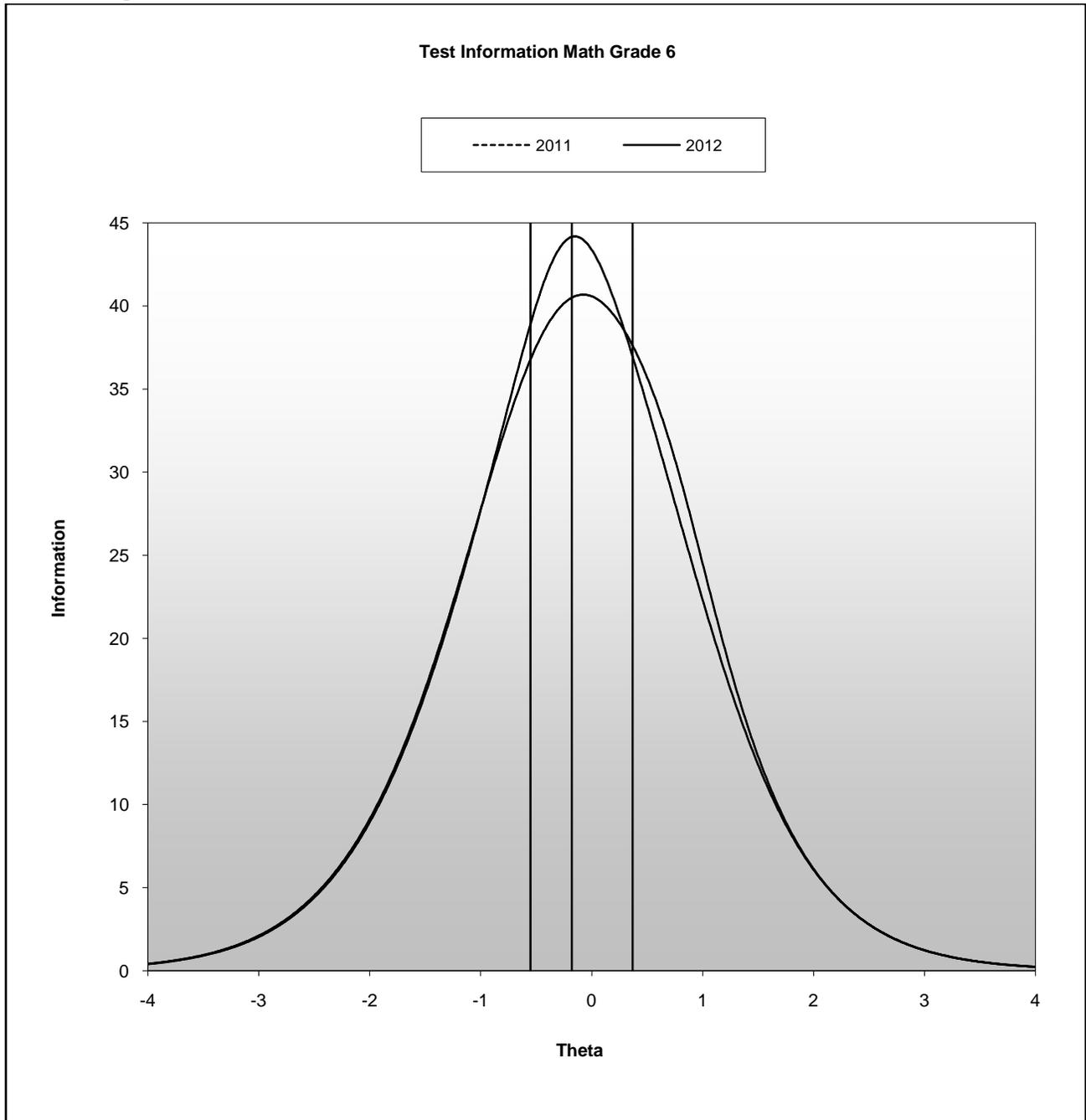


Figure I-9. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 7

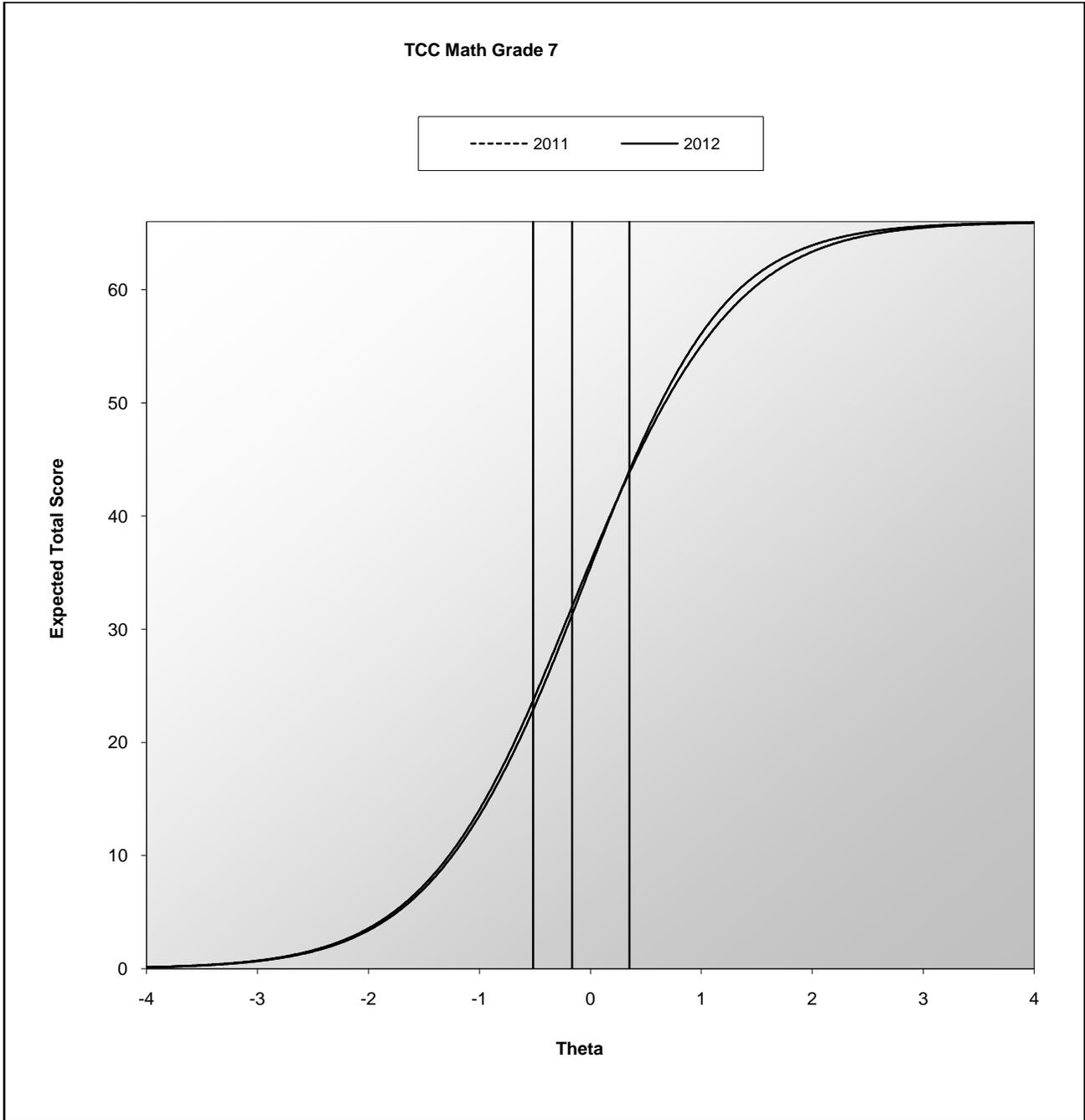


Figure I-10. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 7

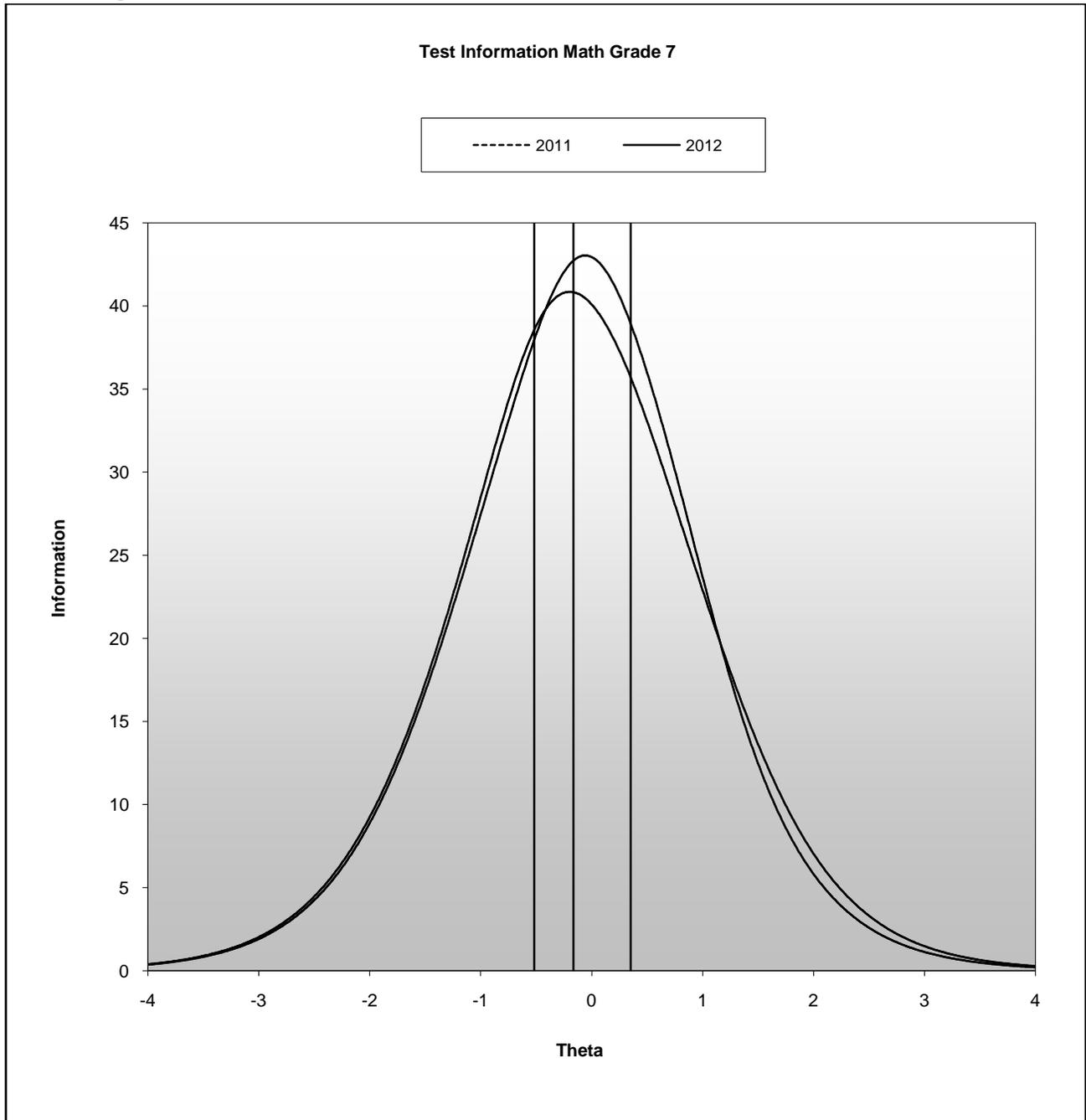


Figure I-11. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 8

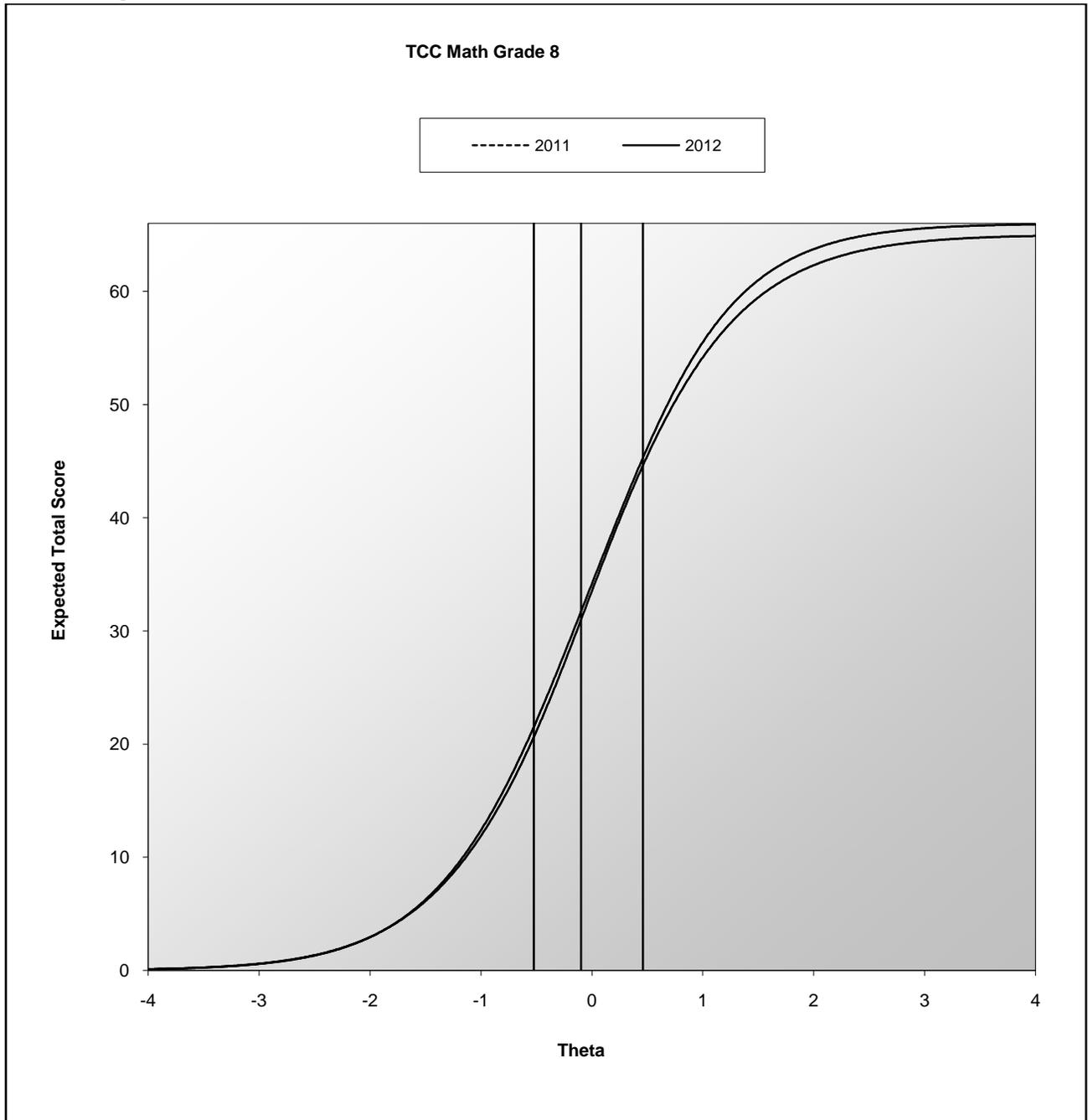


Figure I-12. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 8

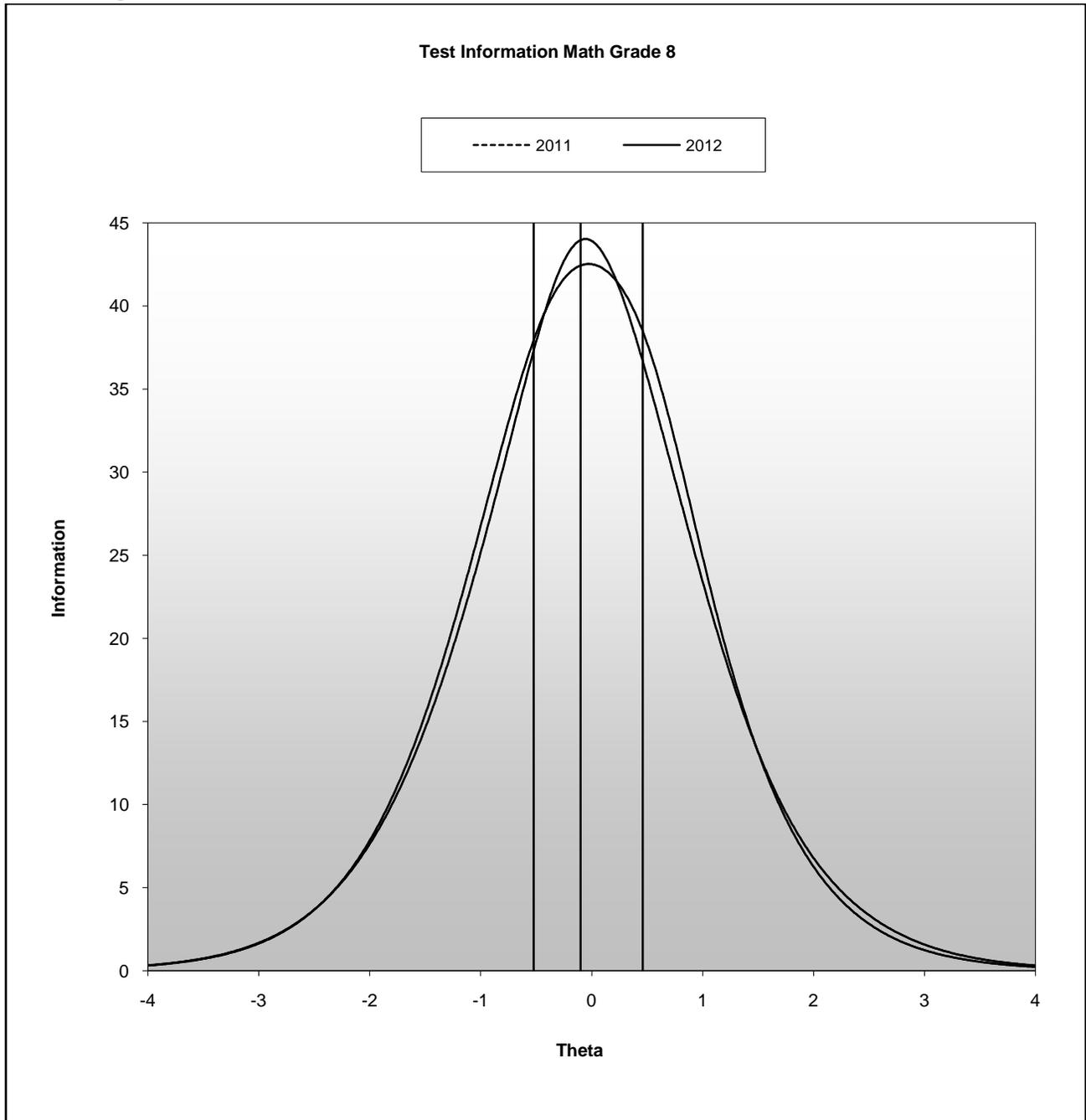


Figure I-13. 2011–12 Montana CRT: Test Characteristic Curve – Mathematics Grade 10

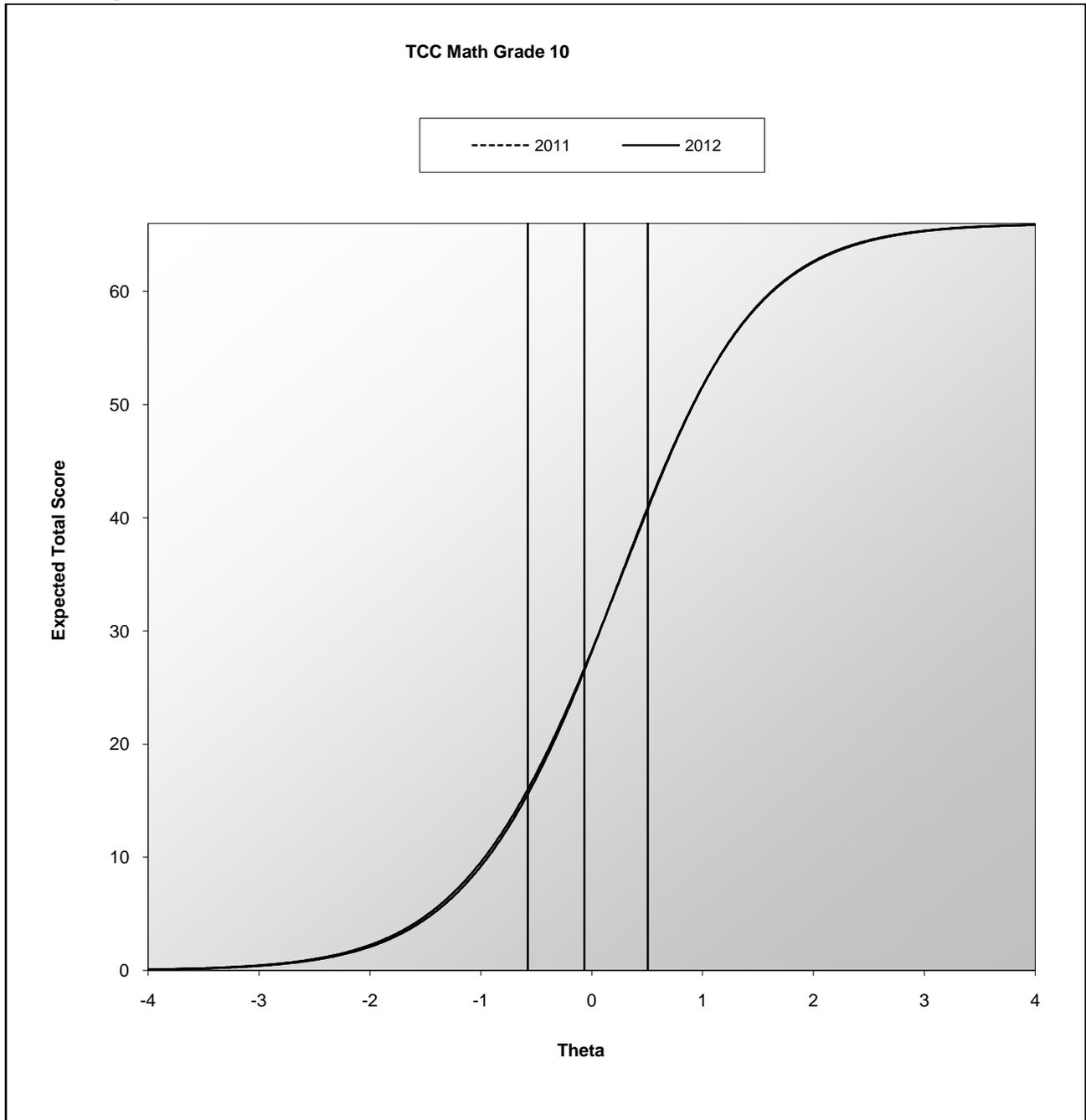


Figure I-14. 2011–12 Montana CRT: Test Information Function – Mathematics Grade 10

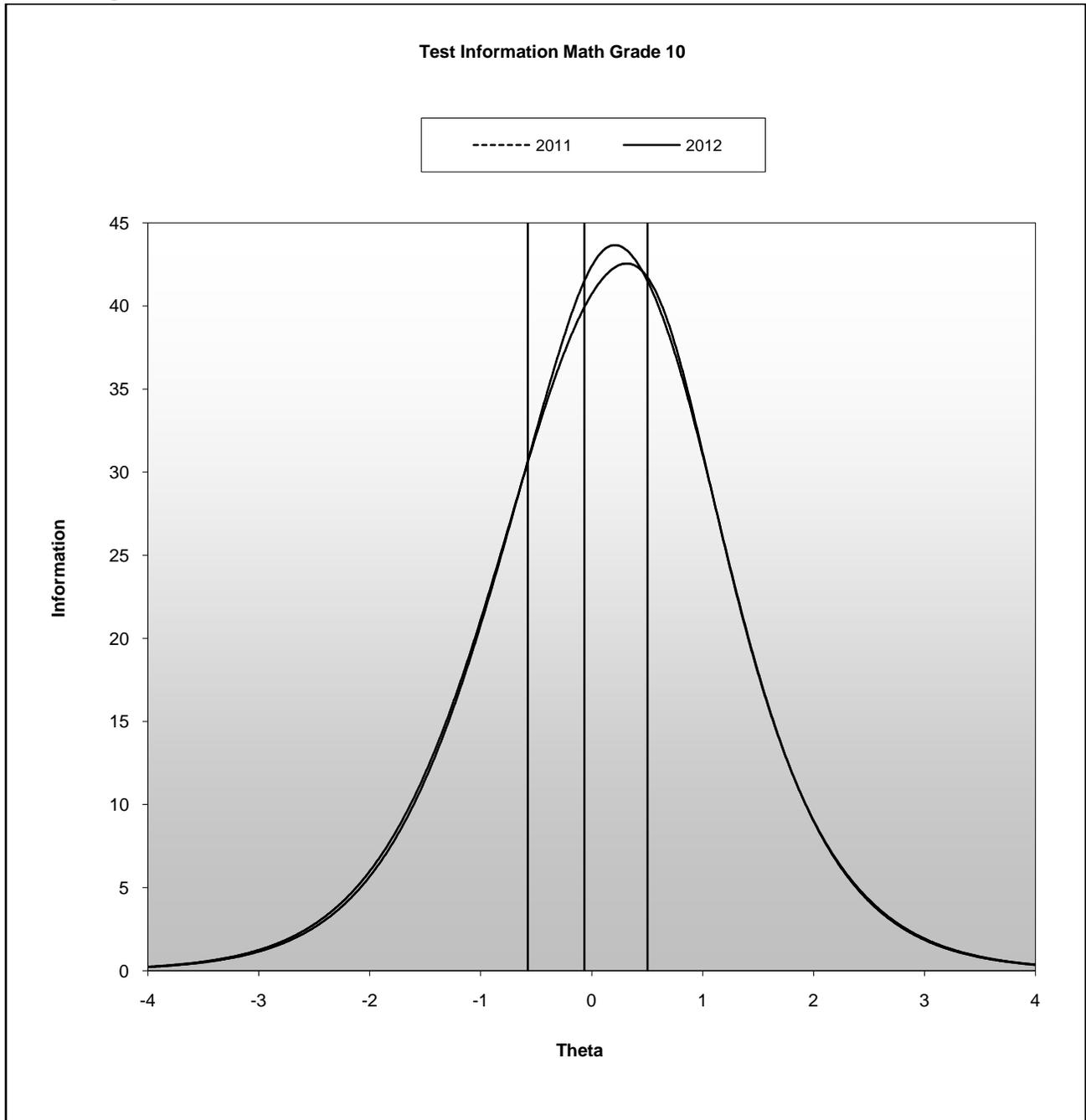


Figure I-15. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 3

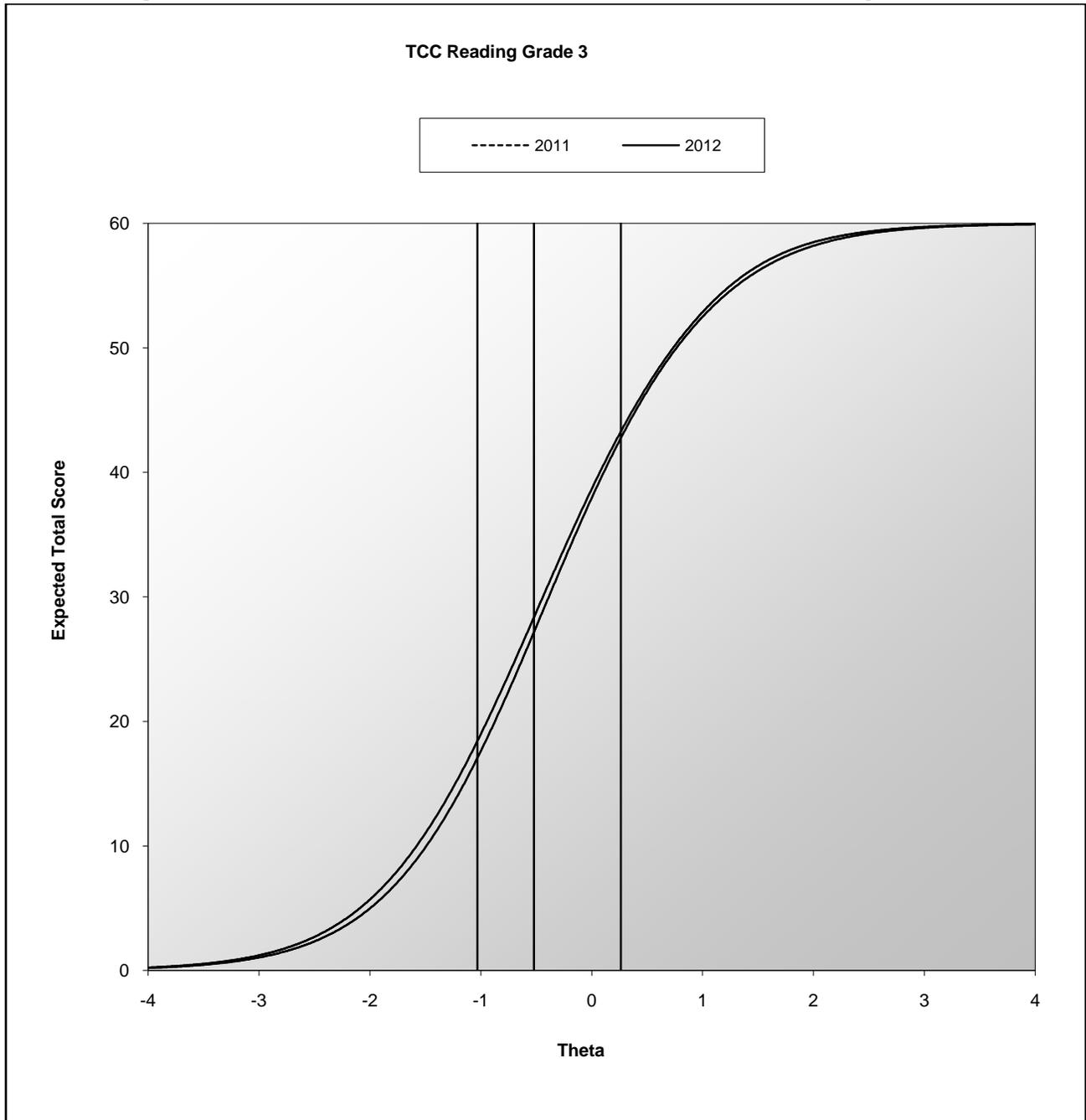


Figure I-16. 2011–12 Montana CRT: Test Information Function – Reading Grade 3

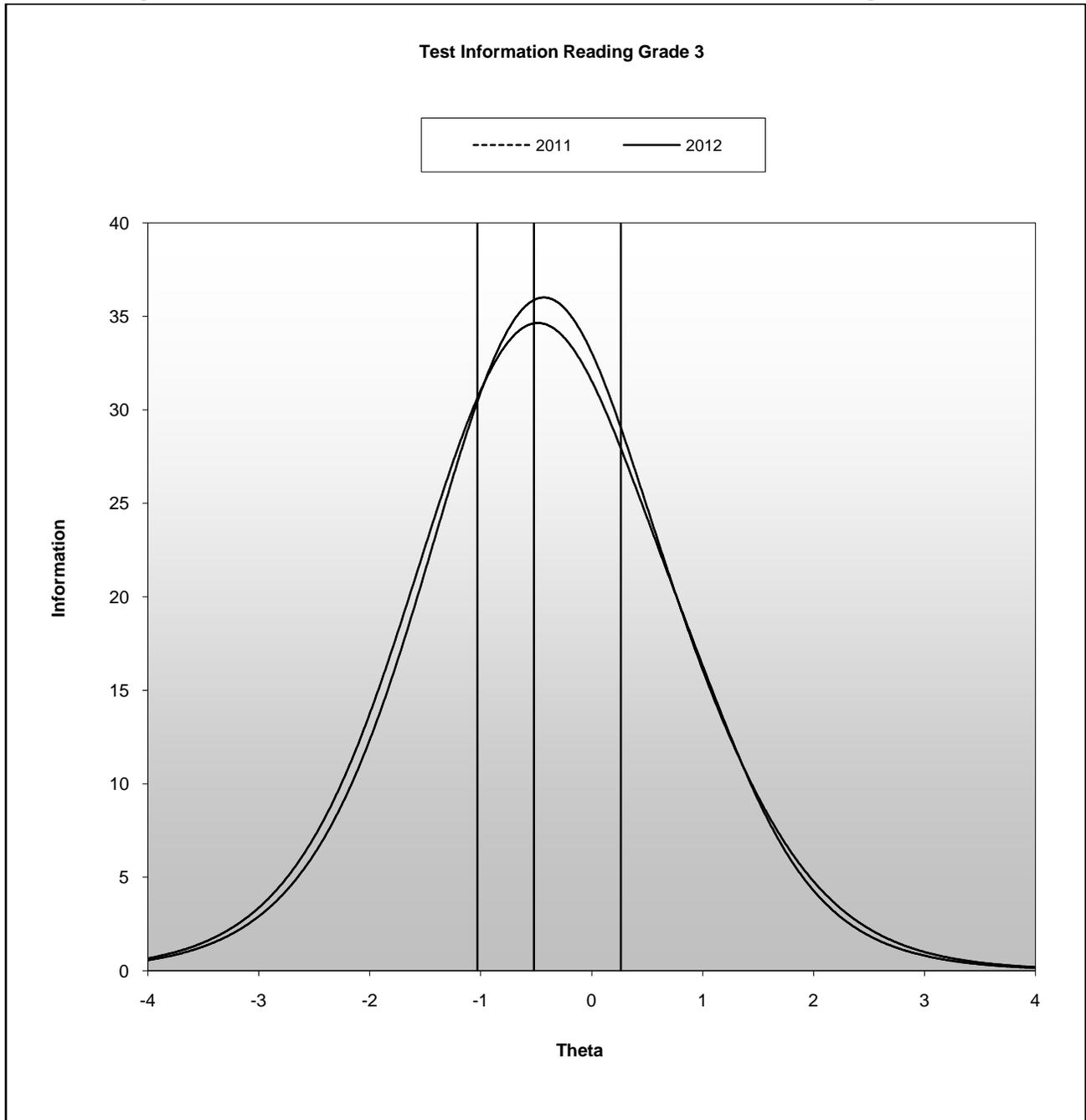


Figure I-17. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 4

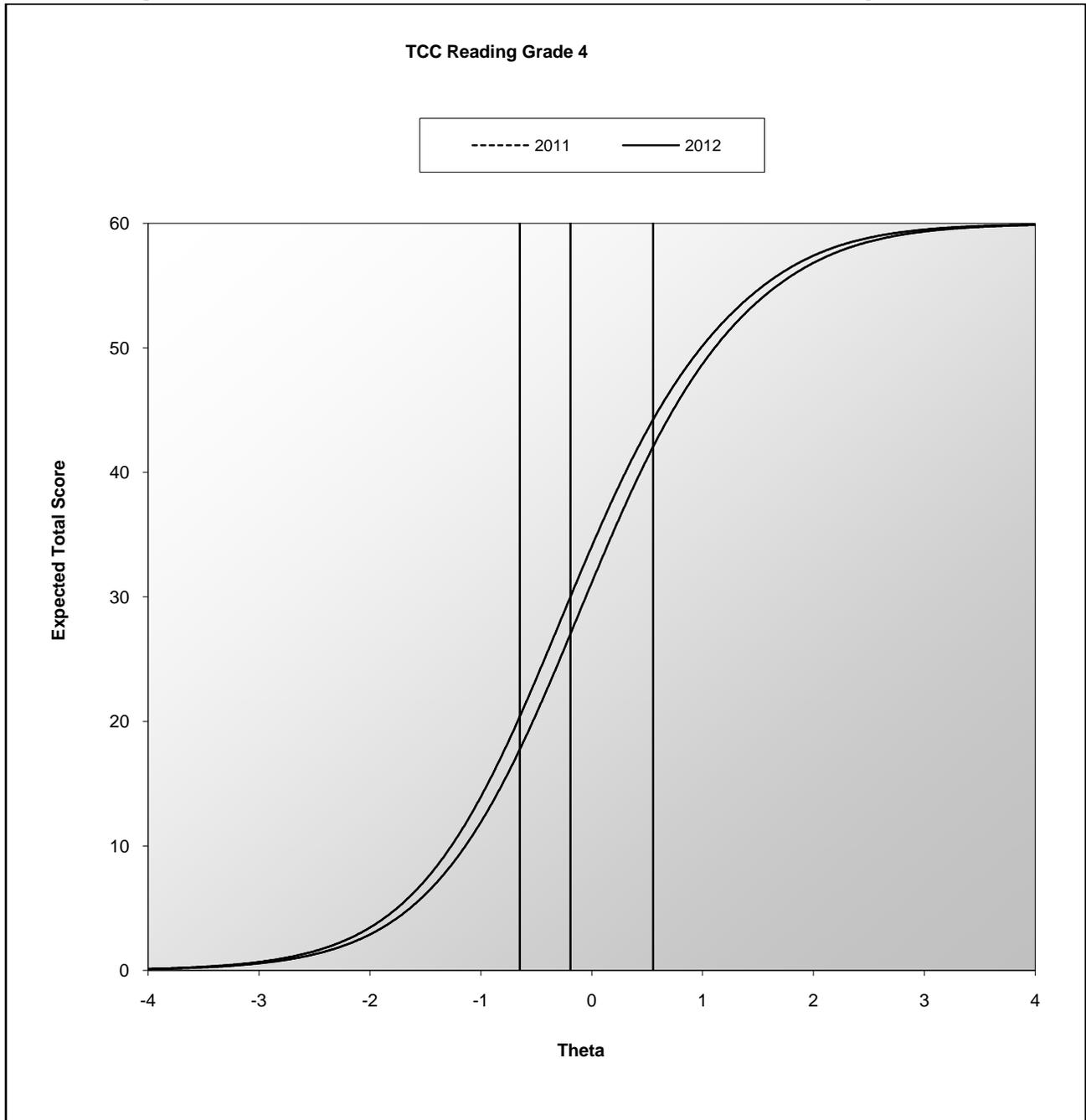


Figure I-18. 2011–12 Montana CRT: Test Information Function – Reading Grade 4

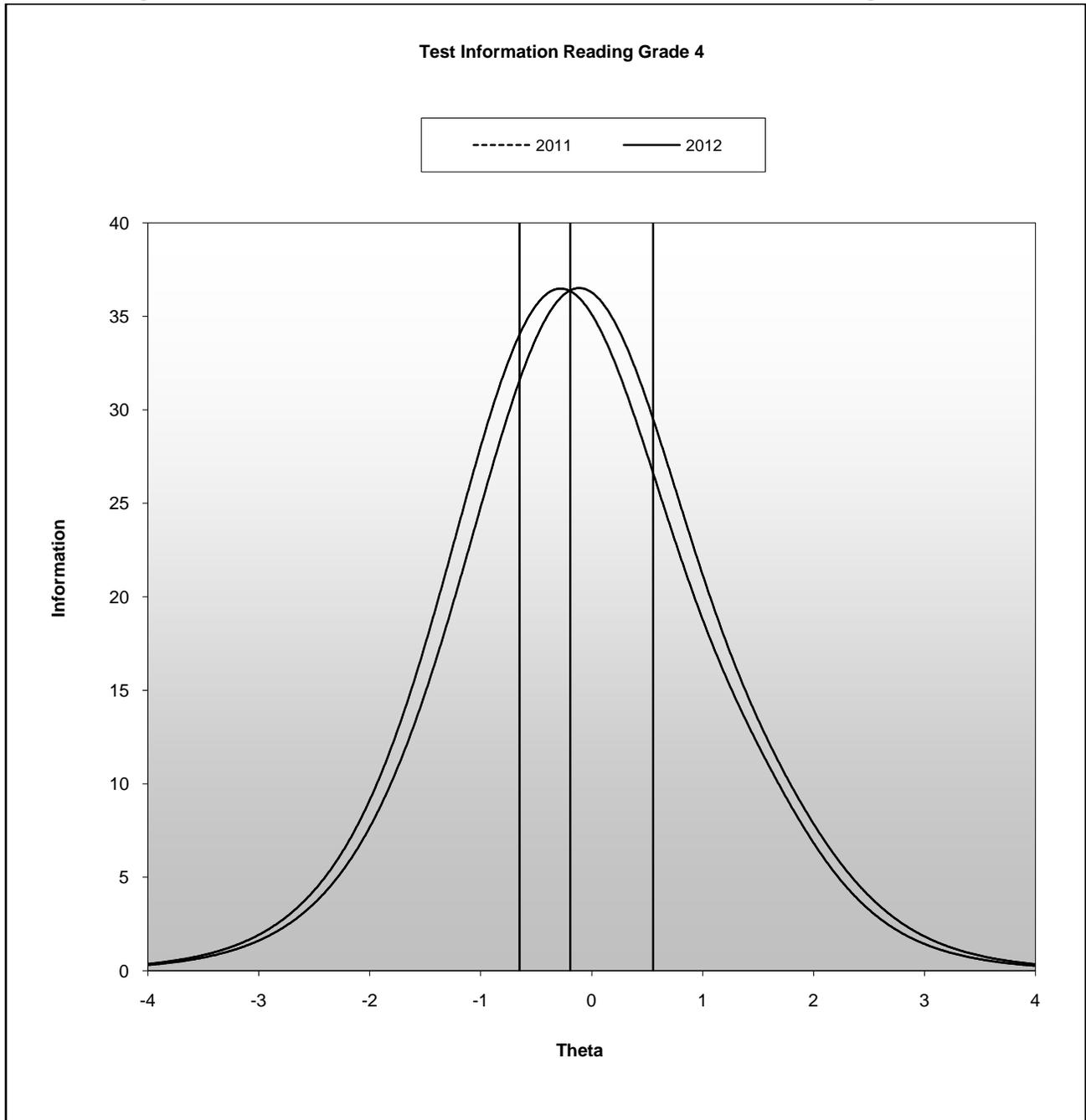


Figure I-19. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 5

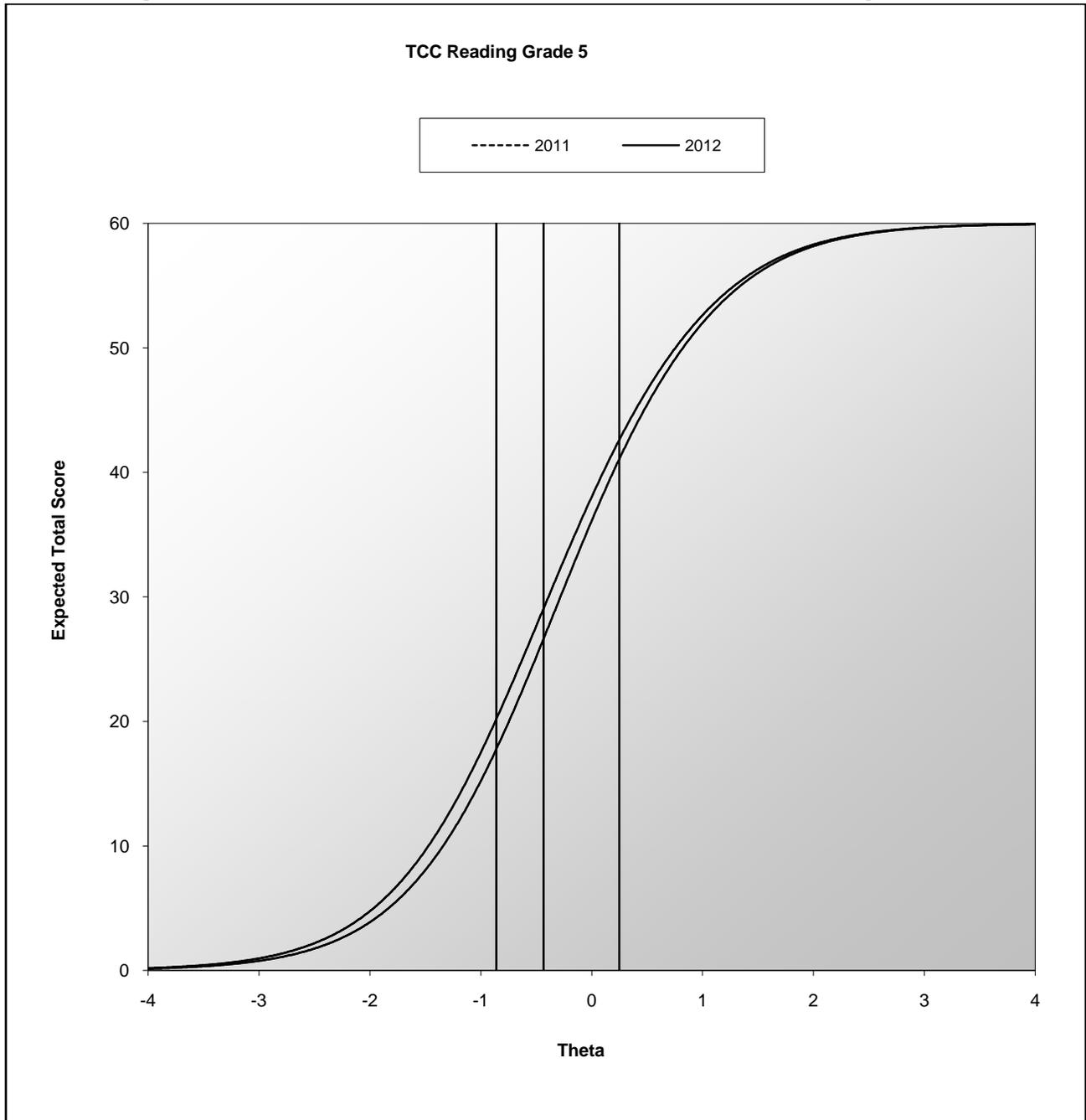


Figure I-20. 2011–12 Montana CRT: Test Information Function – Reading Grade 5

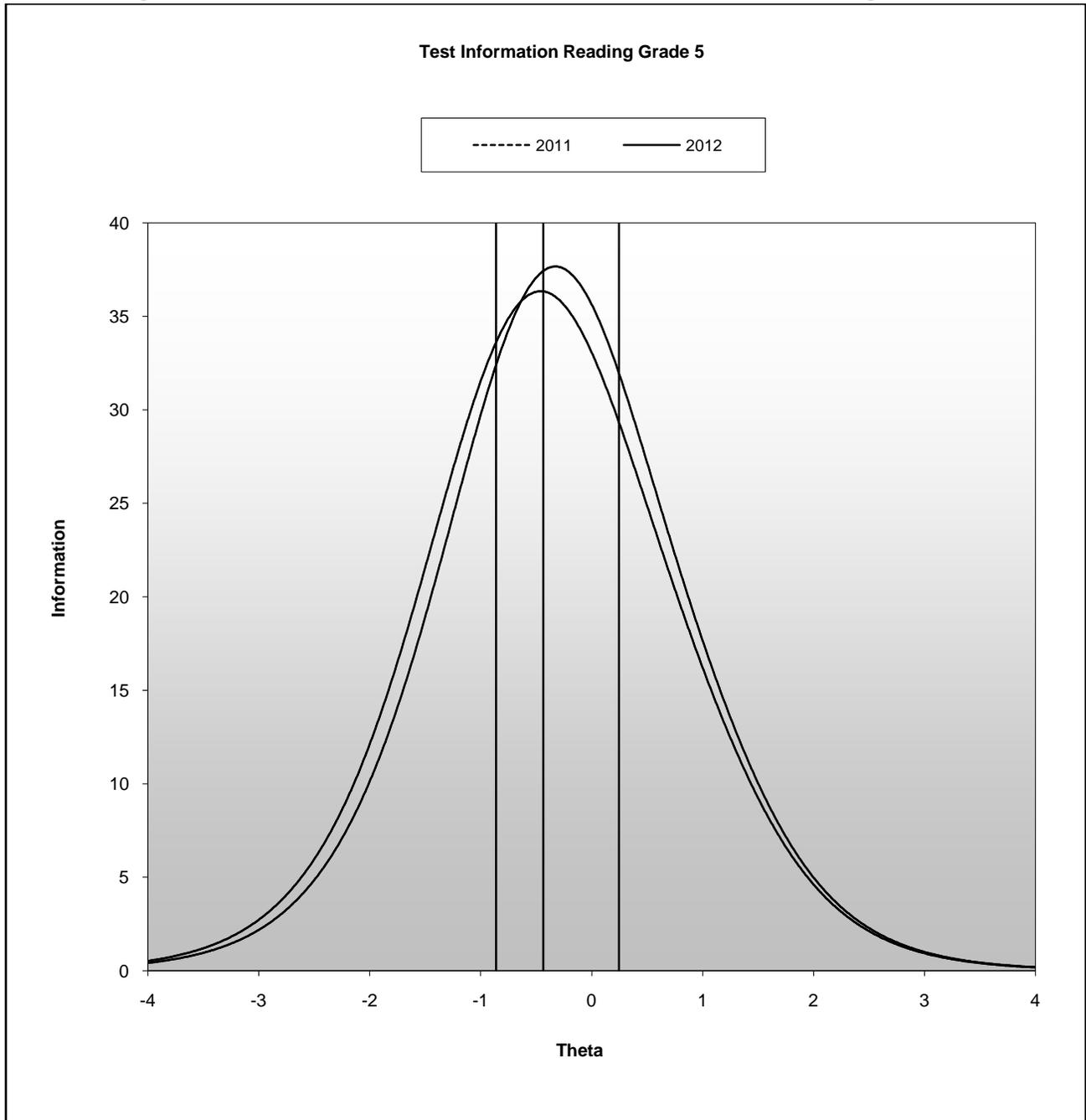


Figure I-21. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 6

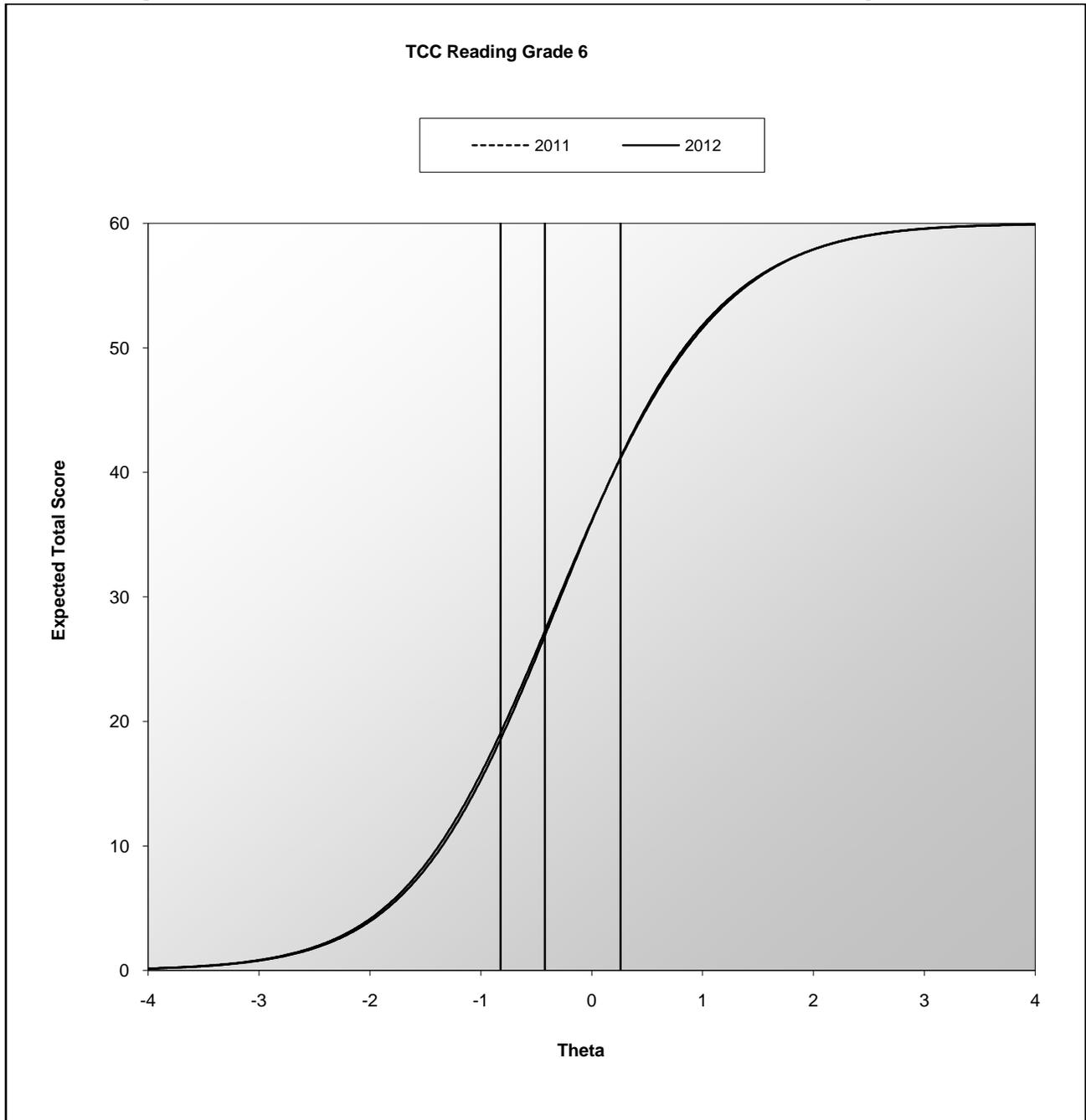


Figure I-22. 2011–12 Montana CRT: Test Information Function – Reading Grade 6

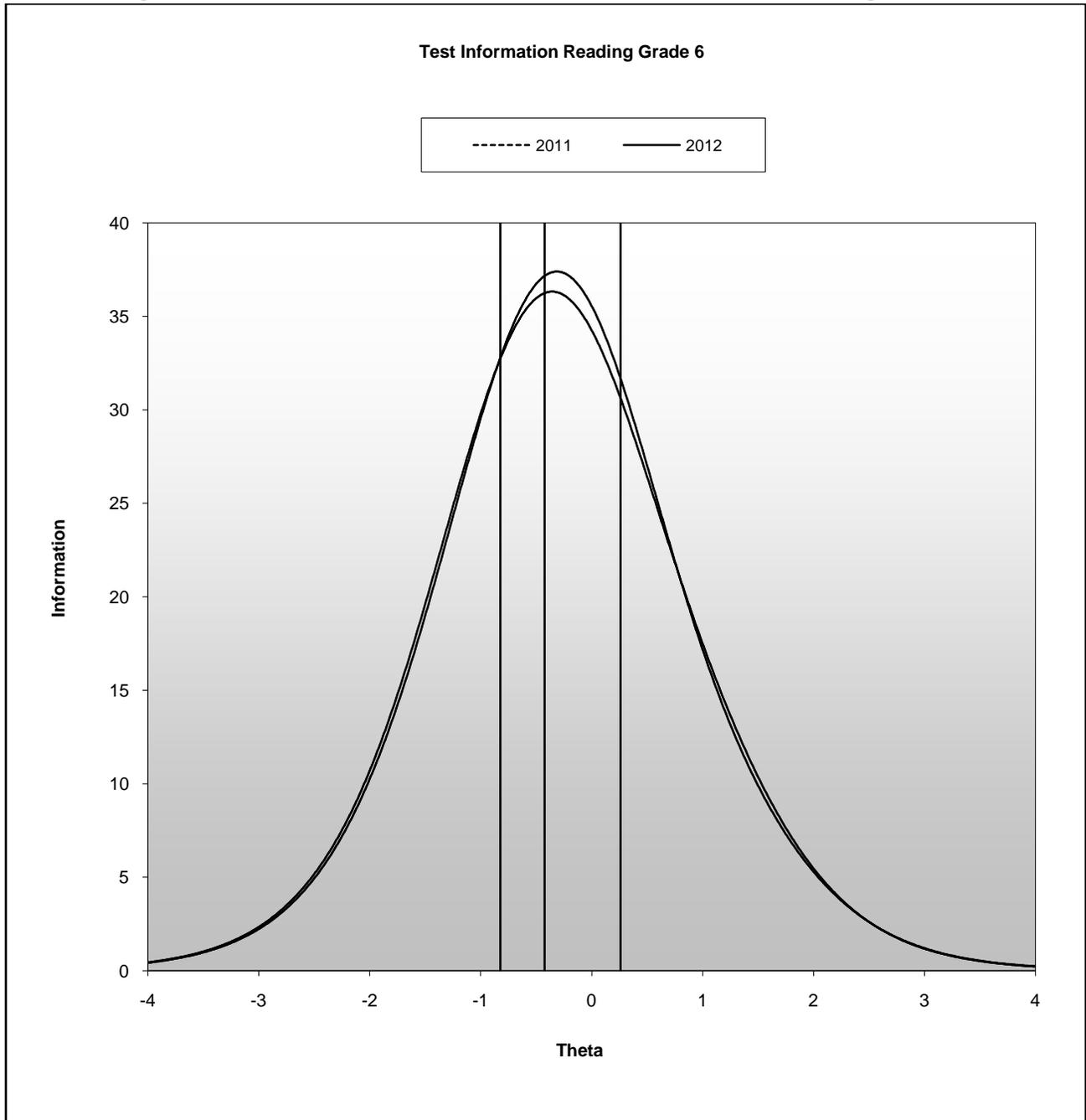


Figure I-23. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 7

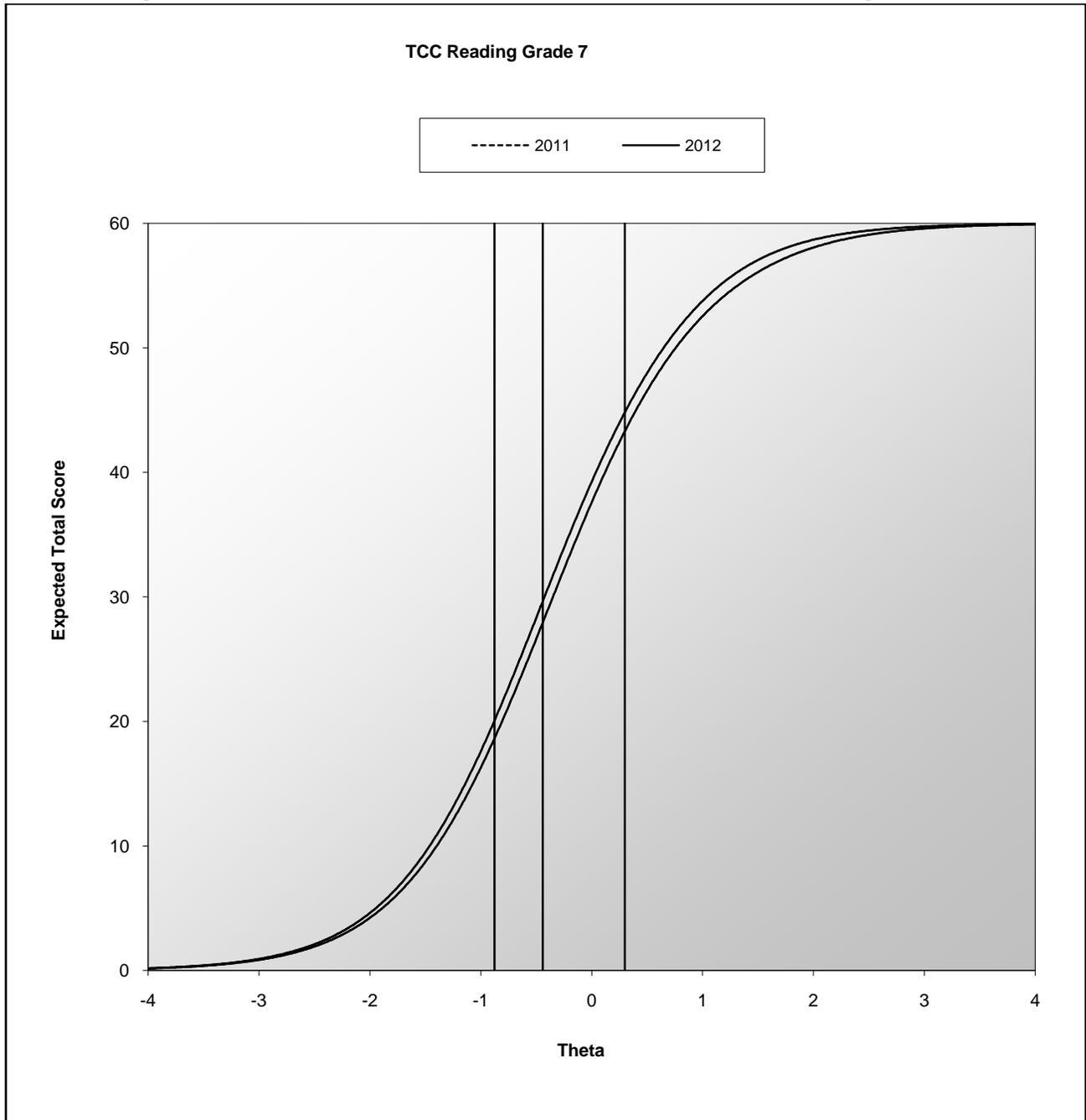


Figure I-24. 2011–12 Montana CRT: Test Information Function – Reading Grade 7

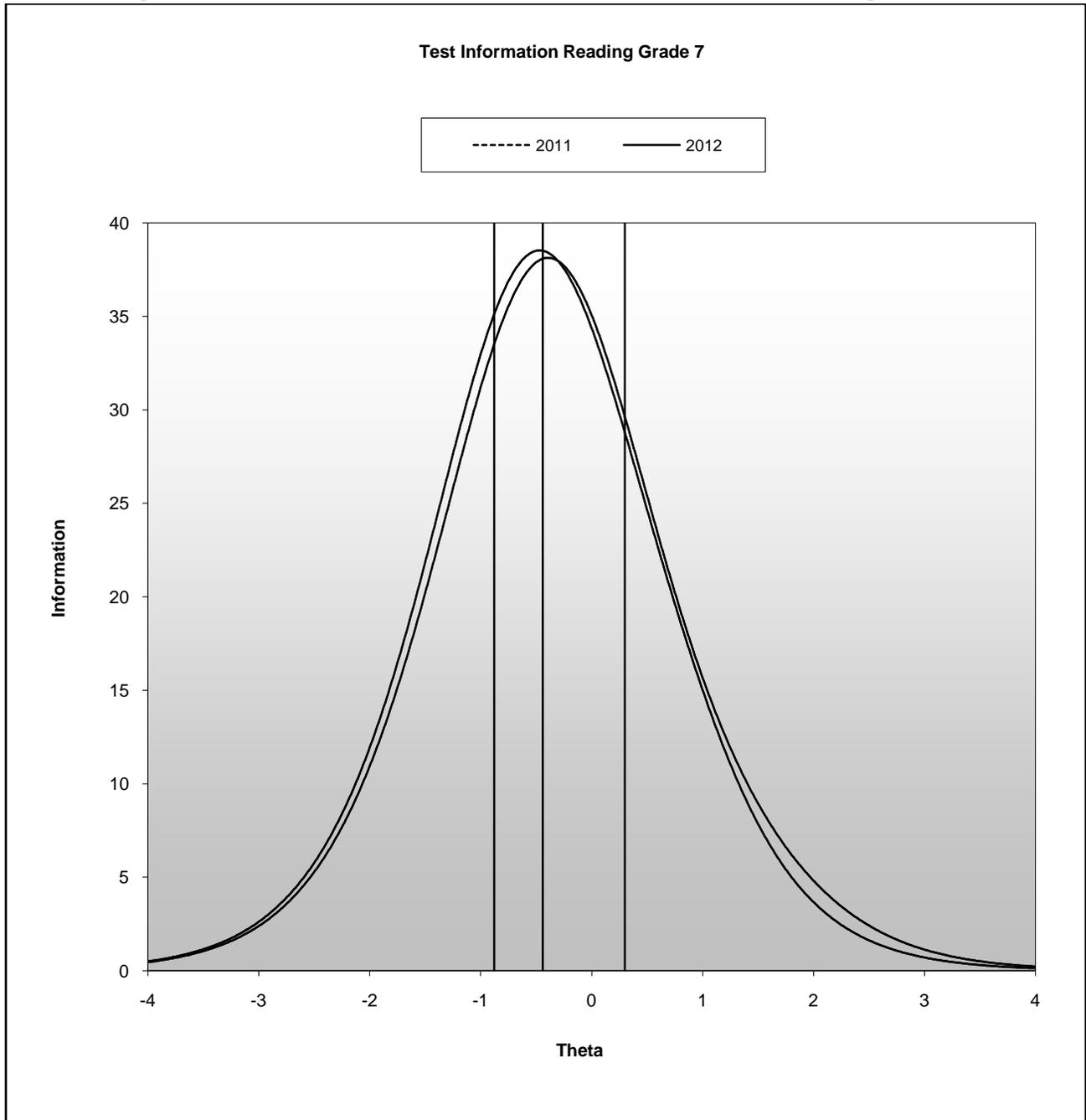


Figure I-25. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 8

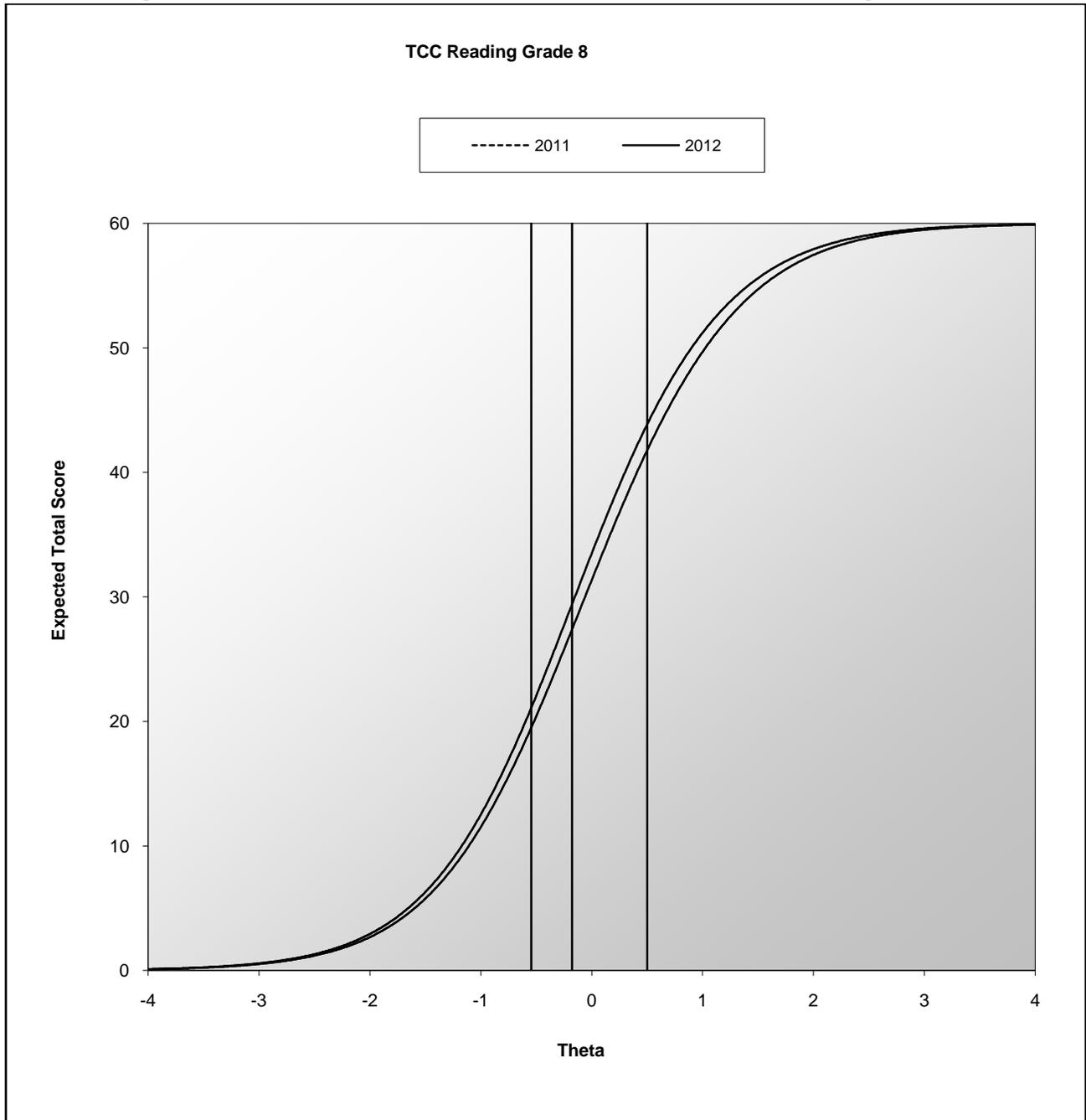


Figure I-26. 2011–12 Montana CRT: Test Information Function – Reading Grade 8

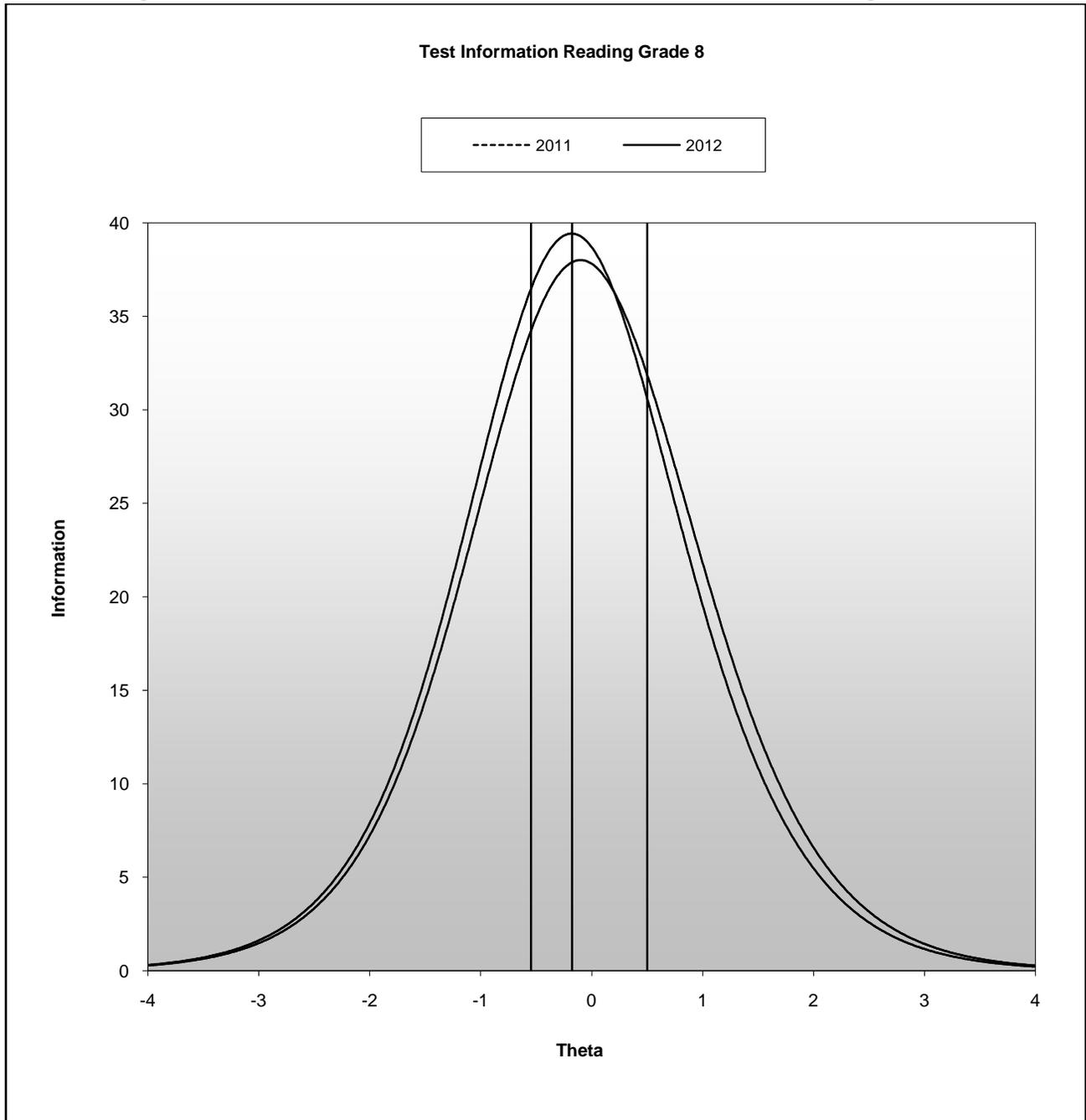


Figure I-27. 2011–12 Montana CRT: Test Characteristic Curve – Reading Grade 10

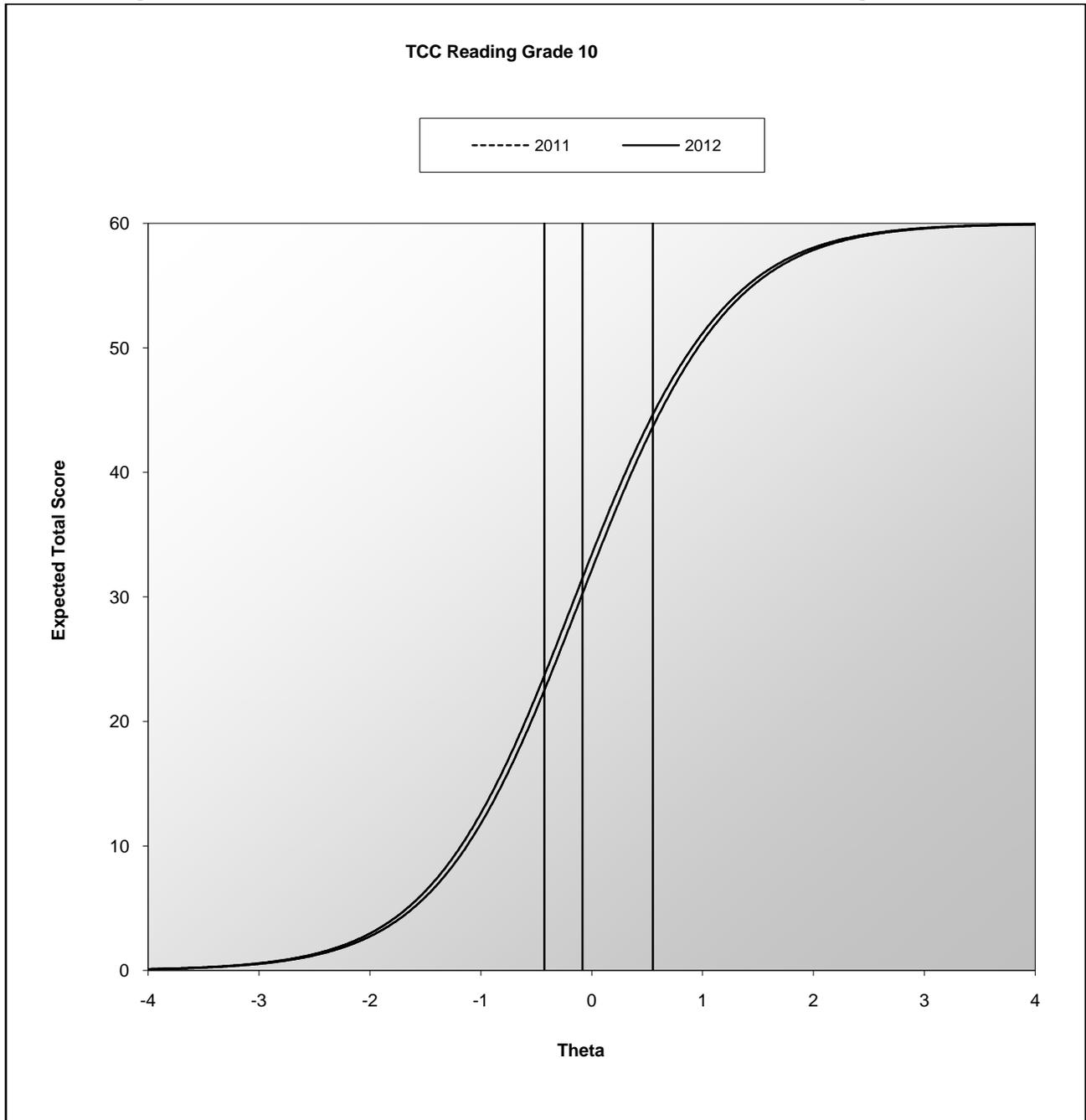


Figure I-28. 2011–12 Montana CRT: Test Information Function – Reading Grade 10

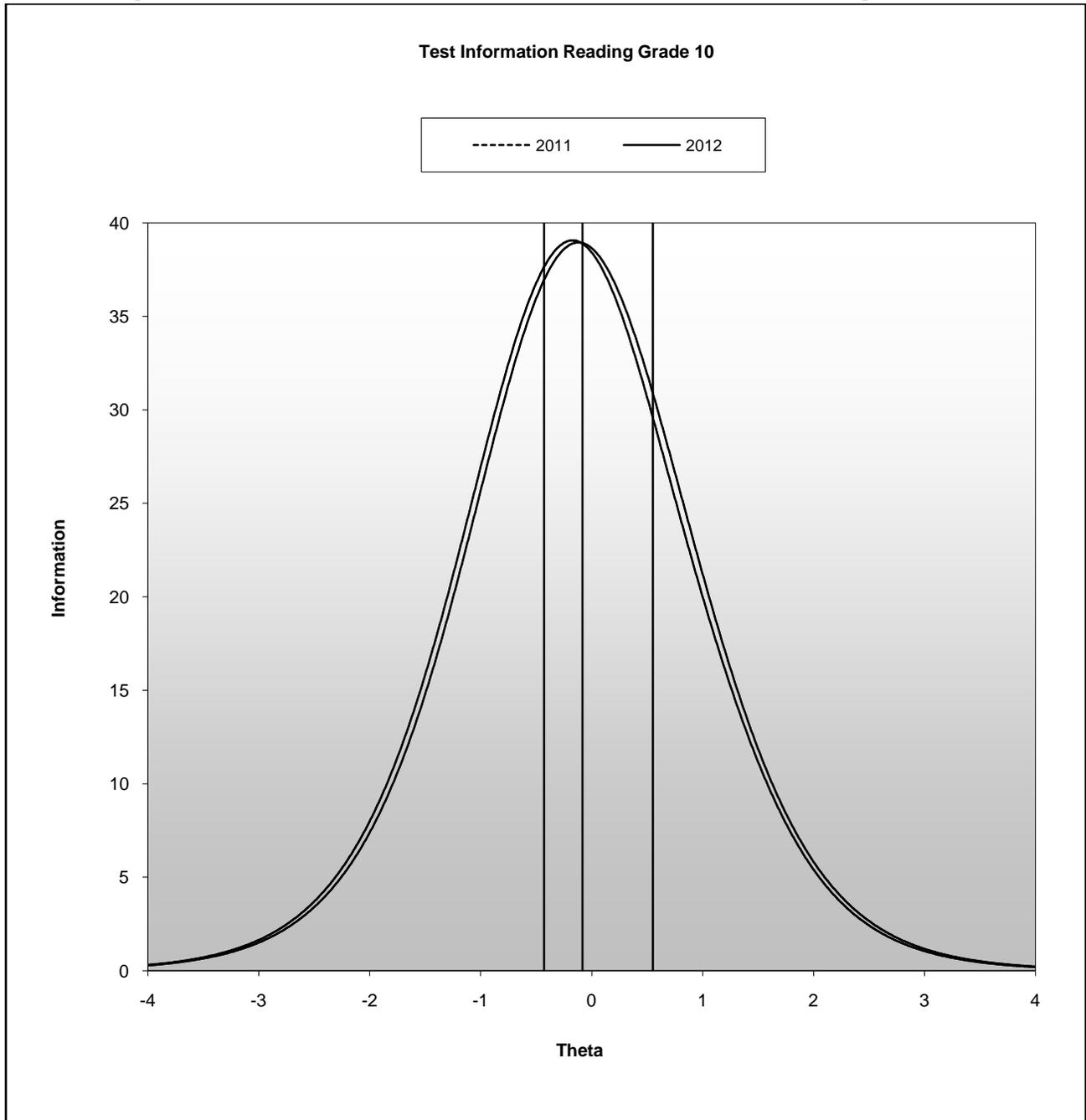


Figure I-29. 2011–12 Montana CRT: Test Characteristic Curve – Science Grade 4

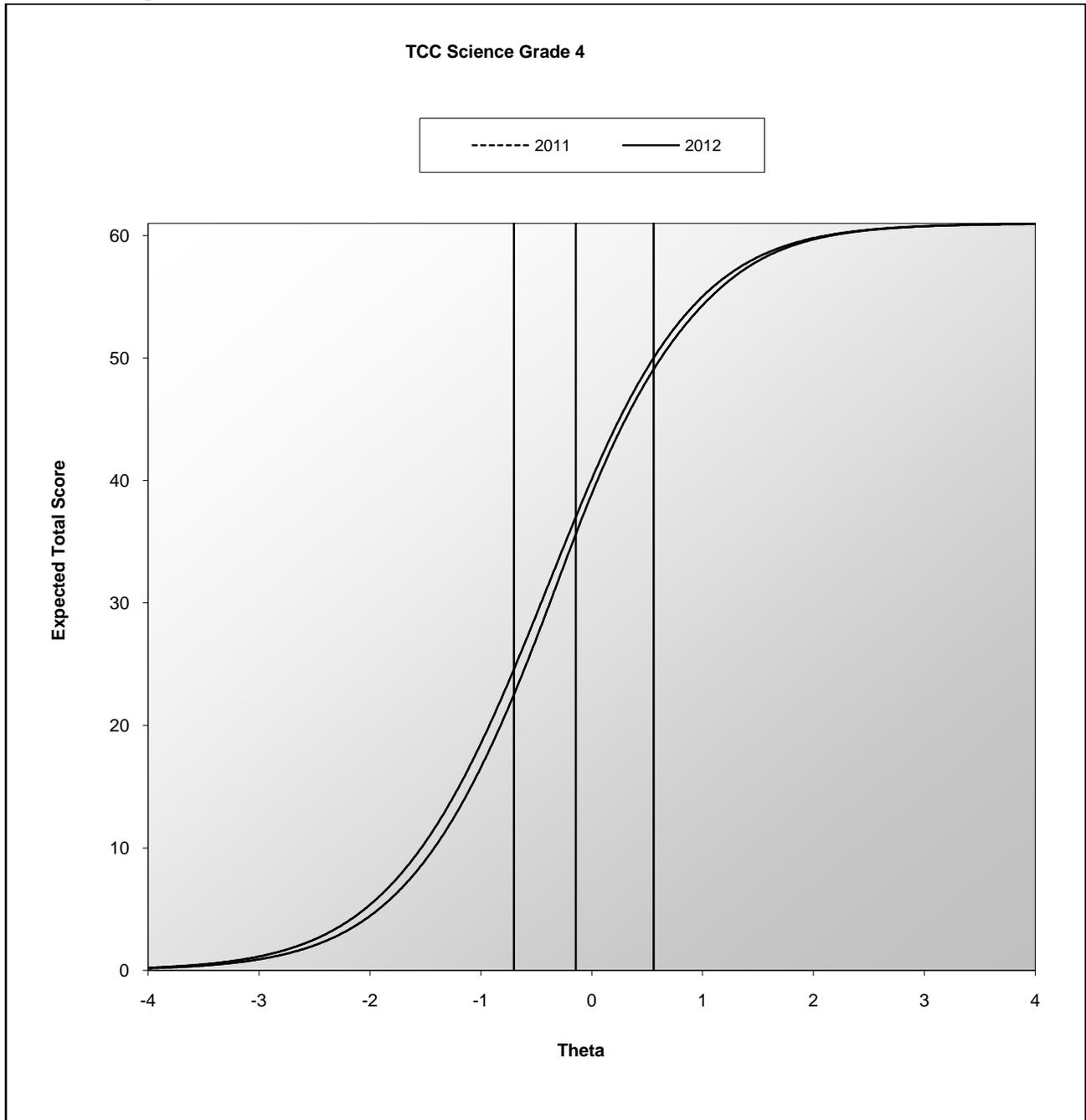


Figure I-30. 2011–12 Montana CRT: Test Information Function – Science Grade 4

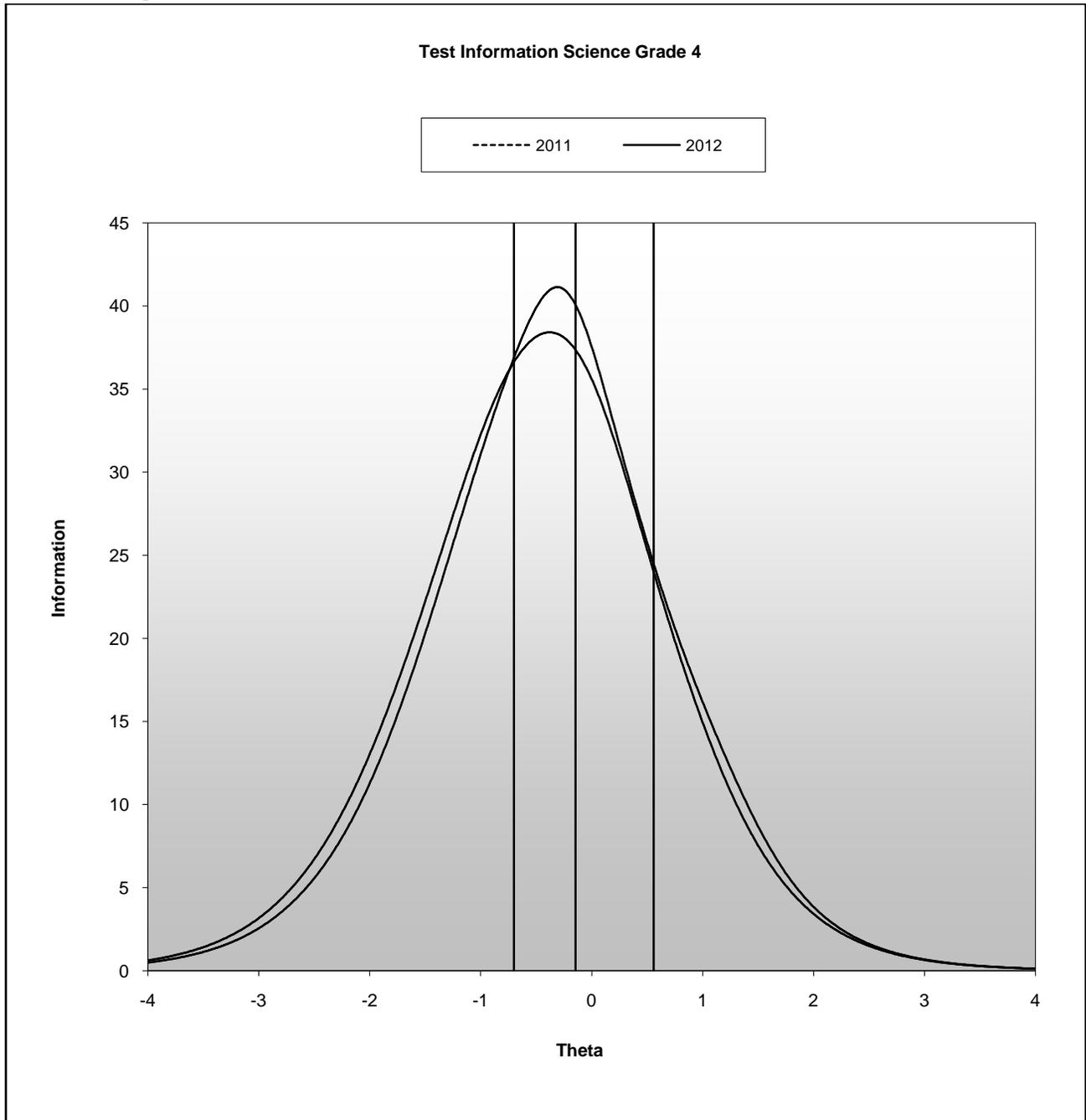


Figure I-31. 2011–12 Montana CRT: Test Characteristic Curve – Science Grade 8

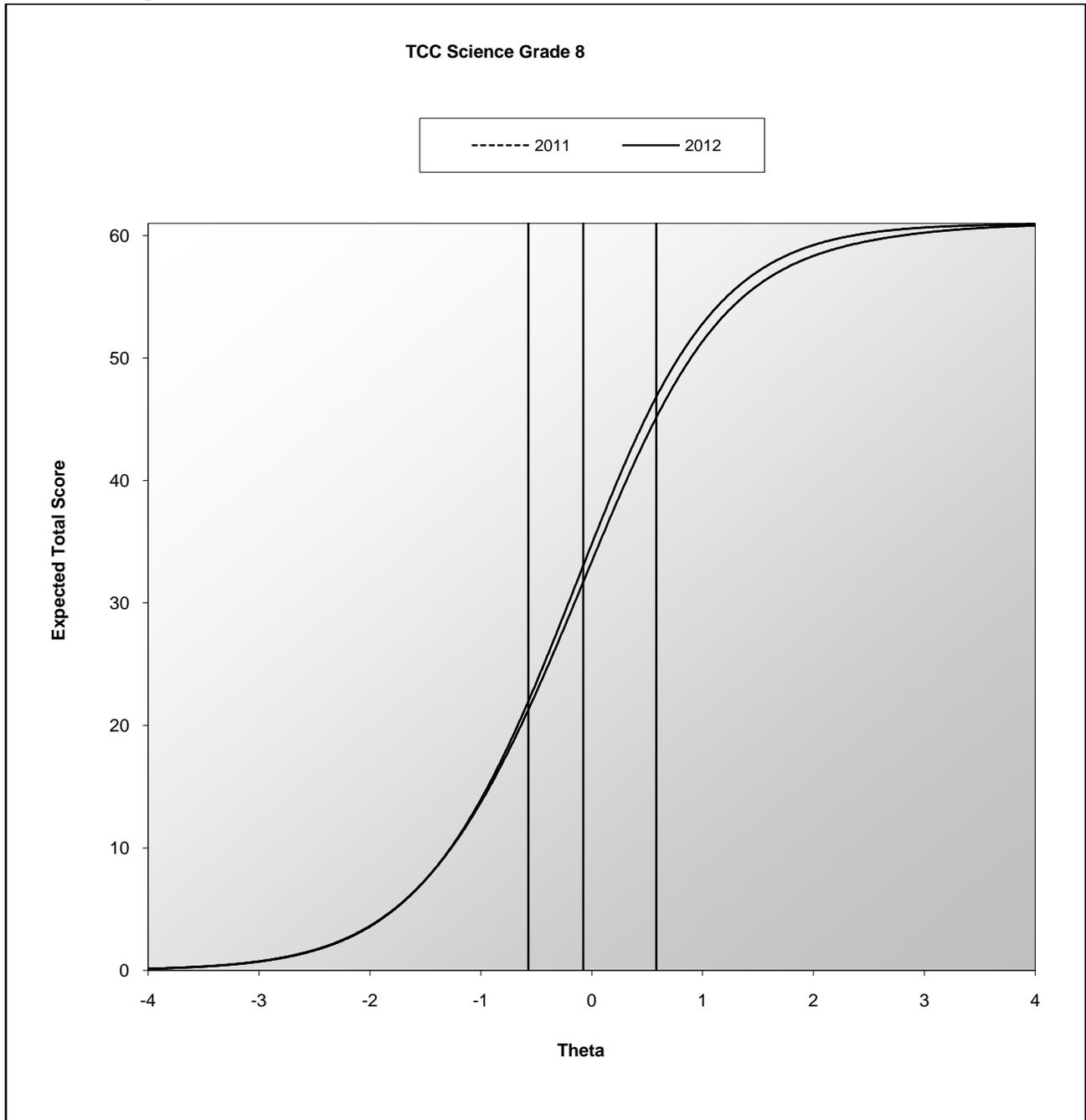


Figure I-32. 2011–12 Montana CRT: Test Information Function – Science Grade 8

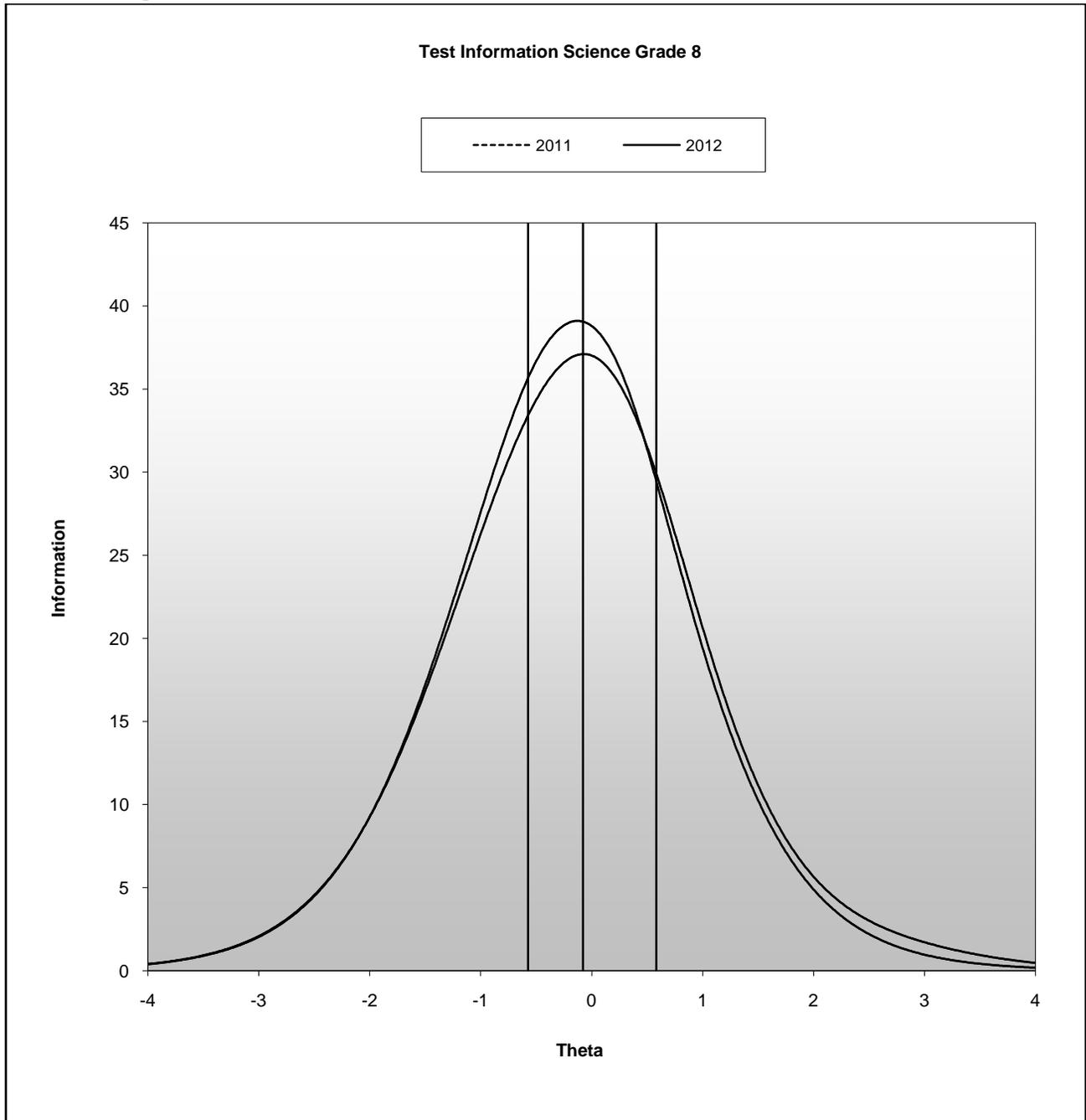


Figure I-33. 2011–12 Montana CRT: Test Characteristic Curve – Science Grade 10

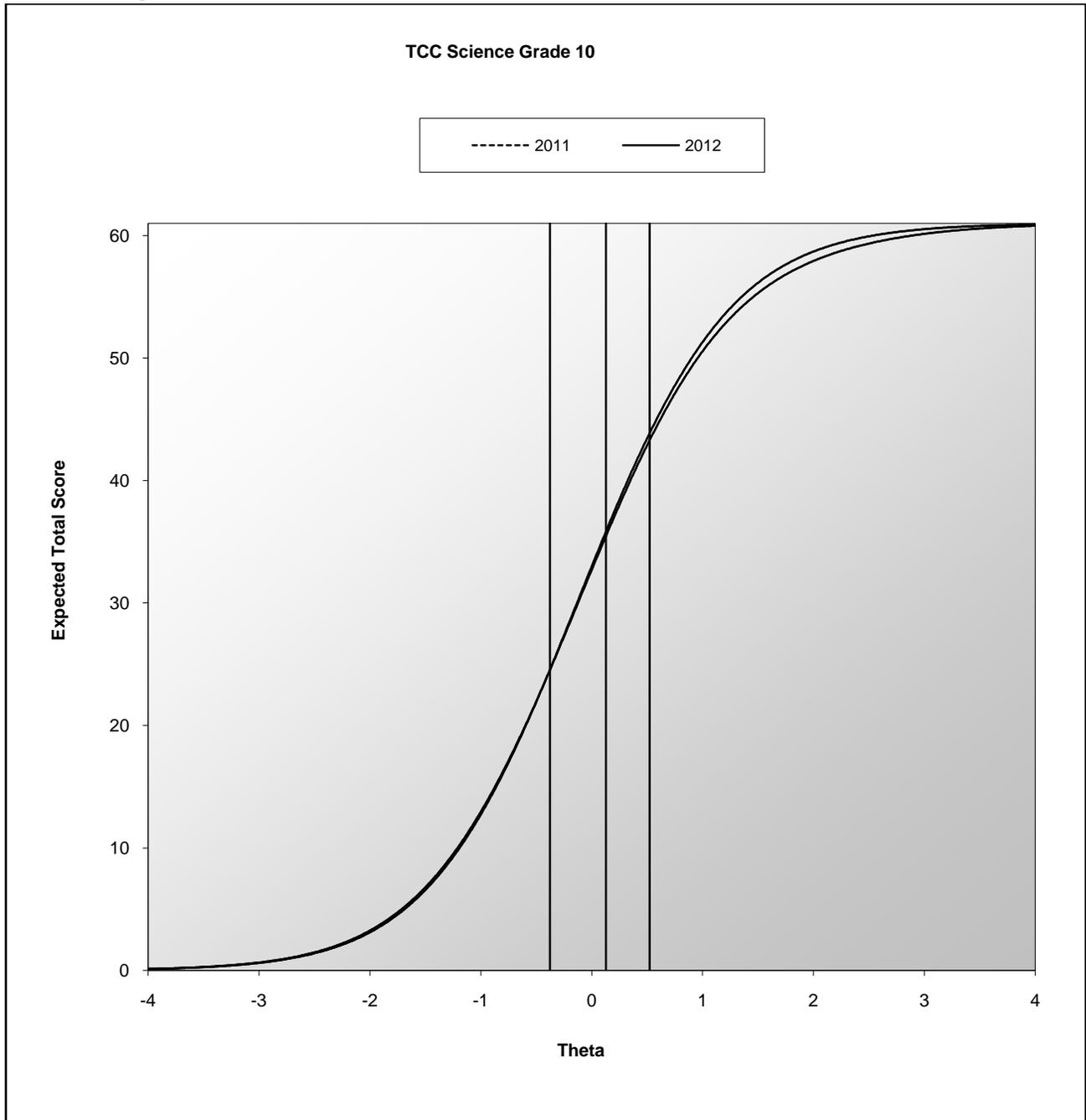
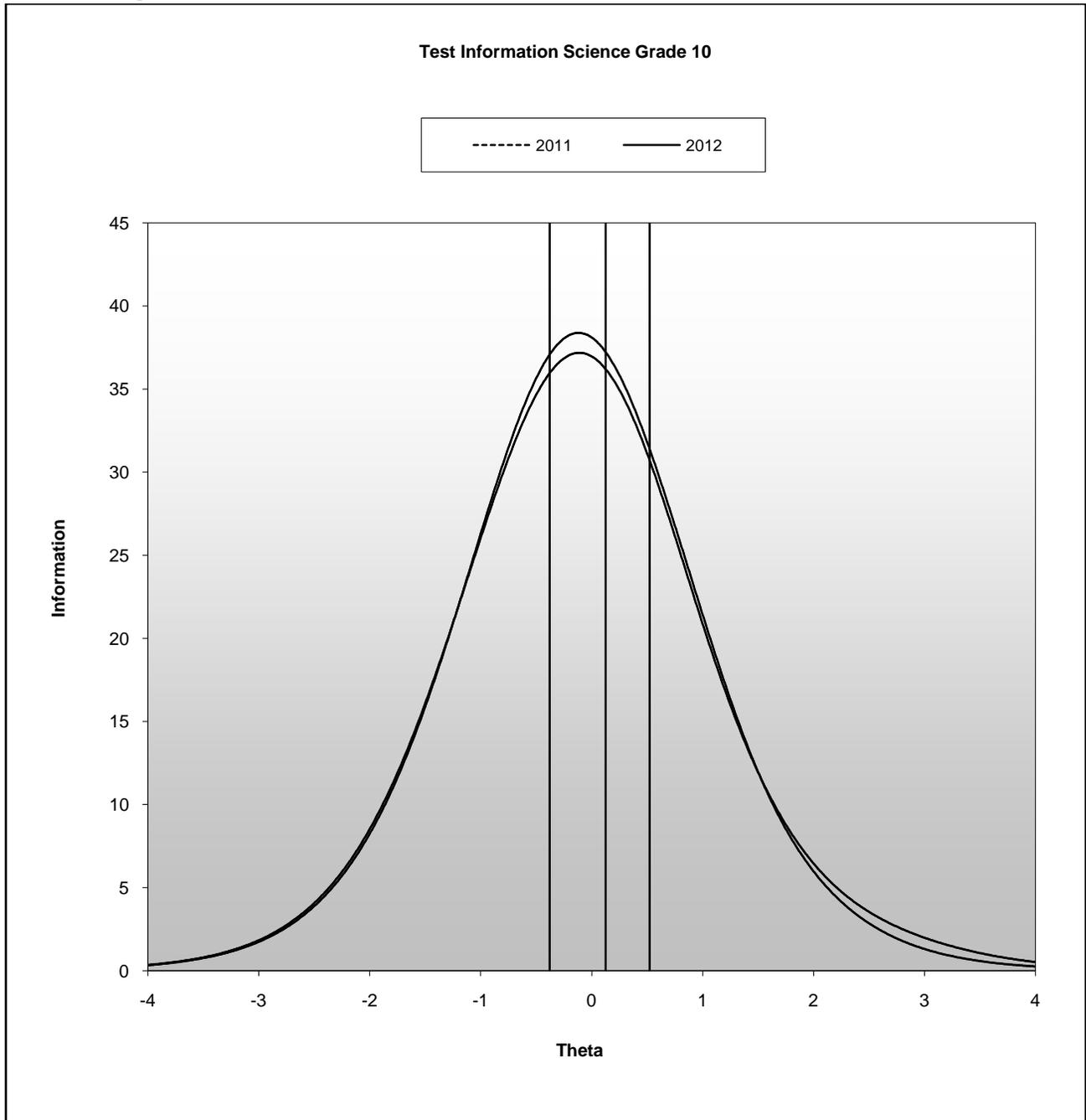


Figure I-34. 2011–12 Montana CRT: Test Information Function – Science Grade 10



APPENDIX J—*b*-PLOTS

Figure J-1. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 3

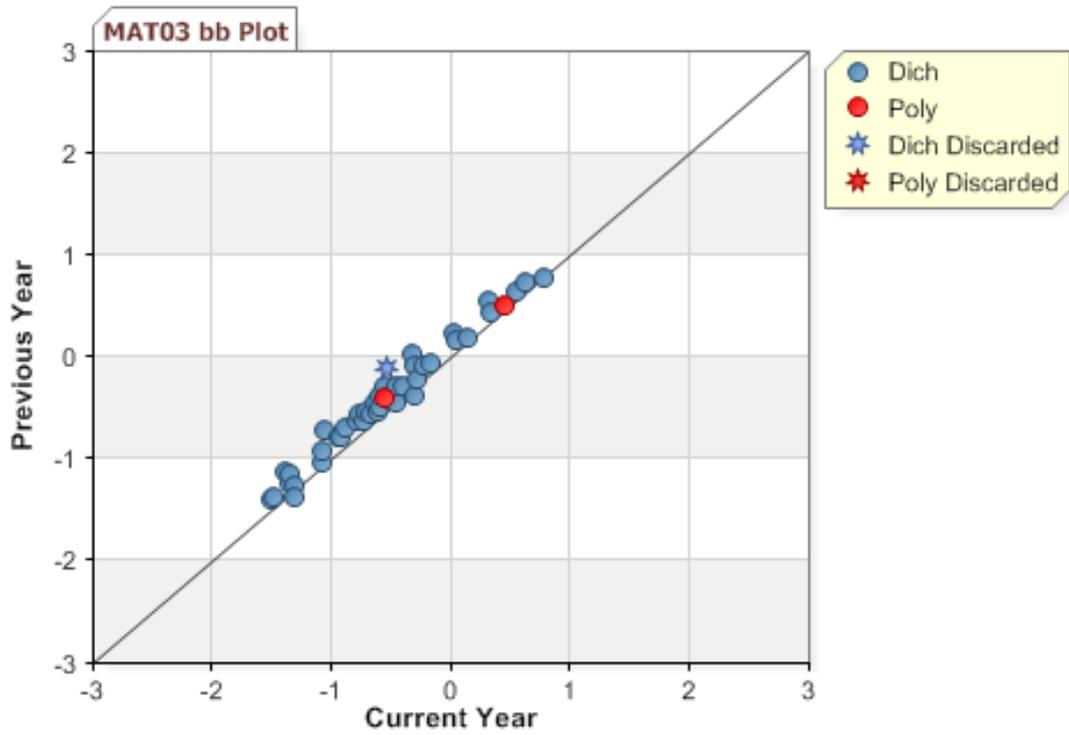


Figure J-2. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 4

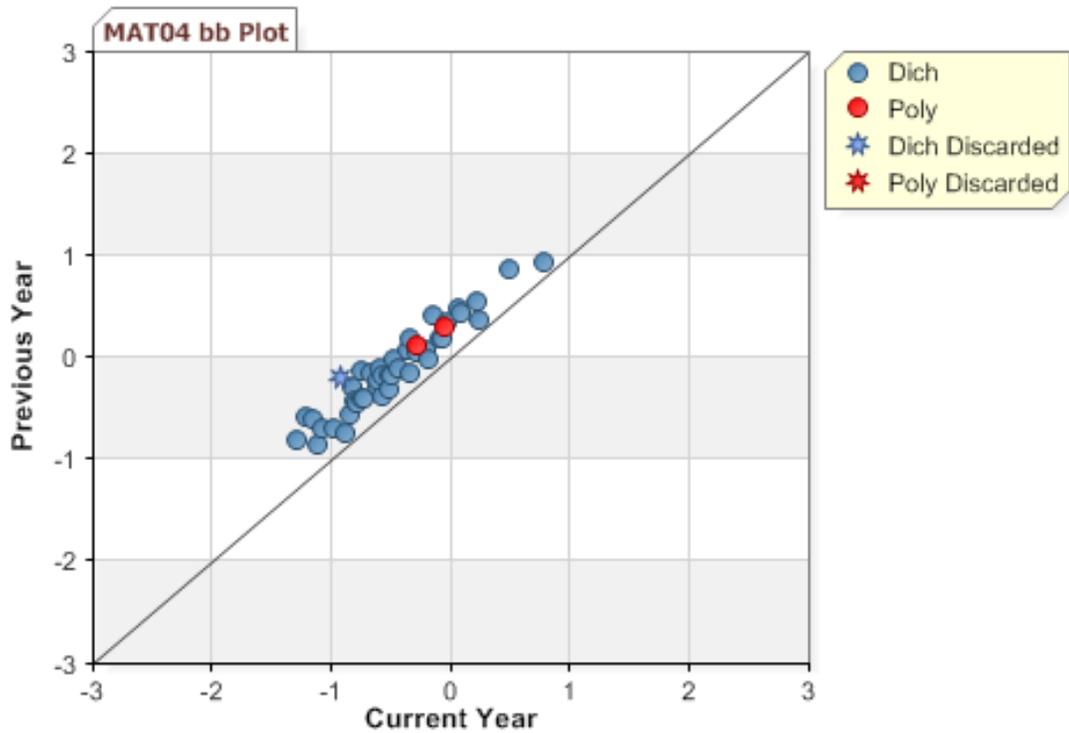


Figure J-3. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 5

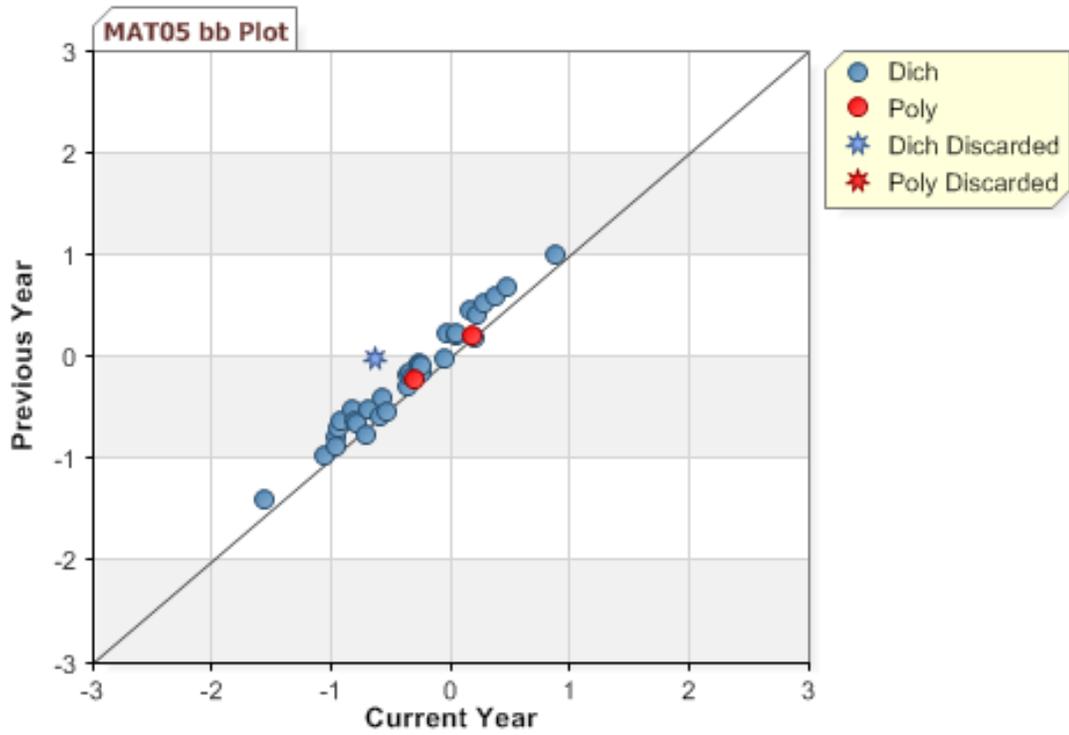


Figure J-4. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 6

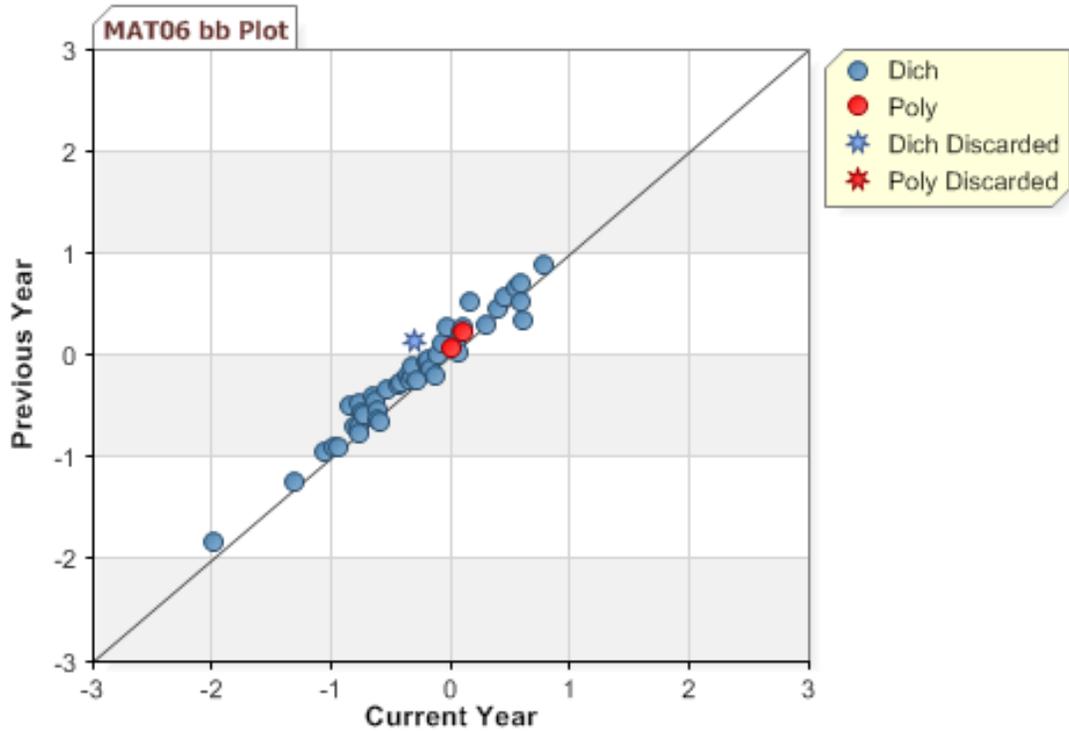


Figure J-5. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 7

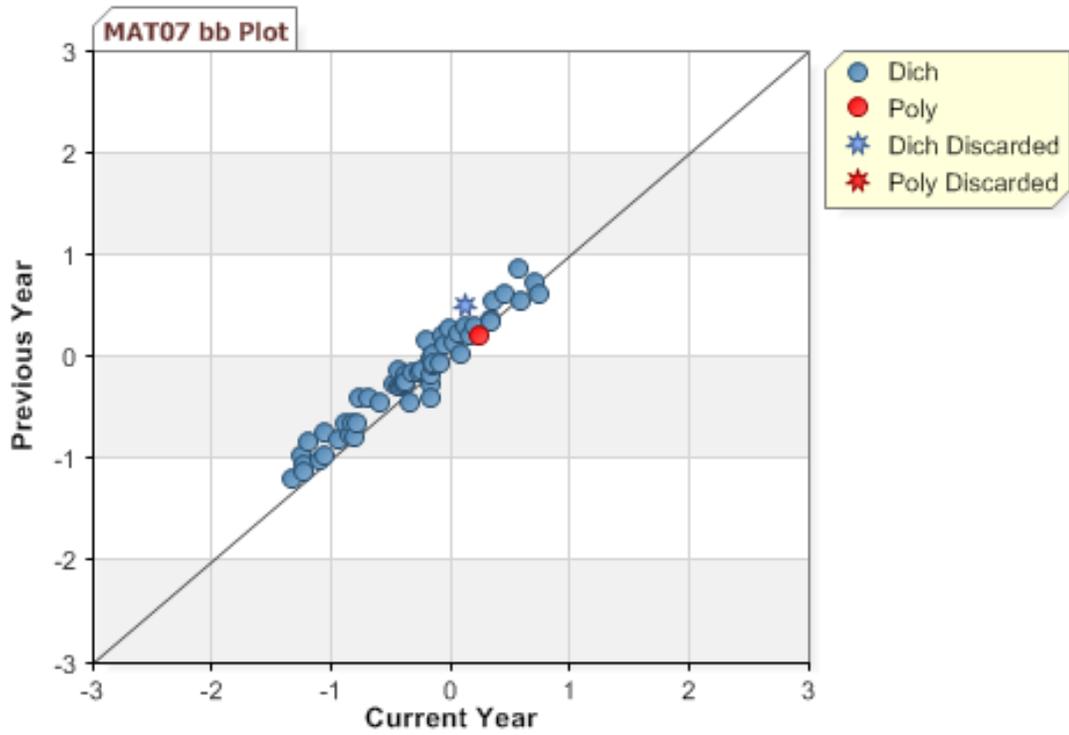


Figure J-6. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 8

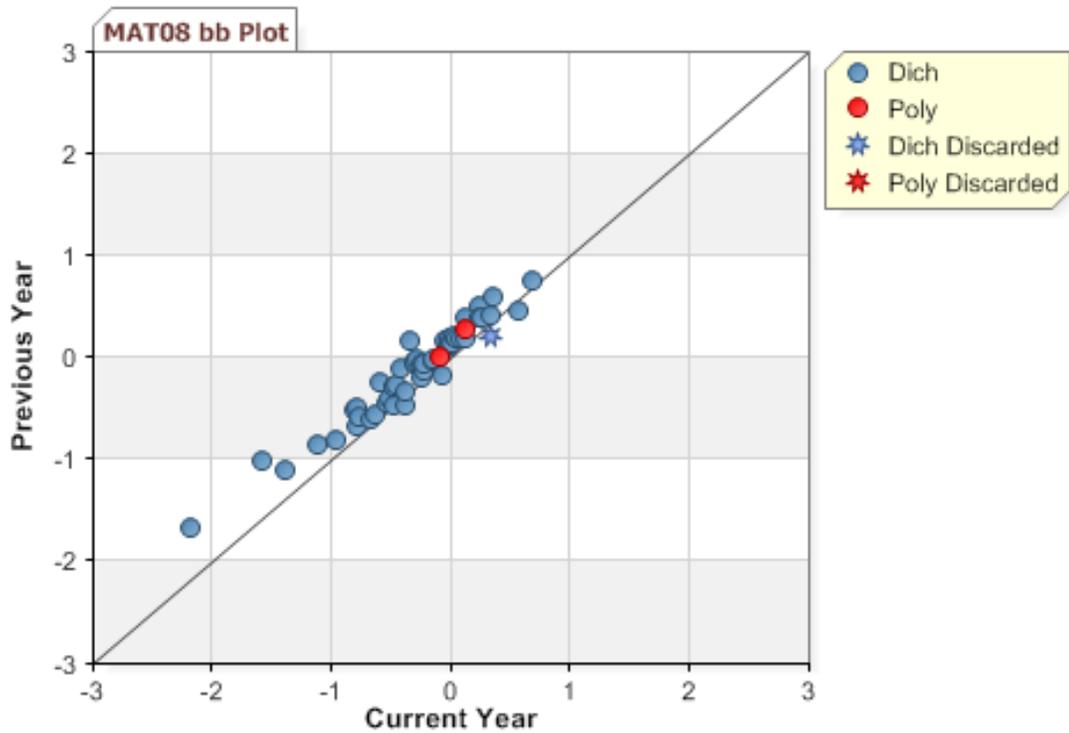


Figure J-7. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 10

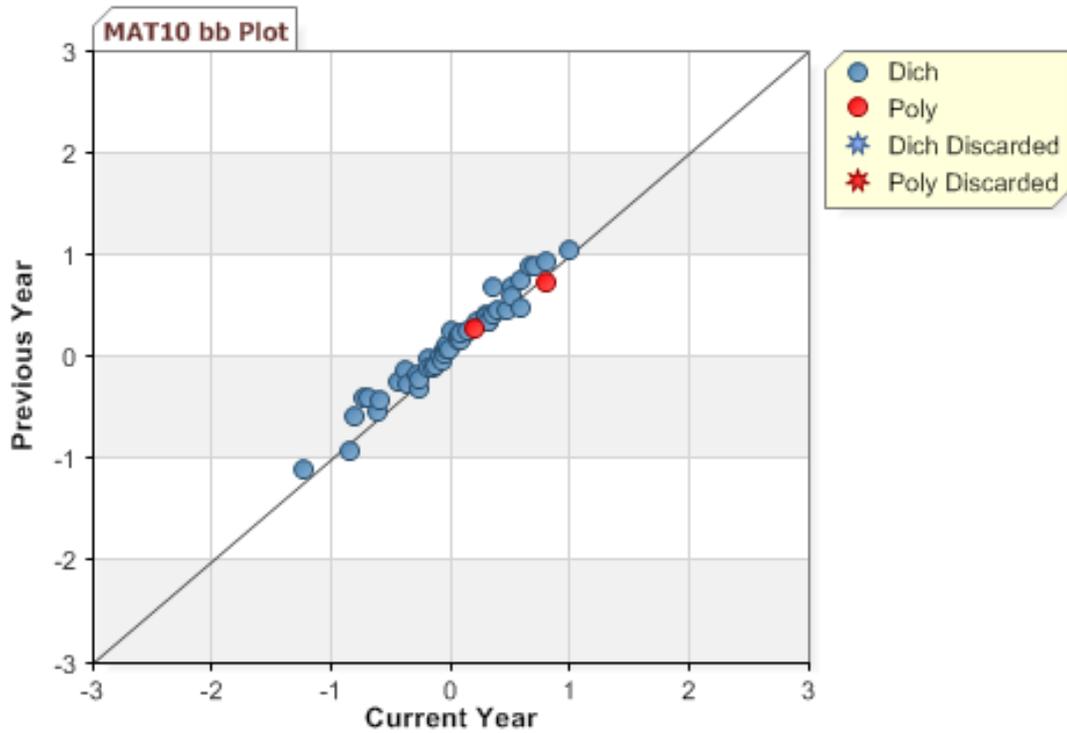


Figure J-8. 2011–12 Montana CRT: Delta Plot – Reading Grade 3

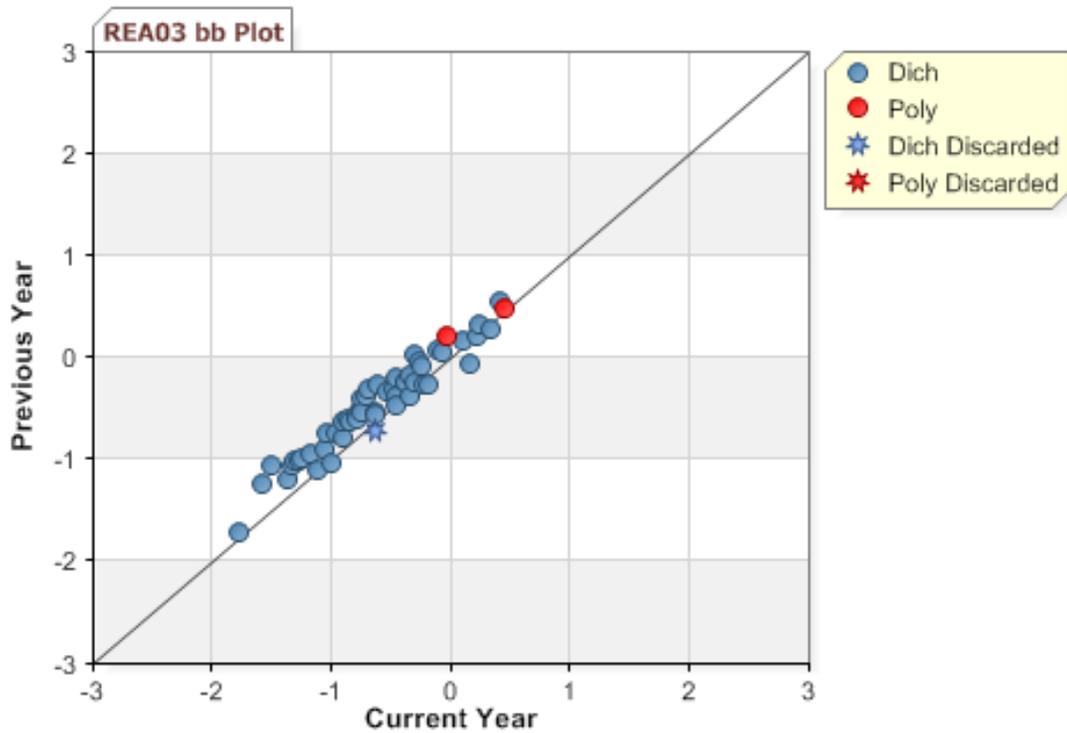


Figure J-9. 2011–12 Montana CRT: Delta Plot – Reading Grade 4

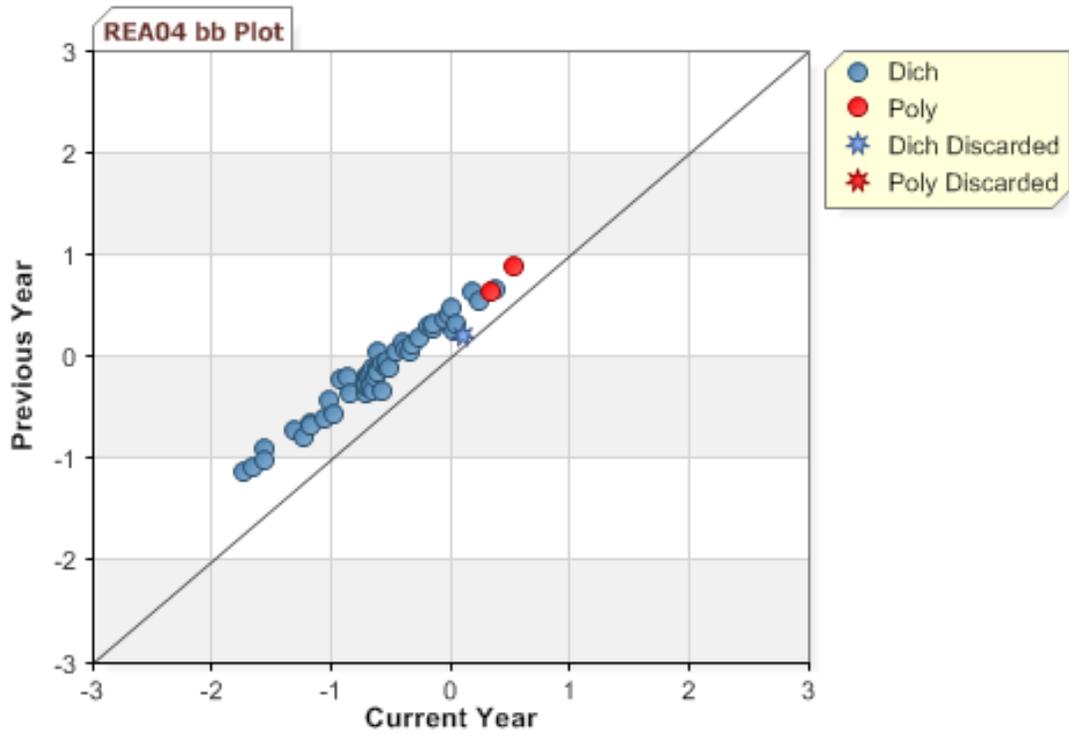


Figure J-10. 2011–12 Montana CRT: Delta Plot – Reading Grade 5

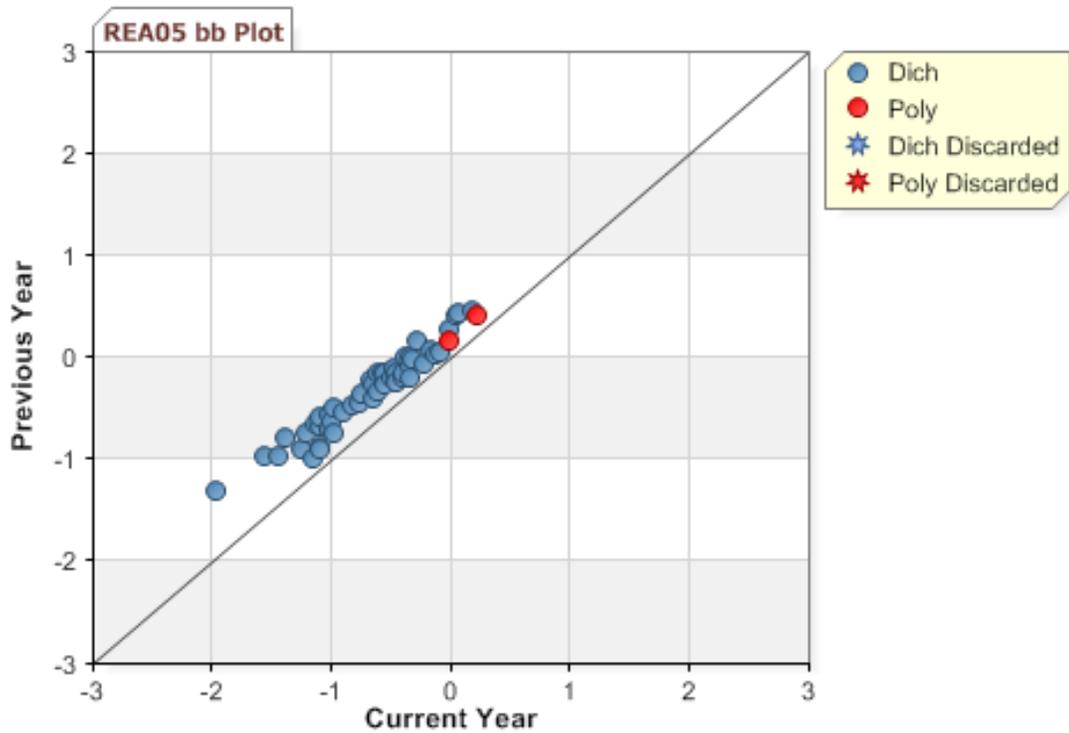


Figure J-11. 2011–12 Montana CRT: Delta Plot – Reading Grade 6

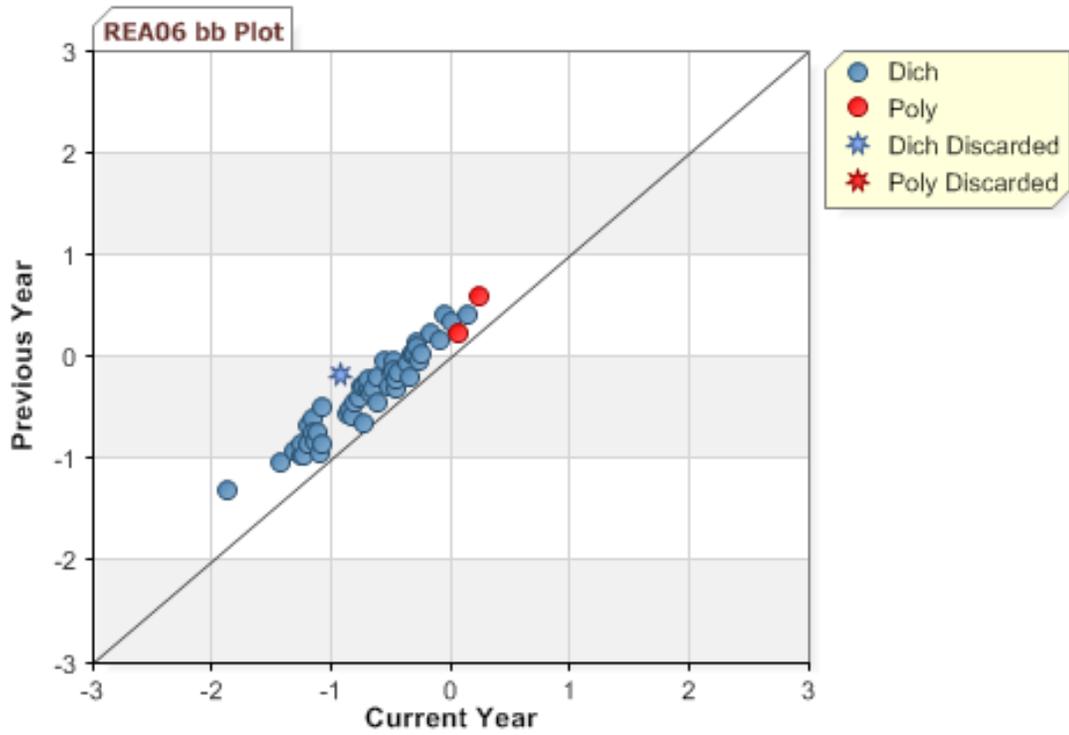


Figure J-12. 2011–12 Montana CRT: Delta Plot – Reading Grade 7

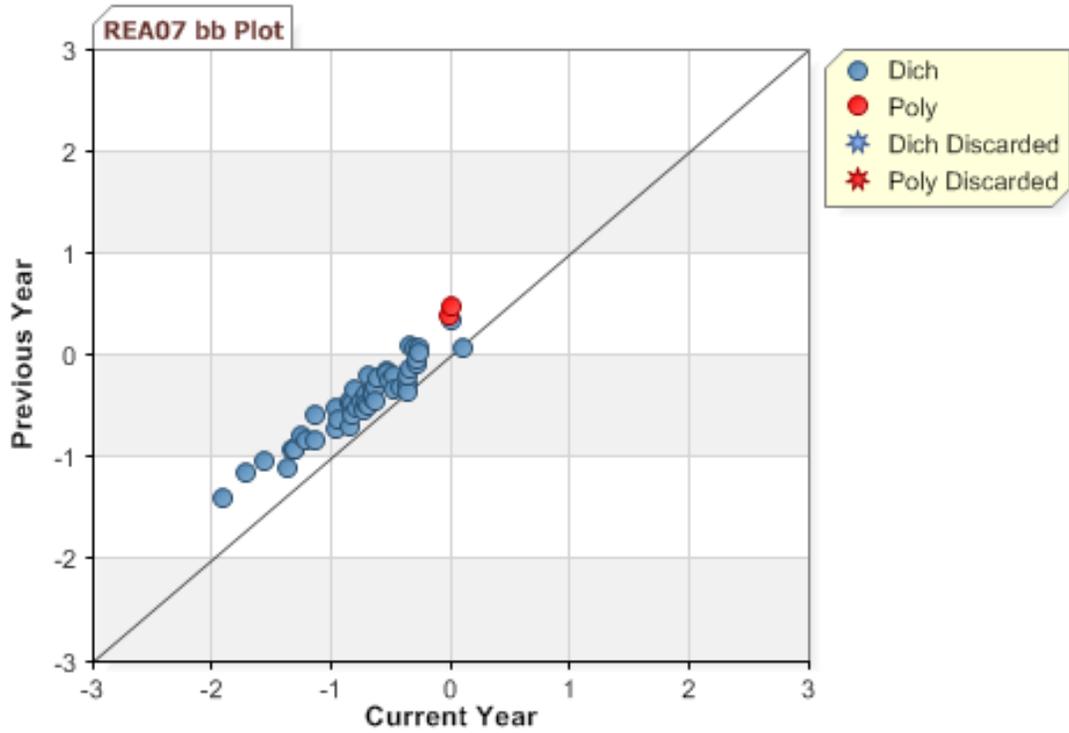


Figure J-13. 2011–12 Montana CRT: Delta Plot – Reading Grade 8

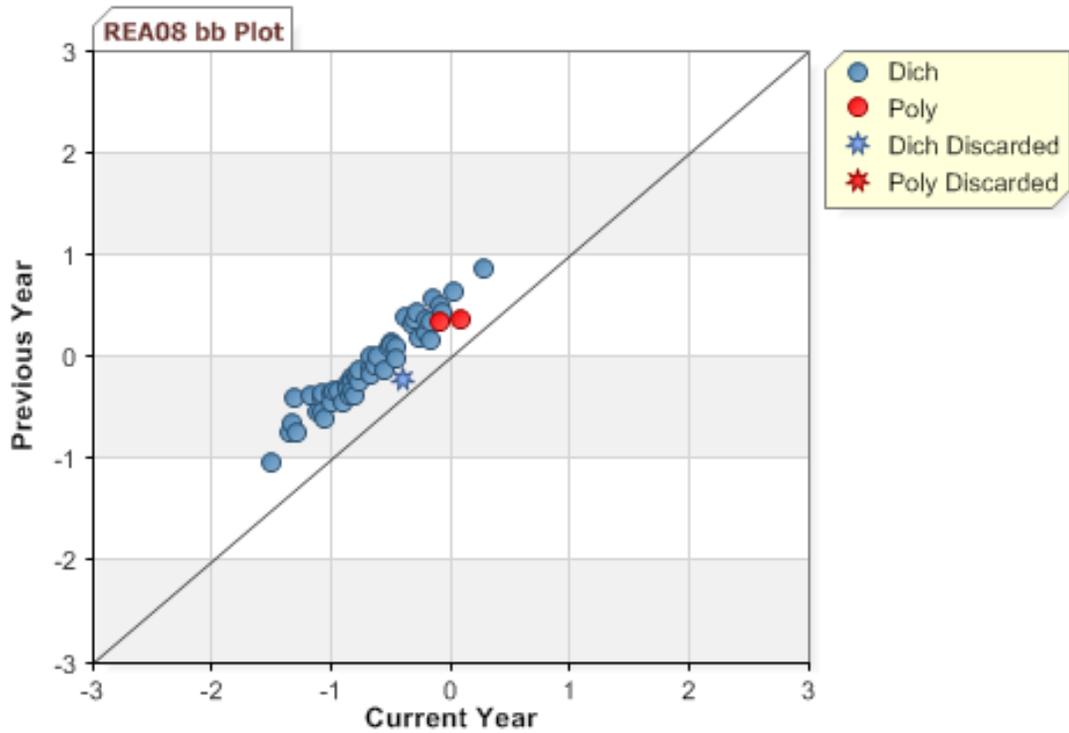


Figure J-14. 2011–12 Montana CRT: Delta Plot – Reading Grade 10

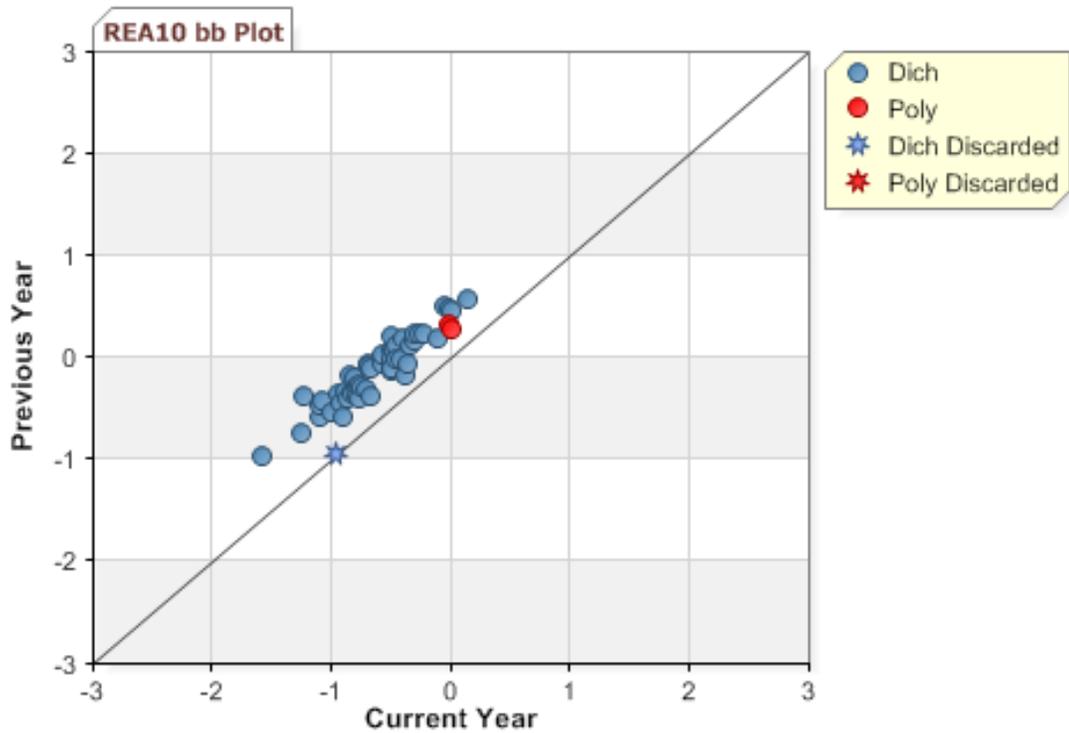


Figure J-15. 2011–12 Montana CRT: Delta Plot – Science Grade 4

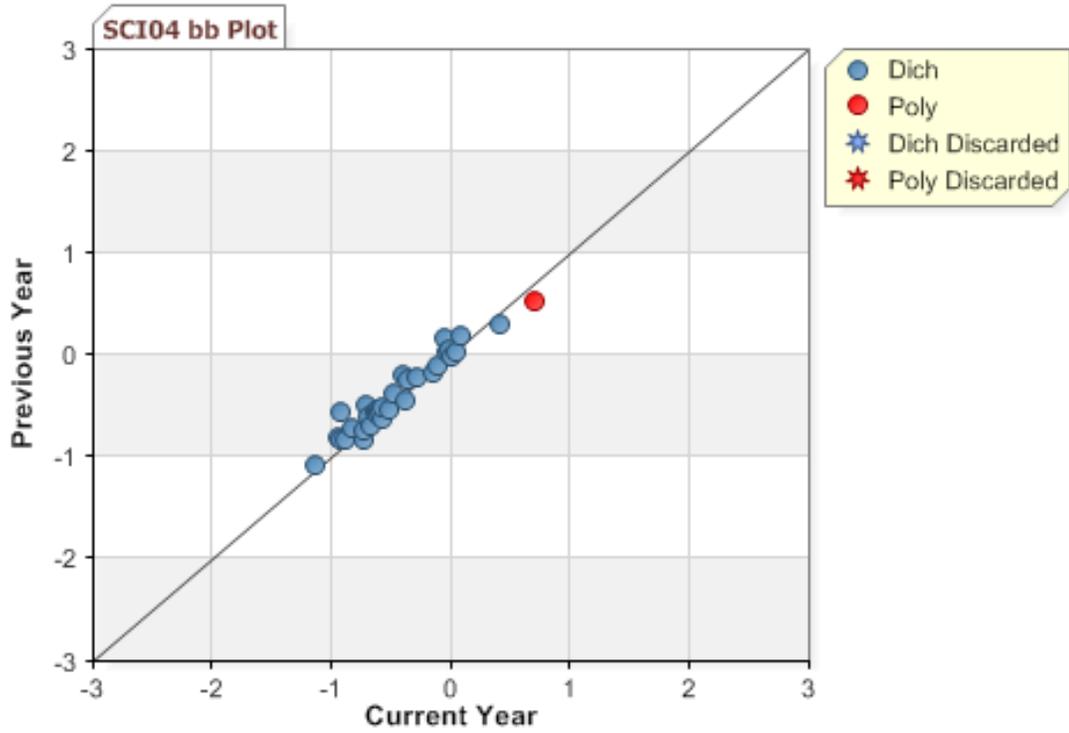


Figure J-16. 2011–12 Montana CRT: Delta Plot – Science Grade 8

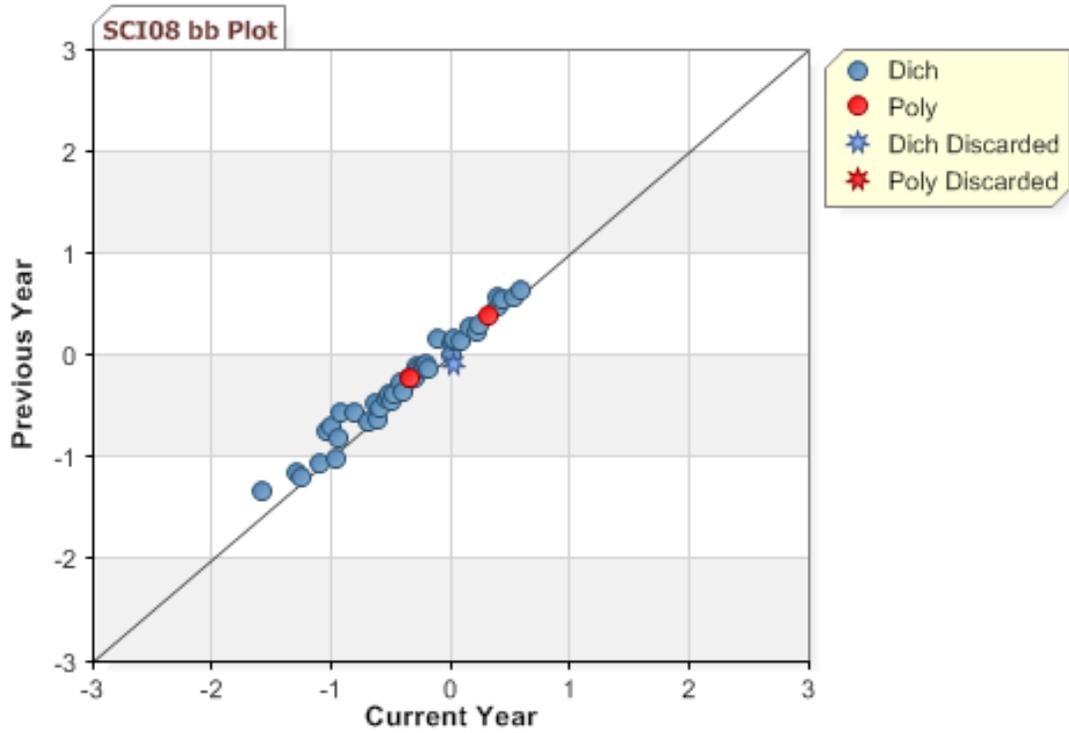
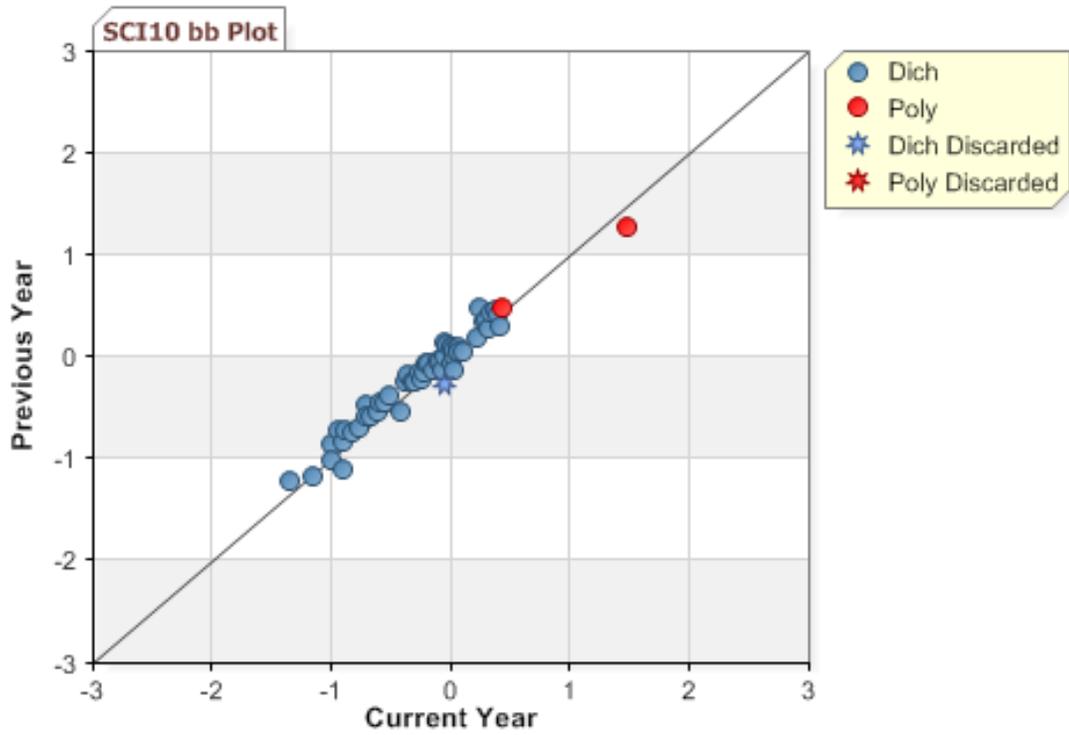


Figure J-17. 2011–12 Montana CRT: Delta Plot – Science Grade 10



APPENDIX K—ANALYSES OF EQUATING ITEMS (DELTA AND RESCORE ANALYSES)

Figure K-1. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 3

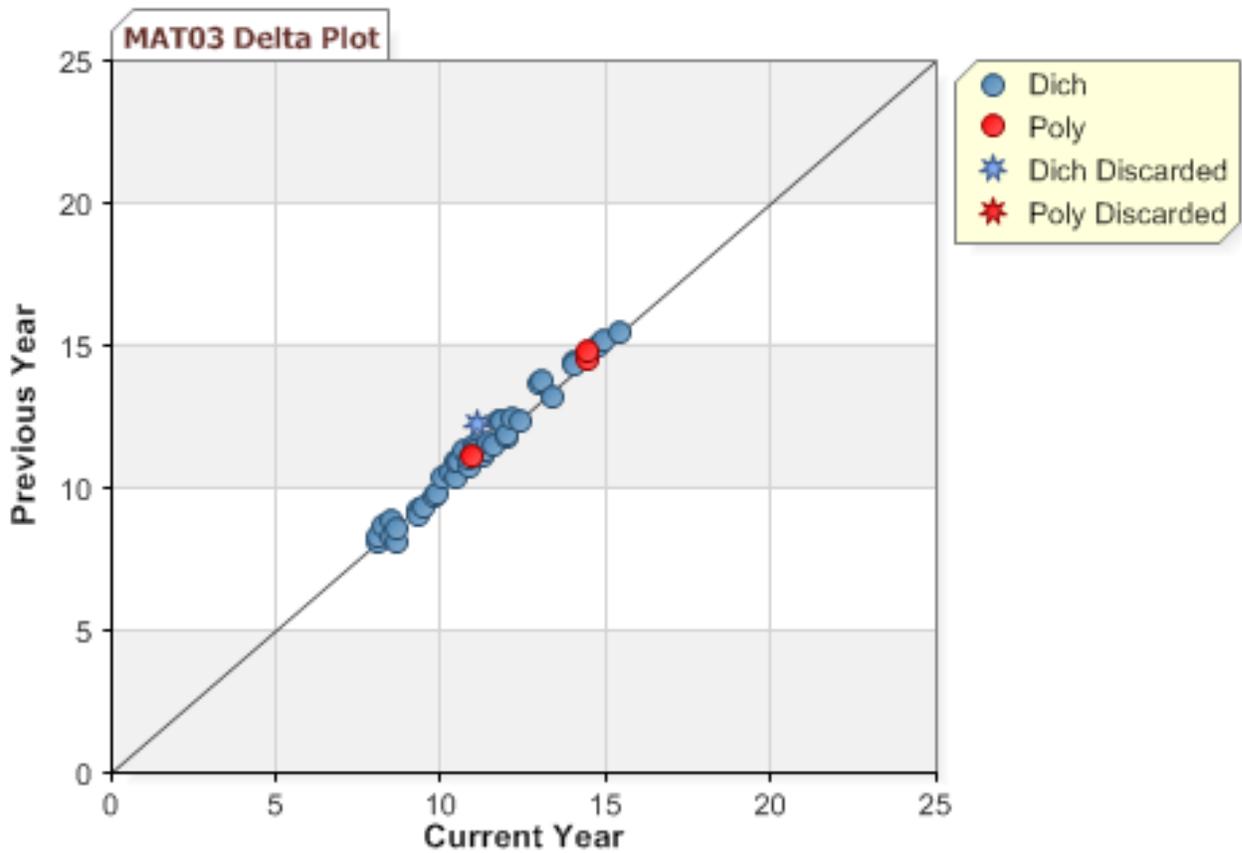


Table K-1. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 3

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
138768	0.62	0.60	11.78	11.99	12.15	1	False
138776	0.65	0.64	11.46	11.57	11.71	1	False
138791	0.68	0.67	11.13	11.24	11.37	1	False
138822	0.86	0.88	8.68	8.30	8.29	1	False
138826	0.27	0.27	15.45	15.45	15.77	1	False
138908	0.36	0.36	14.46	14.49	14.76	4	False
138908	0.33	0.36	14.76	14.49	14.76	4	False
138999	0.67	0.69	11.24	11.02	11.13	1	False
139013	0.65	0.69	11.46	11.02	11.13	1	False
139029	0.85	0.87	8.85	8.49	8.50	1	False
139031	0.56	0.58	12.40	12.19	12.36	1	False
139049	0.69	0.70	11.02	10.90	11.01	1	False
173708	0.64	0.65	11.57	11.46	11.59	1	False
173736	0.75	0.74	10.30	10.43	10.52	1	False
173743	0.88	0.87	8.30	8.49	8.50	1	False
173747	0.79	0.78	9.77	9.91	9.98	1	False
173797	0.36	0.40	14.43	14.01	14.26	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
173822	0.57	0.61	12.29	11.88	12.04	1	False
173835	0.48	0.46	13.20	13.40	13.62	1	False
173854	0.57	0.56	12.29	12.40	12.57	1	False
173867	0.30	0.31	15.10	14.98	15.28	1	False
175524	0.72	0.70	10.67	10.90	11.01	1	False
243003	0.89	0.86	8.09	8.68	8.69	1	False
43022	0.67	0.72	11.24	10.67	10.77	1	False
43103	0.61	0.60	11.88	11.99	12.15	1	False
43154	0.43	0.49	13.71	13.10	13.31	1	False
43261	0.69	0.70	11.07	10.96	11.07	4	False
59328	0.44	0.50	13.60	13.00	13.20	1	False
59350	0.37	0.40	14.33	14.01	14.26	1	False
60921	0.67	0.66	11.24	11.35	11.48	1	False
60923	0.70	0.73	10.90	10.55	10.64	1	False
60938	0.89	0.89	8.09	8.09	8.08	1	False
60944	0.88	0.89	8.30	8.09	8.08	1	False
60952	0.82	0.81	9.34	9.49	9.53	1	False
60974	0.80	0.79	9.63	9.77	9.83	1	False
61040	0.87	0.86	8.49	8.68	8.69	1	False
76750	0.31	0.33	14.98	14.76	15.04	1	False
76778	0.83	0.82	9.18	9.34	9.38	1	False
76781	0.67	0.69	11.24	11.02	11.13	1	False
76840	0.57	0.62	12.29	11.78	11.93	1	False
76881	0.73	0.75	10.55	10.30	10.39	1	False
76904	0.84	0.82	9.02	9.34	9.38	1	False
76981	0.70	0.74	10.90	10.43	10.52	1	False
77008	0.58	0.68	12.19	11.13	11.25	1	True
77039	0.75	0.77	10.30	10.04	10.12	1	False

Figure K-2. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 4

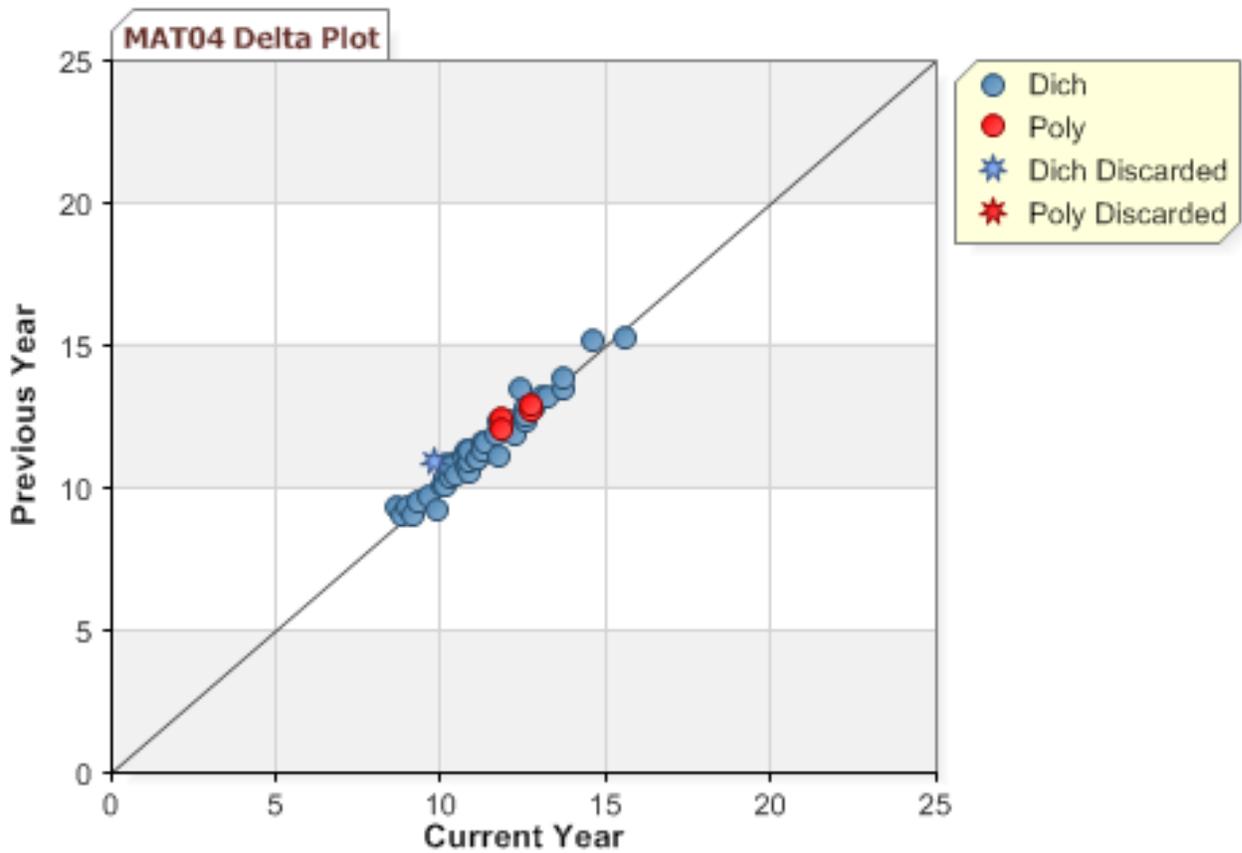


Table K-2. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 4

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
139886	0.77	0.76	10.04	10.17	10.30	1	False
139934	0.57	0.58	12.29	12.19	12.29	1	False
140142	0.57	0.62	12.29	11.78	11.88	1	False
173321	0.68	0.72	11.13	10.67	10.79	1	False
173331	0.67	0.70	11.24	10.90	11.02	1	False
173340	0.61	0.57	11.88	12.29	12.39	1	False
173418	0.61	0.63	11.88	11.67	11.78	1	False
173424	0.68	0.62	11.13	11.78	11.88	1	False
173785	0.72	0.71	10.67	10.79	10.90	1	False
173815	0.48	0.48	13.20	13.20	13.29	1	False
243172	0.46	0.56	13.40	12.40	12.49	1	False
244304	0.67	0.71	11.24	10.79	10.90	1	False
248048	0.82	0.86	9.34	8.68	8.82	1	False
248080	0.58	0.61	12.19	11.88	11.99	1	False
35220	0.70	0.70	10.90	10.90	11.02	1	False
43199	0.55	0.54	12.50	12.60	12.69	1	False
43199	0.52	0.54	12.80	12.60	12.69	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
43304	0.84	0.83	9.02	9.18	9.32	1	False
43334	0.72	0.75	10.67	10.30	10.43	1	False
43340	0.67	0.67	11.24	11.24	11.35	1	False
43367	0.69	0.68	11.02	11.13	11.24	1	False
44584	0.29	0.26	15.21	15.57	15.63	1	False
61779	0.74	0.74	10.43	10.43	10.55	1	False
61798	0.52	0.52	12.80	12.80	12.89	1	False
61817	0.70	0.79	10.90	9.77	9.91	1	True
61829	0.71	0.75	10.79	10.30	10.43	1	False
62135	0.75	0.75	10.30	10.30	10.43	1	False
62294	0.30	0.34	15.10	14.65	14.72	1	False
62302	0.73	0.70	10.55	10.90	11.02	1	False
62326	0.77	0.77	10.04	10.04	10.17	1	False
62381	0.80	0.80	9.63	9.63	9.77	1	False
62405	0.64	0.67	11.57	11.24	11.35	1	False
76788	0.42	0.43	13.81	13.71	13.79	1	False
76814	0.59	0.61	12.09	11.88	11.99	1	False
76819	0.69	0.68	11.02	11.13	11.24	1	False
76824	0.46	0.43	13.40	13.71	13.79	1	False
76830	0.84	0.85	9.02	8.85	9.00	1	False
76888	0.64	0.66	11.57	11.35	11.46	1	False
76892	0.57	0.54	12.29	12.60	12.69	1	False
76921	0.54	0.52	12.65	12.77	12.87	4	False
76921	0.52	0.52	12.85	12.77	12.87	4	False
76926	0.81	0.82	9.49	9.34	9.48	1	False
76941	0.75	0.76	10.30	10.17	10.30	1	False
76943	0.83	0.78	9.18	9.91	10.04	1	False
76959	0.82	0.84	9.34	9.02	9.16	1	False
77042	0.48	0.49	13.20	13.10	13.19	1	False
77065	0.56	0.62	12.40	11.83	11.94	4	False
77065	0.59	0.62	12.06	11.83	11.94	4	False

Figure K-3. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 5

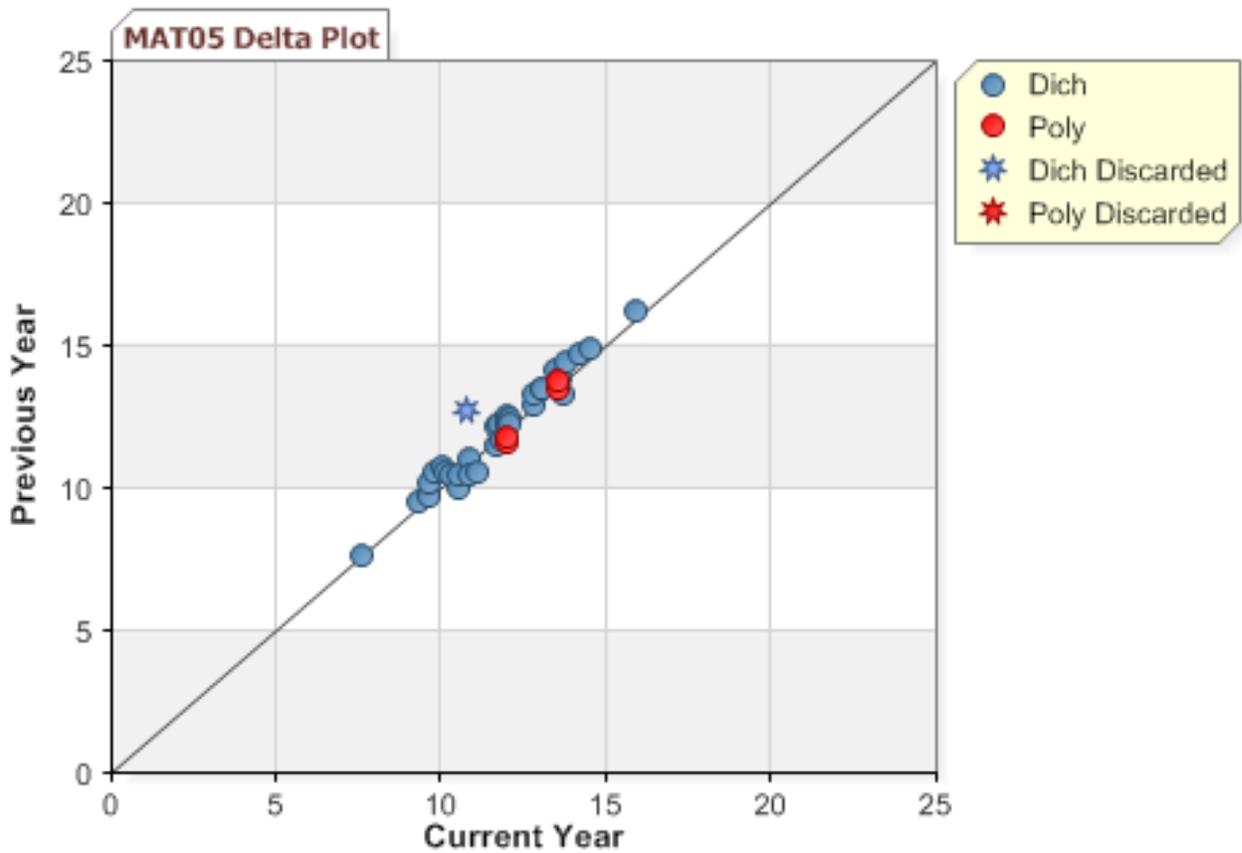


Table K-3. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 5

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
140697	0.59	0.63	12.09	11.67	11.86	1	False
140782	0.46	0.49	13.40	13.10	13.34	1	False
140784	0.63	0.61	11.67	11.88	12.07	1	False
140801	0.32	0.35	14.87	14.54	14.84	1	False
140864	0.74	0.73	10.43	10.55	10.69	1	False
140937	0.69	0.70	11.02	10.90	11.05	1	False
140970	0.46	0.49	13.40	13.10	13.34	1	False
140971	0.58	0.62	12.19	11.78	11.97	1	False
146613	0.62	0.60	11.78	11.99	12.18	4	False
146613	0.64	0.60	11.57	11.99	12.18	4	False
173589	0.58	0.60	12.19	11.99	12.18	1	False
237156	0.53	0.71	12.70	10.79	10.93	1	True
242922	0.34	0.38	14.65	14.22	14.51	1	False
243030	0.42	0.44	13.81	13.60	13.87	1	False
243040	0.39	0.45	14.12	13.50	13.76	1	False
43433	0.55	0.60	12.50	11.99	12.18	1	False
43469	0.51	0.52	12.90	12.80	13.03	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
43532	0.36	0.42	14.43	13.81	14.08	1	False
59810	0.58	0.60	12.19	11.99	12.18	1	False
59840	0.72	0.77	10.67	10.04	10.16	1	False
59848	0.78	0.73	9.91	10.55	10.69	1	False
59908	0.73	0.68	10.55	11.13	11.29	1	False
60371	0.81	0.82	9.49	9.34	9.42	1	False
60422	0.73	0.76	10.55	10.17	10.30	1	False
60843	0.91	0.91	7.64	7.64	7.65	1	False
77172	0.76	0.80	10.17	9.63	9.73	1	False
77177	0.79	0.80	9.77	9.63	9.73	1	False
77182	0.58	0.59	12.19	12.09	12.29	1	False
77185	0.73	0.79	10.55	9.77	9.88	1	False
77200	0.80	0.80	9.63	9.63	9.73	1	False
77211	0.65	0.63	11.46	11.67	11.86	1	False
77214	0.74	0.70	10.43	10.90	11.05	1	False
77222	0.21	0.23	16.23	15.96	16.32	1	False
77249	0.56	0.59	12.40	12.09	12.29	1	False
77265	0.47	0.43	13.30	13.71	13.97	1	False
77278	0.43	0.45	13.73	13.55	13.81	4	False
77278	0.46	0.45	13.40	13.55	13.81	4	False
77294	0.47	0.52	13.30	12.80	13.03	1	False
77388	0.74	0.75	10.43	10.30	10.43	1	False

Figure K-4. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 6

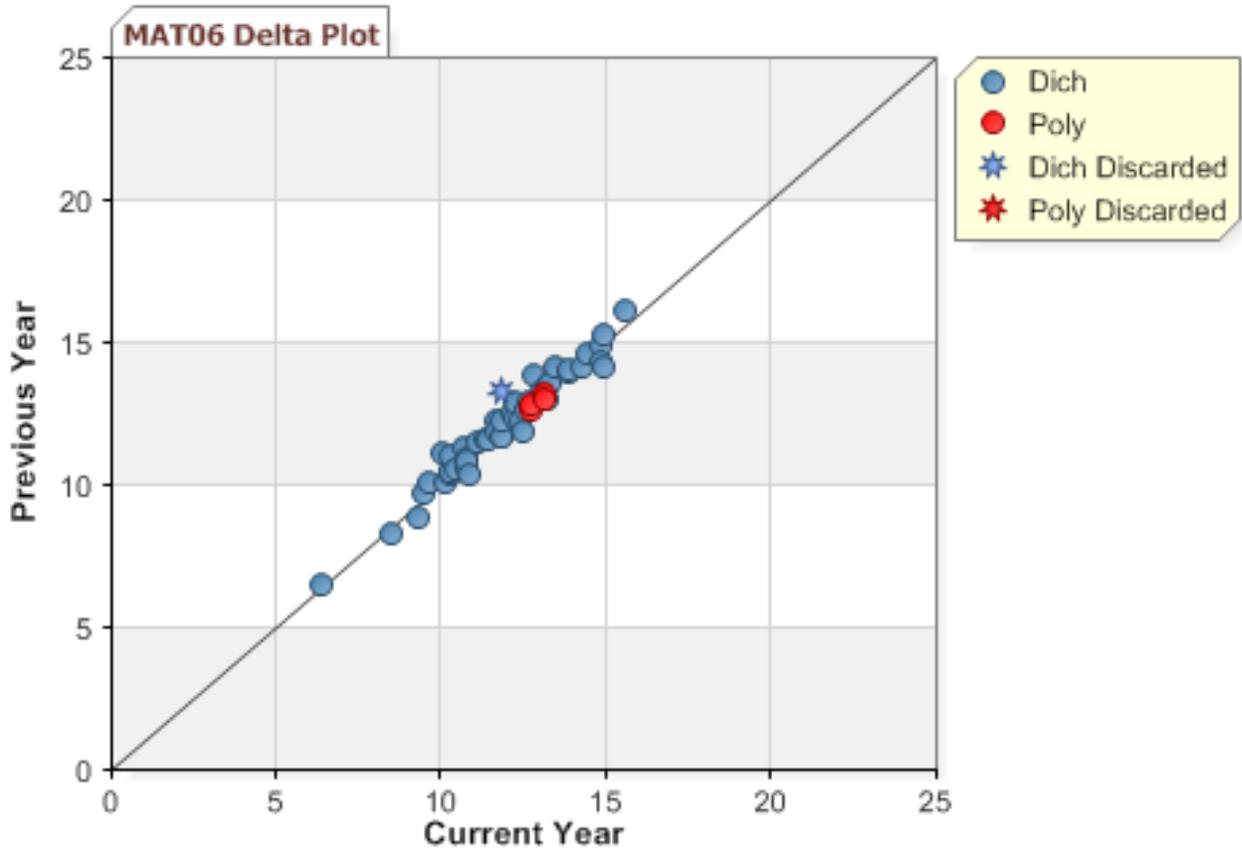


Table K-4. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 6

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
140815	0.39	0.45	14.12	13.50	13.62	1	False
140983	0.63	0.61	11.67	11.88	11.99	1	False
140985	0.77	0.76	10.04	10.17	10.28	1	False
141152	0.32	0.32	14.87	14.87	15.00	1	False
141154	0.64	0.66	11.57	11.35	11.46	1	False
141157	0.37	0.32	14.33	14.87	15.00	1	False
141172	0.58	0.61	12.19	11.88	11.99	1	False
141274	0.51	0.53	12.90	12.70	12.81	1	False
141319	0.88	0.87	8.30	8.49	8.59	1	False
141325	0.61	0.63	11.88	11.67	11.78	1	False
141337	0.39	0.37	14.12	14.33	14.45	1	False
141341	0.29	0.31	15.21	14.98	15.11	1	False
141344	0.54	0.54	12.60	12.60	12.71	1	False
141349	0.35	0.36	14.54	14.43	14.56	1	False
141406	0.73	0.71	10.55	10.79	10.89	1	False
141484	0.70	0.71	10.90	10.79	10.89	1	False
146968	0.49	0.49	13.13	13.15	13.27	4	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
146968	0.50	0.49	13.00	13.15	13.27	4	False
174474	0.46	0.48	13.40	13.20	13.32	1	False
174477	0.45	0.47	13.50	13.30	13.42	1	False
174494	0.64	0.65	11.57	11.46	11.57	1	False
174509	0.68	0.77	11.13	10.04	10.15	1	False
174610	0.65	0.68	11.46	11.13	11.24	1	False
174613	0.67	0.72	11.24	10.67	10.77	1	False
174615	0.55	0.53	12.55	12.75	12.86	4	False
174615	0.52	0.53	12.77	12.75	12.86	4	False
242542	0.50	0.48	13.00	13.20	13.32	1	False
34842	0.73	0.74	10.55	10.43	10.53	1	False
43447	0.71	0.71	10.79	10.79	10.89	1	False
43904	0.41	0.41	13.91	13.91	14.03	1	False
43904	0.40	0.41	14.01	13.91	14.03	1	False
44019	0.42	0.52	13.81	12.80	12.91	1	False
44044	0.22	0.26	16.09	15.57	15.70	1	False
44066	0.80	0.81	9.63	9.49	9.59	1	False
44070	0.75	0.70	10.30	10.90	11.01	1	False
61136	0.47	0.49	13.30	13.10	13.22	1	False
61155	0.55	0.58	12.50	12.19	12.30	1	False
61162	0.61	0.55	11.88	12.50	12.61	1	False
61166	0.77	0.80	10.04	9.63	9.73	1	False
61168	0.47	0.61	13.30	11.88	11.99	1	True
62039	0.58	0.63	12.19	11.67	11.78	1	False
62060	0.85	0.82	8.85	9.34	9.44	1	False
77347	0.63	0.61	11.67	11.88	11.99	1	False
77359	0.58	0.56	12.19	12.40	12.51	1	False
77373	0.57	0.57	12.29	12.29	12.41	1	False
77378	0.51	0.57	12.90	12.29	12.41	1	False
77434	0.39	0.31	14.12	14.98	15.11	1	False
77443	0.69	0.75	11.02	10.30	10.40	1	False
77445	0.95	0.95	6.42	6.42	6.50	1	False
77555	0.74	0.75	10.43	10.30	10.40	1	False
77614	0.75	0.75	10.30	10.30	10.40	1	False
77621	0.74	0.75	10.43	10.30	10.40	1	False

Figure K-5. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 7

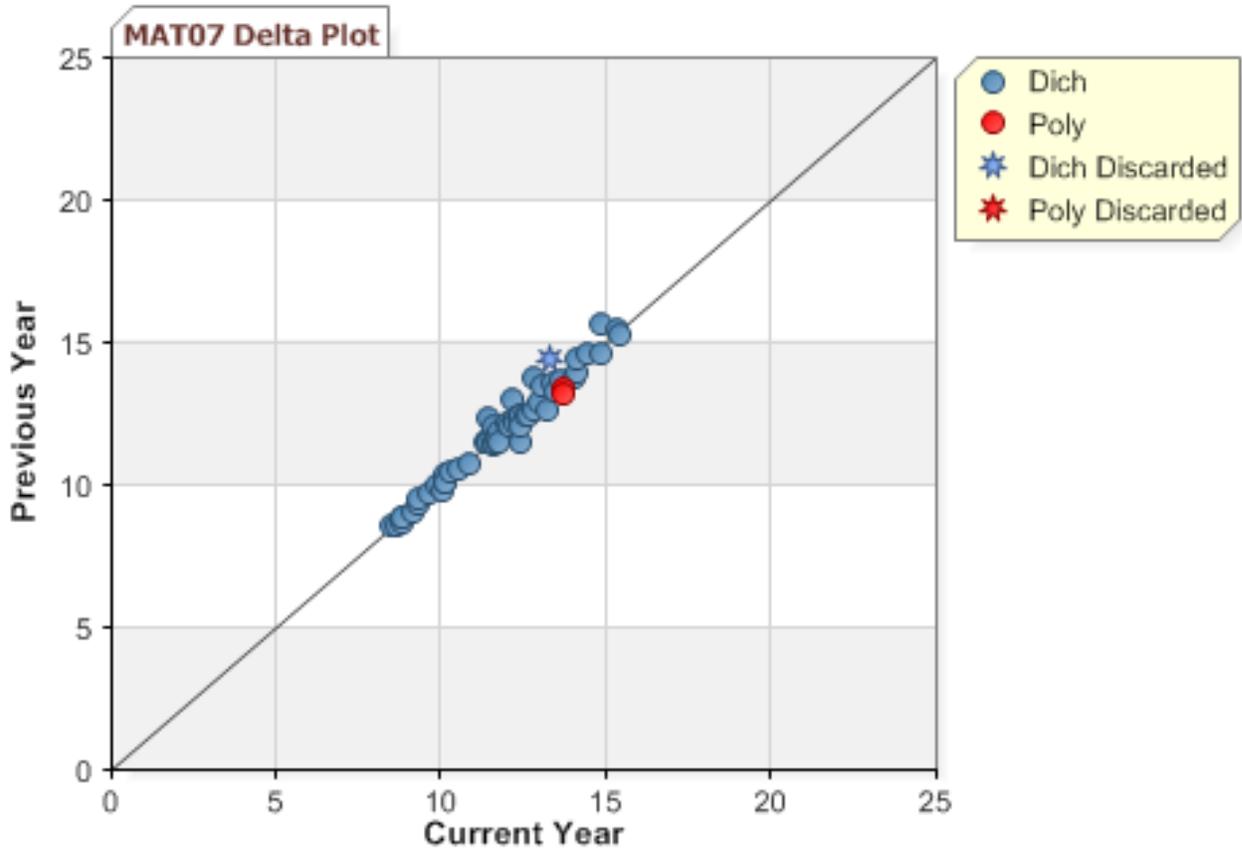


Table K-5. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 7

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
142364	0.56	0.56	12.40	12.40	12.39	1	False
142376	0.56	0.56	12.40	12.40	12.39	1	False
142387	0.51	0.50	12.90	13.00	13.01	1	False
142420	0.35	0.36	14.54	14.43	14.47	1	False
142421	0.65	0.66	11.46	11.35	11.32	1	False
142647	0.50	0.58	13.00	12.19	12.18	1	False
142661	0.79	0.77	9.77	10.04	9.98	1	False
142713	0.41	0.39	13.91	14.12	14.15	1	False
142756	0.80	0.80	9.63	9.63	9.56	1	False
142803	0.61	0.62	11.88	11.78	11.76	1	False
142811	0.77	0.76	10.04	10.17	10.12	1	False
142815	0.58	0.56	12.19	12.40	12.39	1	False
142821	0.86	0.85	8.68	8.85	8.77	1	False
174331	0.65	0.64	11.46	11.57	11.54	1	False
174355	0.60	0.59	11.99	12.09	12.08	1	False
174360	0.45	0.46	13.50	13.40	13.42	1	False
174441	0.64	0.63	11.57	11.67	11.65	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
174533	0.36	0.39	14.43	14.12	14.15	1	False
43654	0.65	0.62	11.46	11.78	11.76	1	False
43675	0.65	0.56	11.46	12.40	12.39	1	False
43680	0.29	0.27	15.21	15.45	15.51	1	False
43695	0.77	0.76	10.04	10.17	10.12	1	False
43735	0.81	0.82	9.49	9.34	9.26	1	False
43763	0.64	0.65	11.57	11.46	11.43	1	False
43799	0.73	0.73	10.55	10.55	10.50	1	False
43832	0.85	0.85	8.85	8.85	8.77	1	False
43836	0.59	0.57	12.09	12.29	12.29	1	False
43856	0.43	0.52	13.71	12.80	12.80	1	False
43896	0.44	0.44	13.60	13.60	13.62	1	False
44211	0.57	0.65	12.29	11.46	11.43	1	False
61158	0.60	0.64	11.99	11.57	11.54	1	False
61206	0.78	0.78	9.91	9.91	9.85	1	False
61240	0.59	0.60	12.09	11.99	11.97	1	False
61252	0.84	0.83	9.02	9.18	9.10	1	False
61264	0.54	0.48	12.60	13.20	13.21	1	False
61279	0.87	0.87	8.49	8.49	8.40	1	False
61346	0.46	0.49	13.40	13.10	13.11	1	False
61358	0.82	0.82	9.34	9.34	9.26	1	False
61745	0.65	0.65	11.46	11.46	11.43	1	False
61746	0.27	0.28	15.45	15.33	15.39	1	False
86297	0.74	0.75	10.43	10.30	10.25	1	False
86330	0.57	0.57	12.29	12.29	12.29	1	False
86339	0.54	0.52	12.60	12.80	12.80	1	False
86350	0.35	0.32	14.54	14.87	14.92	1	False
86455	0.60	0.56	11.99	12.40	12.39	1	False
86464	0.56	0.54	12.40	12.60	12.60	1	False
86473	0.66	0.64	11.35	11.57	11.54	1	False
86486	0.47	0.45	13.30	13.50	13.52	1	False
86545	0.75	0.76	10.30	10.17	10.12	1	False
86570	0.36	0.47	14.43	13.30	13.32	1	True
86578	0.43	0.40	13.71	14.01	14.04	1	False
86597	0.56	0.53	12.40	12.70	12.70	1	False
86635	0.87	0.86	8.49	8.68	8.59	1	False
86658	0.49	0.43	13.13	13.76	13.78	4	False
86658	0.47	0.43	13.35	13.76	13.78	4	False
86672	0.72	0.70	10.67	10.90	10.86	1	False
86681	0.85	0.85	8.85	8.85	8.77	1	False
88064	0.26	0.32	15.57	14.87	14.92	1	False

Figure K-6. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 8

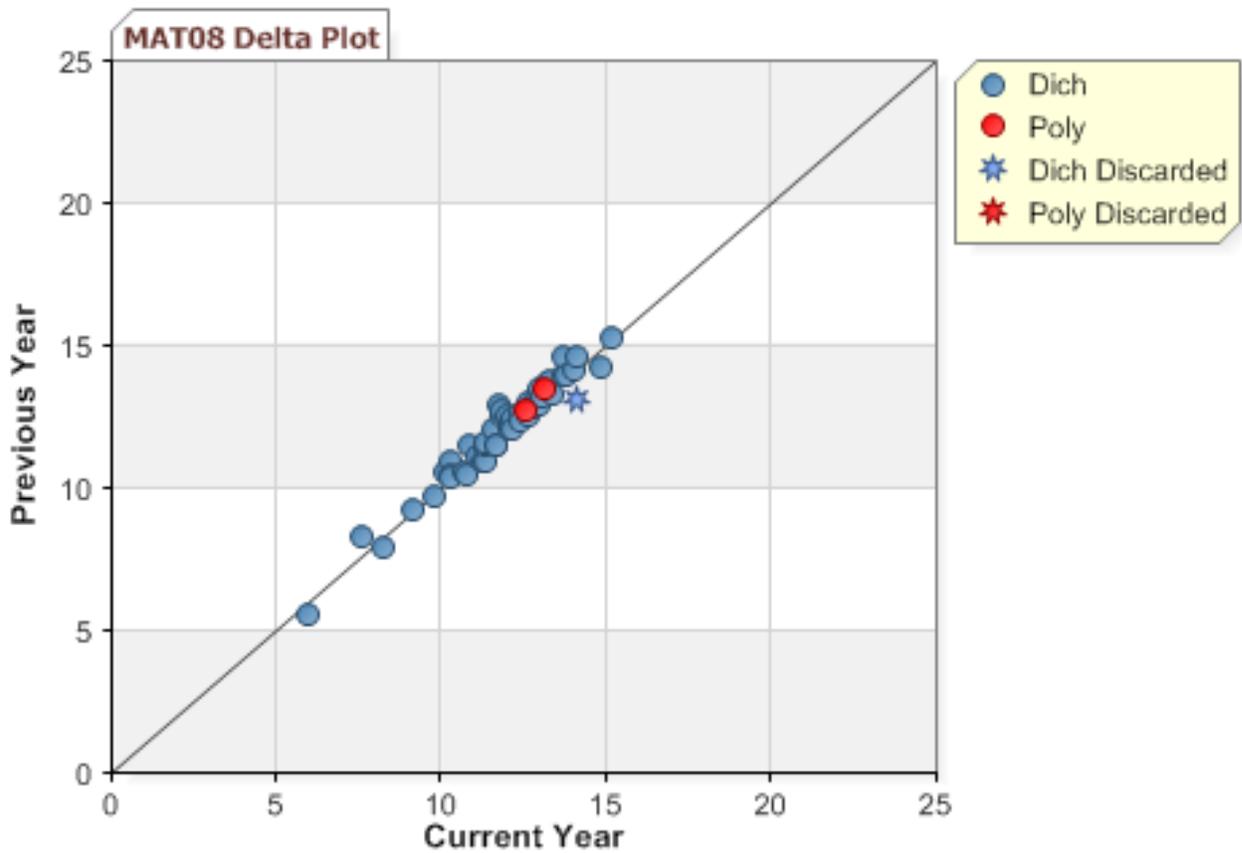


Table K-6. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 8

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
144244	0.56	0.58	12.40	12.19	12.30	1	False
144287	0.29	0.29	15.21	15.21	15.43	1	False
144374	0.75	0.75	10.30	10.30	10.35	1	False
144424	0.51	0.51	12.90	12.90	13.04	1	False
144428	0.73	0.76	10.55	10.17	10.22	1	False
144551	0.60	0.58	11.99	12.19	12.30	1	False
144849	0.66	0.66	11.35	11.35	11.43	1	False
144854	0.58	0.59	12.19	12.09	12.20	1	False
144868	0.35	0.39	14.54	14.12	14.30	1	False
144927	0.65	0.70	11.46	10.90	10.97	1	False
144963	0.74	0.71	10.43	10.79	10.85	1	False
174425	0.57	0.56	12.29	12.40	12.52	1	False
175488	0.41	0.43	13.91	13.71	13.87	1	False
175599	0.52	0.52	12.80	12.80	12.93	1	False
175602	0.70	0.67	10.90	11.24	11.32	1	False
175605	0.46	0.50	13.40	13.00	13.14	1	False
175610	0.49	0.39	13.10	14.12	14.30	1	True

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
175672	0.47	0.46	13.30	13.40	13.56	1	False
175765	0.55	0.60	12.50	11.99	12.09	1	False
175810	0.51	0.50	12.90	13.00	13.14	1	False
243716	0.41	0.42	13.91	13.81	13.98	1	False
244528	0.44	0.48	13.60	13.20	13.35	1	False
244567	0.51	0.62	12.90	11.78	11.88	1	False
248854	0.46	0.49	13.45	13.15	13.30	4	False
34993	0.88	0.91	8.30	7.64	7.59	1	False
44141	0.80	0.79	9.63	9.77	9.80	1	False
44149	0.65	0.63	11.46	11.67	11.77	1	False
44201	0.73	0.72	10.55	10.67	10.73	1	False
44239	0.83	0.83	9.18	9.18	9.19	1	False
44243	0.60	0.59	11.99	12.09	12.20	1	False
44626	0.90	0.88	7.87	8.30	8.28	1	False
44632	0.39	0.40	14.12	14.01	14.19	1	False
44662	0.48	0.49	13.20	13.10	13.24	1	False
44666	0.54	0.56	12.60	12.40	12.52	1	False
62856	0.65	0.66	11.46	11.35	11.43	1	False
62992	0.74	0.75	10.43	10.30	10.35	1	False
63047	0.60	0.64	11.99	11.57	11.66	1	False
63135	0.70	0.75	10.90	10.30	10.35	1	False
63138	0.68	0.68	11.13	11.13	11.20	1	False
63279	0.49	0.51	13.10	12.90	13.04	1	False
63305	0.53	0.55	12.72	12.55	12.67	4	False
72828	0.55	0.61	12.50	11.88	11.98	1	False
87527	0.65	0.63	11.46	11.67	11.77	1	False
87588	0.70	0.66	10.90	11.35	11.43	1	False
87598	0.97	0.96	5.48	6.00	5.89	1	False
87821	0.53	0.61	12.70	11.88	11.98	1	False
87841	0.50	0.53	13.00	12.70	12.83	1	False
88174	0.55	0.53	12.50	12.70	12.83	1	False
88319	0.38	0.32	14.22	14.87	15.08	1	False
88325	0.35	0.43	14.54	13.71	13.87	1	False
88363	0.43	0.47	13.71	13.30	13.45	1	False
88864	0.64	0.66	11.57	11.35	11.43	1	False

Figure K-7. 2011–12 Montana CRT: Delta Plot – Mathematics Grade 10

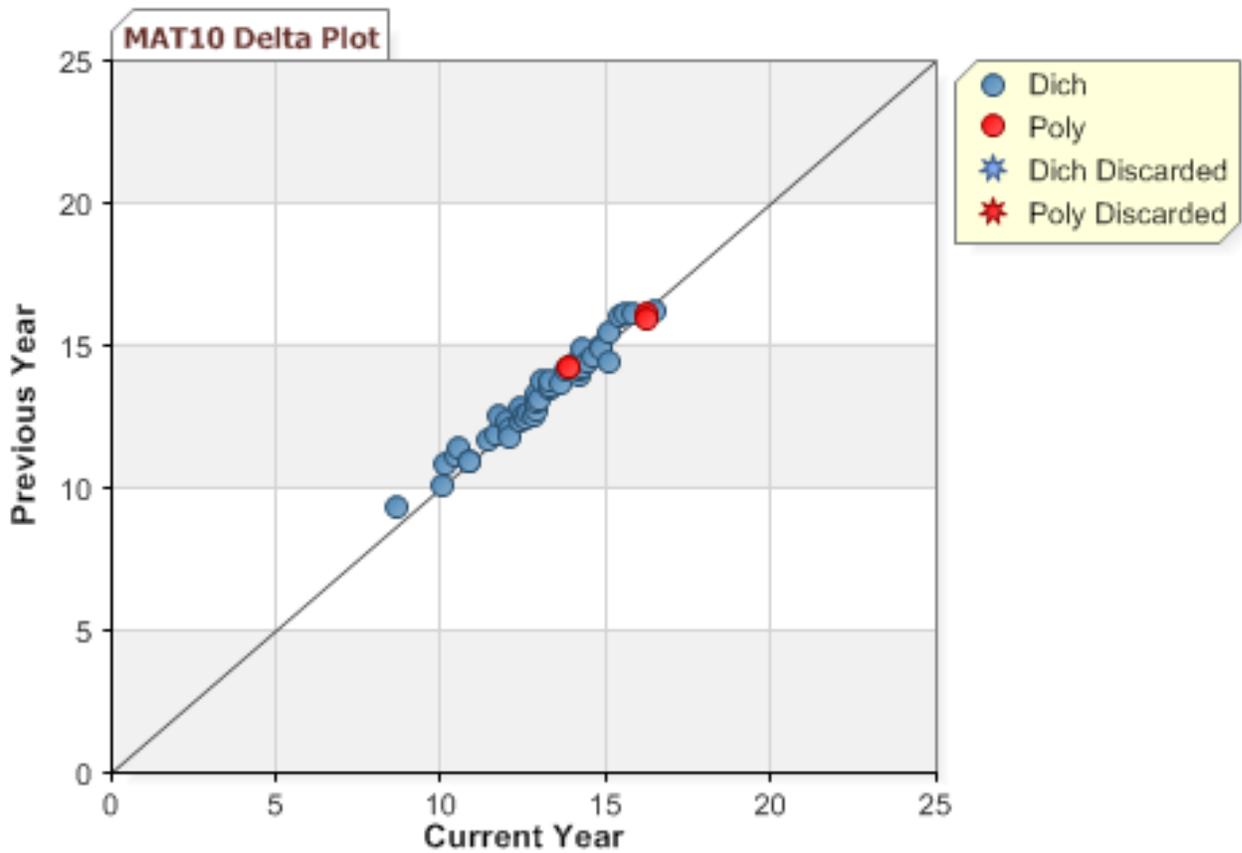


Table K-7. 2011–12 Montana CRT: Delta Analysis Results – Mathematics Grade 10

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
144825	0.56	0.54	12.40	12.60	12.76	1	False
144888	0.23	0.27	15.96	15.45	15.48	1	False
144904	0.70	0.70	10.90	10.90	11.15	1	False
144973	0.22	0.21	16.09	16.26	16.25	4	False
144973	0.23	0.21	15.92	16.26	16.25	4	False
145015	0.68	0.74	11.13	10.43	10.70	1	False
145024	0.36	0.30	14.43	15.10	15.14	1	False
145025	0.54	0.53	12.60	12.70	12.86	1	False
145292	0.57	0.56	12.29	12.40	12.57	1	False
146548	0.31	0.32	14.98	14.87	14.93	1	False
146565	0.63	0.65	11.67	11.46	11.68	1	False
174633	0.39	0.39	14.12	14.12	14.21	1	False
174700	0.55	0.52	12.50	12.80	12.96	1	False
174714	0.21	0.19	16.23	16.51	16.49	1	False
241018	0.77	0.77	10.04	10.04	10.34	1	False
241082	0.41	0.38	13.91	14.22	14.31	1	False
243053	0.32	0.37	14.87	14.33	14.41	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
249034	0.39	0.42	14.12	13.81	13.91	1	False
249038	0.82	0.86	9.34	8.68	9.04	1	False
34835	0.38	0.37	14.22	14.33	14.41	1	False
34856	0.44	0.44	13.60	13.60	13.72	1	False
43611	0.43	0.47	13.71	13.30	13.43	1	False
43629	0.55	0.62	12.50	11.78	11.98	1	False
43765	0.52	0.56	12.80	12.40	12.57	1	False
43778	0.43	0.49	13.71	13.10	13.24	1	False
43877	0.36	0.39	14.43	14.12	14.21	1	False
43917	0.51	0.51	12.90	12.90	13.05	1	False
43926	0.45	0.47	13.50	13.30	13.43	1	False
43951	0.32	0.32	14.87	14.87	14.93	1	False
44531	0.55	0.55	12.50	12.50	12.67	1	False
44572	0.62	0.59	11.78	12.09	12.28	1	False
59379	0.50	0.51	13.00	12.90	13.05	1	False
62230	0.35	0.34	14.54	14.65	14.72	1	False
62279	0.70	0.70	10.90	10.90	11.15	1	False
62292	0.39	0.38	14.12	14.22	14.31	1	False
62352	0.57	0.60	12.29	11.99	12.18	1	False
62368	0.61	0.63	11.88	11.67	11.88	1	False
62374	0.71	0.76	10.79	10.17	10.46	1	False
77354	0.60	0.59	11.99	12.09	12.28	1	False
77396	0.47	0.51	13.30	12.90	13.05	1	False
77407	0.46	0.47	13.40	13.30	13.43	1	False
77412	0.27	0.30	15.45	15.10	15.14	1	False
77514	0.36	0.36	14.43	14.43	14.51	1	False
77520	0.49	0.50	13.10	13.00	13.15	1	False
77529	0.66	0.73	11.35	10.55	10.82	1	False
77551	0.53	0.51	12.70	12.90	13.05	1	False
77572	0.22	0.26	16.09	15.57	15.59	1	False
77604	0.22	0.24	16.09	15.83	15.83	1	False
77632	0.44	0.47	13.60	13.30	13.43	1	False
77651	0.39	0.41	14.17	13.88	13.99	4	False
77651	0.39	0.41	14.17	13.88	13.99	4	False

Figure K-8. 2011–12 Montana CRT: Delta Plot – Reading Grade 3

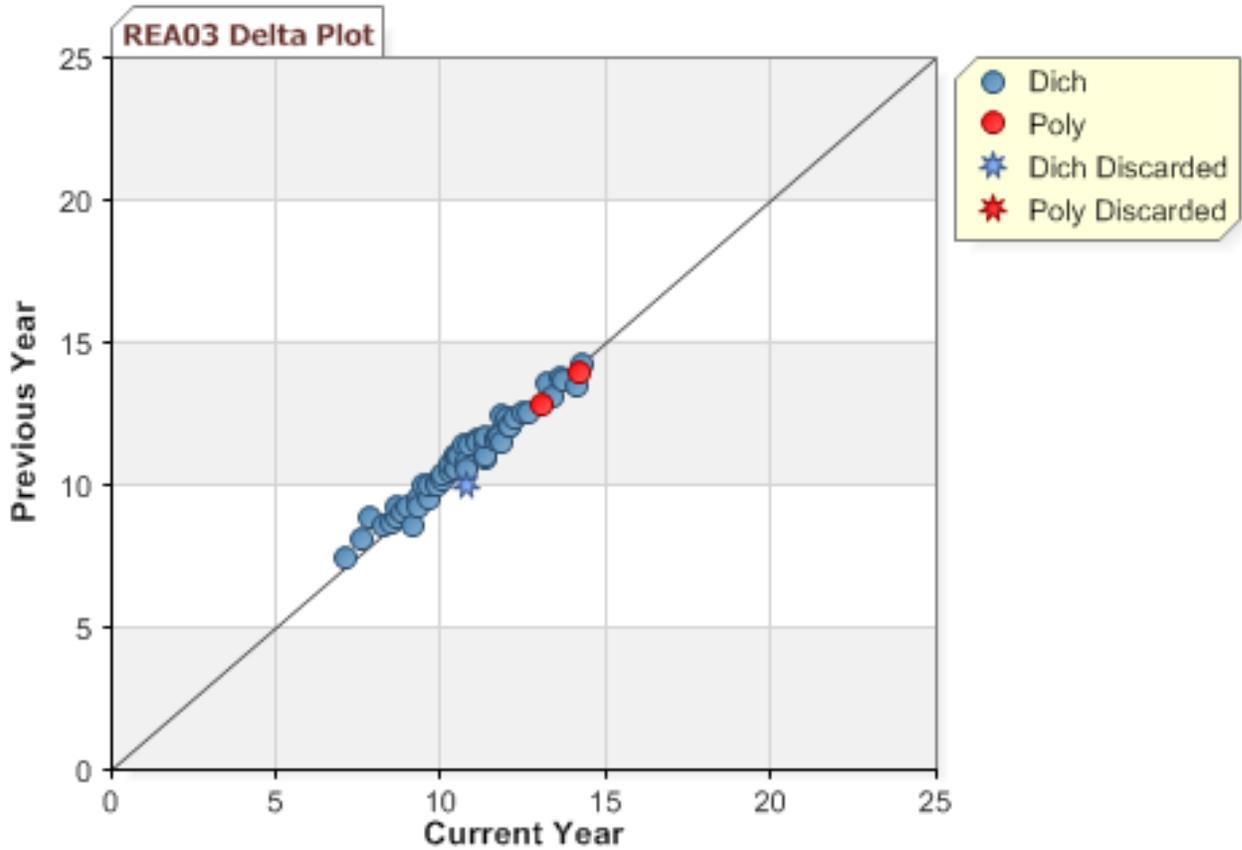


Table K-8. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 3

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
150517	0.78	0.81	9.91	9.49	9.66	1	False
150522	0.87	0.88	8.49	8.30	8.55	1	False
150524	0.73	0.71	10.55	10.79	10.87	1	False
150529	0.83	0.86	9.18	8.68	8.91	1	False
150552	0.71	0.71	10.79	10.79	10.87	1	False
150555	0.78	0.78	9.91	9.91	10.05	1	False
150569	0.85	0.90	8.85	7.87	8.16	1	False
177827	0.65	0.61	11.46	11.88	11.89	1	False
177828	0.44	0.43	13.60	13.71	13.59	1	False
177832	0.55	0.53	12.50	12.70	12.65	1	False
177833	0.64	0.63	11.57	11.67	11.69	1	False
177836	0.55	0.55	12.50	12.50	12.46	1	False
177837	0.57	0.60	12.29	11.99	11.99	1	False
177838	0.83	0.82	9.18	9.34	9.52	1	False
177838	0.81	0.82	9.49	9.34	9.52	1	False
177841	0.86	0.87	8.68	8.49	8.74	1	False
177844	0.89	0.91	8.09	7.64	7.94	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
177847	0.62	0.62	11.78	11.78	11.79	1	False
177848	0.66	0.72	11.35	10.67	10.76	1	False
177849	0.60	0.59	11.99	12.09	12.08	1	False
177850	0.73	0.74	10.55	10.43	10.53	1	False
177853	0.69	0.66	11.02	11.35	11.39	1	False
177982	0.78	0.80	9.91	9.63	9.80	1	False
177983	0.84	0.85	9.02	8.85	9.07	1	False
178002	0.87	0.83	8.49	9.18	9.38	1	False
178006	0.66	0.70	11.35	10.90	10.98	1	False
178009	0.63	0.66	11.67	11.35	11.39	1	False
178018	0.76	0.77	10.17	10.04	10.18	1	False
178033	0.69	0.73	11.02	10.55	10.65	1	False
42895	0.65	0.68	11.46	11.13	11.19	1	False
42895	0.64	0.68	11.57	11.13	11.19	1	False
42896	0.72	0.75	10.67	10.30	10.42	1	False
42897	0.43	0.44	13.71	13.60	13.49	1	False
42899	0.49	0.46	13.10	13.40	13.30	1	False
42900	0.57	0.57	12.29	12.29	12.27	1	False
42903	0.70	0.66	10.90	11.35	11.39	1	False
42904	0.60	0.59	11.99	12.09	12.08	1	False
42906	0.63	0.62	11.67	11.78	11.79	1	False
42908	0.81	0.80	9.49	9.63	9.80	1	False
42910	0.45	0.48	13.50	13.20	13.12	1	False
42912	0.92	0.93	7.38	7.10	7.43	1	False
42913	0.52	0.49	12.80	13.08	13.00	4	False
44735	0.73	0.74	10.55	10.43	10.53	1	False
92698	0.74	0.75	10.43	10.30	10.42	1	False
92699	0.66	0.66	11.35	11.35	11.39	1	False
92702	0.85	0.86	8.85	8.68	8.91	1	False
92704	0.83	0.84	9.18	9.02	9.23	1	False
92705	0.56	0.61	12.40	11.88	11.89	1	False
92706	0.38	0.37	14.22	14.33	14.17	1	False
92708	0.77	0.78	10.04	9.91	10.05	1	False
92712	0.69	0.74	11.02	10.43	10.53	1	False
92712	0.69	0.74	11.02	10.43	10.53	1	False
92714	0.78	0.71	9.91	10.79	10.87	1	True
92716	0.46	0.39	13.40	14.12	13.97	1	False
92718	0.75	0.77	10.30	10.04	10.18	1	False
92719	0.64	0.63	11.57	11.67	11.69	1	False
92719	0.64	0.63	11.57	11.67	11.69	1	False
92721	0.41	0.39	13.91	14.17	14.02	4	False

Figure K-9. 2011–12 Montana CRT: Delta Plot – Reading Grade 4

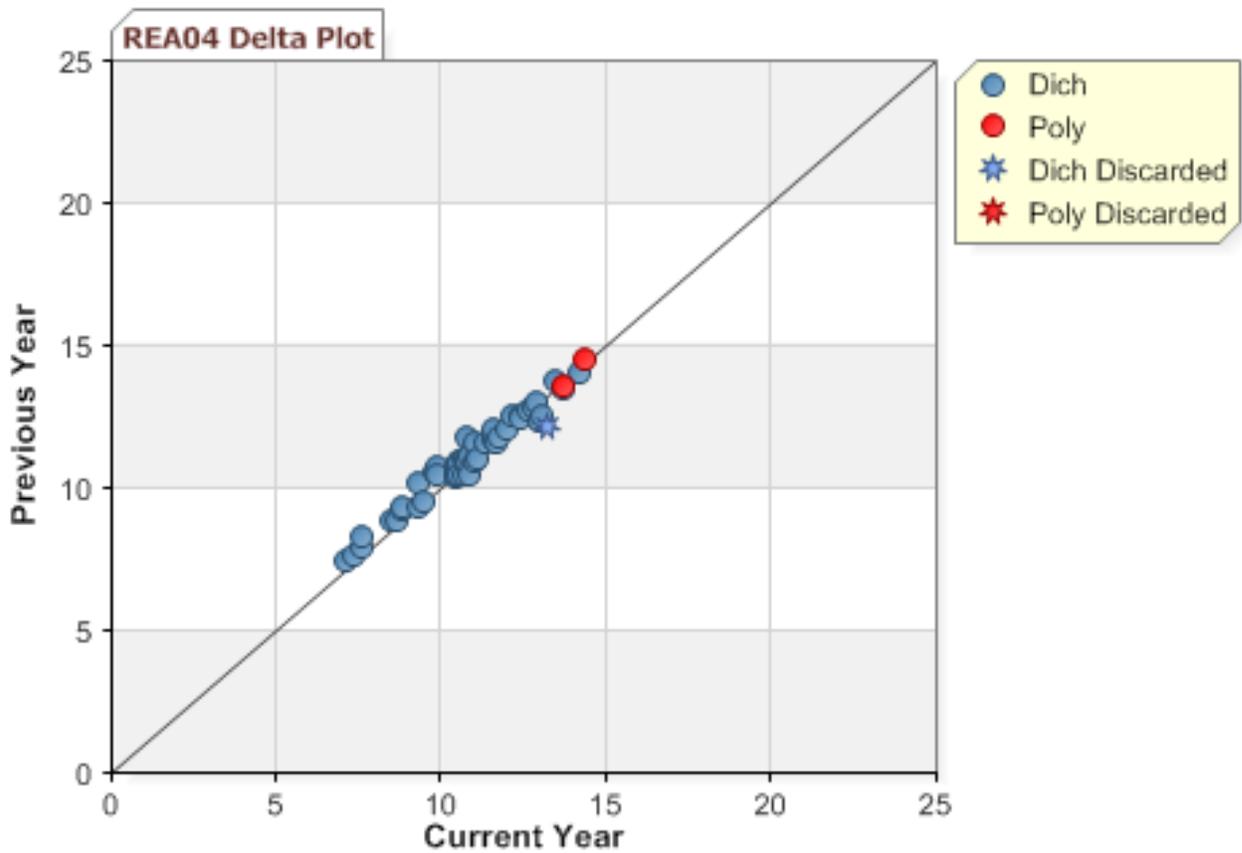


Table K-9. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 4

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
178123	0.88	0.91	8.30	7.64	8.04	1	False
178132	0.91	0.92	7.64	7.38	7.81	1	False
178136	0.76	0.82	10.17	9.34	9.59	1	False
178144	0.74	0.74	10.43	10.43	10.59	1	False
178150	0.74	0.72	10.43	10.67	10.81	1	False
178151	0.71	0.73	10.79	10.55	10.70	1	False
178152	0.82	0.85	9.34	8.85	9.15	1	False
178157	0.74	0.78	10.43	9.91	10.12	1	False
178159	0.72	0.78	10.67	9.91	10.12	1	False
178166	0.53	0.53	12.70	12.70	12.66	1	False
178168	0.64	0.69	11.57	11.02	11.13	1	False
178170	0.73	0.79	10.55	9.77	9.99	1	False
178171	0.62	0.71	11.78	10.79	10.91	1	False
178172	0.85	0.86	8.85	8.68	8.99	1	False
178192	0.70	0.71	10.90	10.79	10.91	1	False
178208	0.90	0.91	7.87	7.64	8.04	1	False
178209	0.85	0.87	8.85	8.49	8.82	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
178211	0.52	0.52	12.80	12.80	12.75	1	False
178214	0.68	0.70	11.13	10.90	11.02	1	False
178225	0.59	0.48	12.09	13.20	13.12	1	True
178227	0.43	0.45	13.71	13.50	13.39	1	False
178239	0.55	0.56	12.50	12.40	12.38	1	False
178241	0.72	0.74	10.67	10.43	10.59	1	False
178245	0.69	0.72	11.02	10.67	10.81	1	False
178251	0.62	0.62	11.78	11.78	11.82	1	False
178255	0.70	0.73	10.90	10.55	10.70	1	False
178258	0.72	0.73	10.67	10.55	10.70	1	False
178259	0.61	0.64	11.88	11.57	11.63	1	False
178273	0.69	0.68	11.02	11.13	11.23	1	False
178278	0.56	0.56	12.40	12.40	12.38	1	False
178290	0.57	0.50	12.29	13.00	12.94	1	False
178292	0.82	0.82	9.34	9.34	9.59	1	False
178295	0.55	0.49	12.50	13.10	13.03	1	False
178298	0.45	0.43	13.53	13.76	13.63	4	False
178364	0.55	0.58	12.50	12.19	12.20	1	False
178370	0.70	0.71	10.90	10.79	10.91	1	False
178372	0.73	0.73	10.55	10.55	10.70	1	False
178372	0.74	0.73	10.43	10.55	10.70	1	False
178377	0.74	0.70	10.43	10.90	11.02	1	False
178386	0.83	0.85	9.18	8.85	9.15	1	False
178389	0.60	0.64	11.99	11.57	11.63	1	False
178389	0.63	0.64	11.67	11.57	11.63	1	False
178393	0.71	0.71	10.79	10.79	10.91	1	False
178393	0.71	0.71	10.79	10.79	10.91	1	False
178394	0.40	0.38	14.01	14.22	14.05	1	False
178395	0.74	0.74	10.43	10.43	10.59	1	False
178396	0.81	0.81	9.49	9.49	9.73	1	False
178398	0.64	0.63	11.57	11.67	11.72	1	False
178403	0.60	0.60	11.99	11.99	12.01	1	False
178404	0.46	0.43	13.40	13.71	13.58	1	False
178405	0.92	0.93	7.38	7.10	7.55	1	False
178407	0.70	0.69	10.90	11.02	11.13	1	False
178415	0.50	0.51	13.00	12.90	12.84	1	False
178416	0.64	0.66	11.57	11.35	11.43	1	False
178418	0.35	0.37	14.51	14.35	14.17	4	False
178419	0.75	0.74	10.30	10.43	10.59	1	False
178424	0.70	0.71	10.90	10.79	10.91	1	False

Figure K-10. 2011–12 Montana CRT: Delta Plot – Reading Grade 5

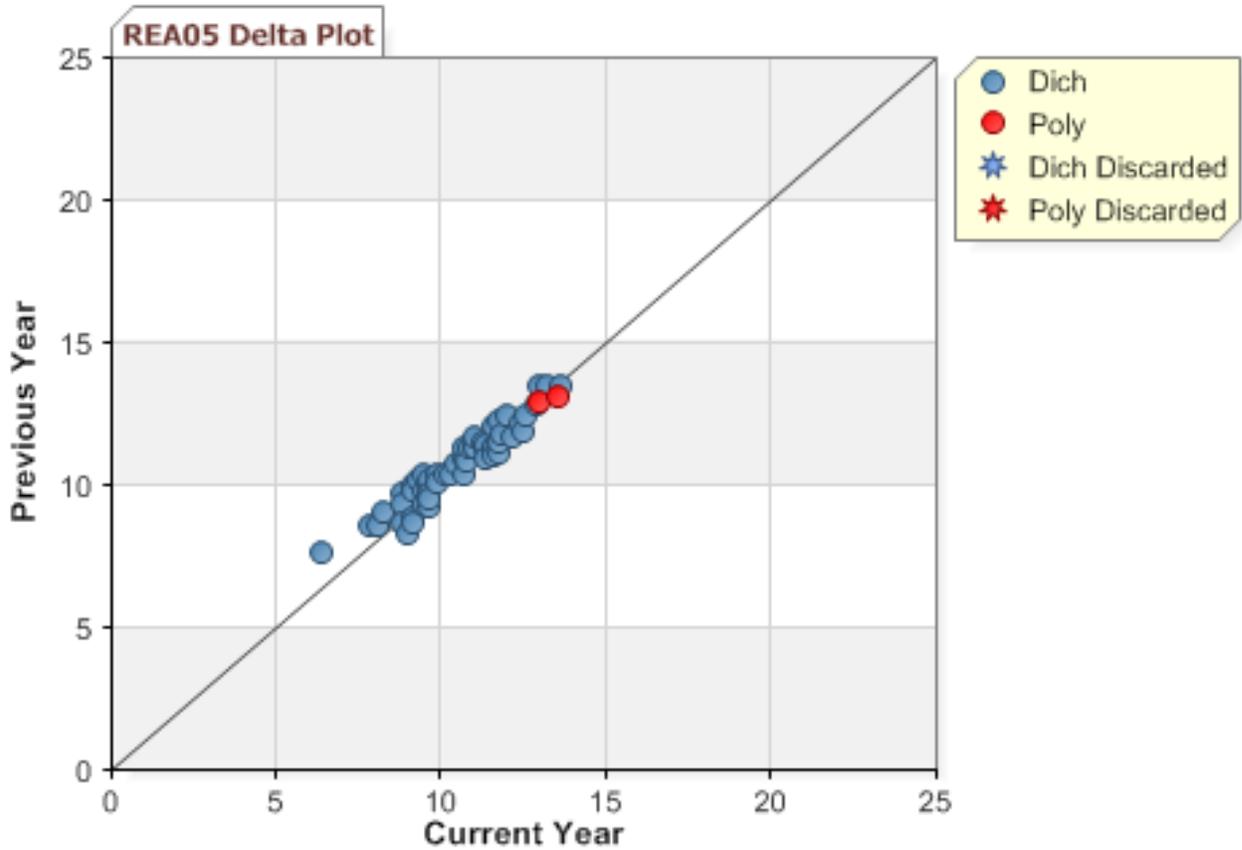


Table K-10. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 5

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
151801	0.81	0.80	9.49	9.63	9.82	1	False
151801	0.80	0.80	9.63	9.63	9.82	1	False
151803	0.61	0.55	11.88	12.50	12.41	1	False
151828	0.67	0.70	11.24	10.90	10.97	1	False
151829	0.84	0.88	9.02	8.30	8.61	1	False
151833	0.82	0.81	9.34	9.49	9.69	1	False
151837	0.87	0.90	8.49	7.87	8.23	1	False
151838	0.67	0.66	11.24	11.35	11.37	1	False
176297	0.65	0.67	11.46	11.24	11.27	1	False
176300	0.63	0.58	11.67	12.19	12.13	1	False
176323	0.67	0.72	11.24	10.67	10.75	1	False
176324	0.56	0.54	12.40	12.60	12.50	1	False
176332	0.76	0.82	10.17	9.34	9.55	1	False
176334	0.60	0.64	11.99	11.57	11.57	1	False
176341	0.91	0.95	7.64	6.42	6.91	1	False
176346	0.72	0.74	10.67	10.43	10.54	1	False
176354	0.66	0.69	11.35	11.02	11.07	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
176357	0.71	0.71	10.79	10.79	10.86	1	False
176361	0.78	0.83	9.91	9.18	9.41	1	False
176364	0.46	0.48	13.40	13.20	13.04	1	False
176371	0.52	0.50	12.85	13.03	12.88	4	False
176385	0.83	0.80	9.18	9.63	9.82	1	False
176387	0.88	0.84	8.30	9.02	9.27	1	False
176388	0.68	0.62	11.13	11.78	11.76	1	False
176393	0.75	0.72	10.30	10.67	10.75	1	False
176394	0.46	0.44	13.40	13.60	13.41	1	False
176402	0.66	0.66	11.35	11.35	11.37	1	False
176405	0.65	0.62	11.46	11.78	11.76	1	False
176416	0.70	0.66	10.90	11.35	11.37	1	False
176425	0.52	0.51	12.80	12.90	12.77	1	False
176428	0.67	0.69	11.24	11.02	11.07	1	False
176429	0.56	0.60	12.40	11.99	11.95	1	False
176432	0.86	0.83	8.68	9.18	9.41	1	False
176438	0.49	0.45	13.10	13.55	13.36	4	False
176474	0.59	0.56	12.09	12.40	12.32	1	False
176482	0.69	0.64	11.02	11.57	11.57	1	False
176488	0.76	0.80	10.17	9.63	9.82	1	False
176488	0.78	0.80	9.91	9.63	9.82	1	False
176490	0.70	0.72	10.90	10.67	10.75	1	False
176493	0.67	0.64	11.24	11.57	11.57	1	False
176493	0.67	0.64	11.24	11.57	11.57	1	False
176497	0.87	0.89	8.49	8.09	8.43	1	False
176504	0.82	0.81	9.34	9.49	9.69	1	False
176507	0.85	0.83	8.85	9.18	9.41	1	False
176513	0.77	0.78	10.04	9.91	10.07	1	False
176513	0.75	0.78	10.30	9.91	10.07	1	False
176516	0.75	0.75	10.30	10.30	10.42	1	False
176523	0.79	0.81	9.77	9.49	9.69	1	False
176523	0.75	0.81	10.30	9.49	9.69	1	False
176524	0.58	0.62	12.19	11.78	11.76	1	False
176529	0.67	0.69	11.24	11.02	11.07	1	False
176531	0.86	0.85	8.68	8.85	9.11	1	False
176531	0.82	0.85	9.34	8.85	9.11	1	False
181940	0.80	0.85	9.63	8.85	9.11	1	False
181943	0.63	0.69	11.67	11.02	11.07	1	False
181944	0.62	0.61	11.78	11.88	11.85	1	False
181949	0.46	0.50	13.40	13.00	12.86	1	False
181973	0.75	0.76	10.30	10.17	10.31	1	False
206094	0.79	0.83	9.77	9.18	9.41	1	False
206103	0.67	0.66	11.24	11.35	11.37	1	False

Figure K-11. 2011–12 Montana CRT: Delta Plot – Reading Grade 6

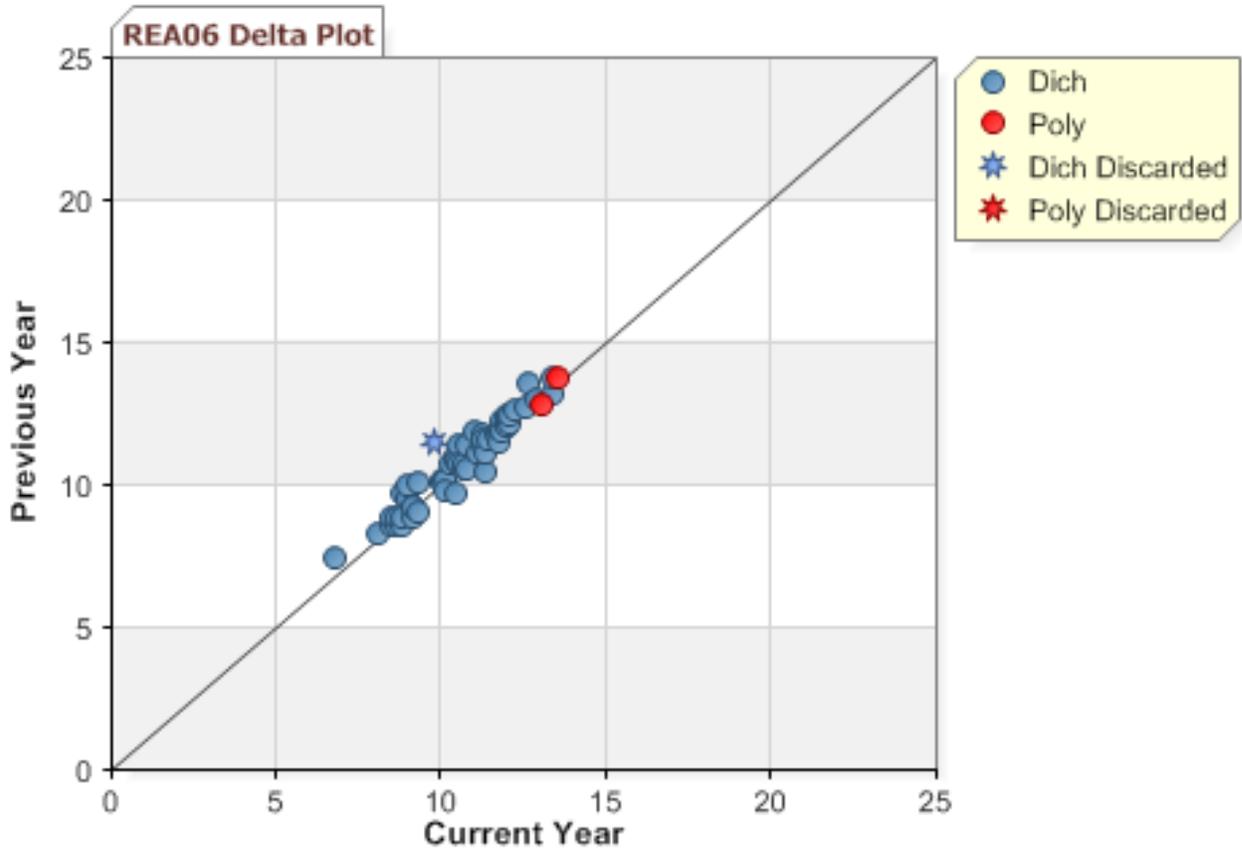


Table K-11. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 6

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
176870	0.66	0.71	11.35	10.79	10.95	1	False
176880	0.73	0.71	10.55	10.79	10.95	1	False
176887	0.72	0.73	10.67	10.55	10.71	1	False
176889	0.72	0.75	10.67	10.30	10.46	1	False
176892	0.77	0.82	10.04	9.34	9.50	1	False
176903	0.78	0.84	9.91	9.02	9.18	1	False
176910	0.53	0.54	12.70	12.60	12.77	1	False
176913	0.66	0.73	11.35	10.55	10.71	1	False
176923	0.64	0.65	11.57	11.46	11.63	1	False
176927	0.43	0.46	13.71	13.40	13.58	1	False
176927	0.48	0.46	13.20	13.40	13.58	1	False
176932	0.73	0.72	10.55	10.67	10.83	1	False
176940	0.83	0.83	9.18	9.18	9.34	1	False
176942	0.72	0.72	10.67	10.67	10.83	1	False
176945	0.76	0.76	10.17	10.17	10.34	1	False
176952	0.62	0.63	11.78	11.67	11.84	1	False
176959	0.60	0.60	11.99	11.99	12.16	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
176959	0.56	0.60	12.40	11.99	12.16	1	False
176970	0.84	0.82	9.02	9.34	9.50	1	False
176974	0.83	0.83	9.18	9.18	9.34	1	False
176980	0.66	0.67	11.35	11.24	11.41	1	False
176981	0.61	0.61	11.88	11.88	12.05	1	False
176983	0.88	0.89	8.30	8.09	8.24	1	False
177008	0.68	0.66	11.13	11.35	11.52	1	False
177009	0.57	0.60	12.29	11.99	12.16	1	False
177011	0.61	0.69	11.88	11.02	11.18	1	False
177013	0.92	0.94	7.38	6.78	6.92	1	False
177016	0.80	0.85	9.63	8.85	9.01	1	False
177021	0.77	0.77	10.04	10.04	10.21	1	False
177023	0.45	0.53	13.50	12.70	12.87	1	False
177027	0.61	0.62	11.88	11.78	11.95	1	False
177028	0.71	0.74	10.79	10.43	10.59	1	False
177030	0.62	0.67	11.78	11.24	11.41	1	False
177045	0.69	0.74	11.02	10.43	10.59	1	False
177049	0.85	0.87	8.85	8.49	8.65	1	False
177049	0.87	0.87	8.49	8.49	8.65	1	False
177052	0.43	0.45	13.73	13.53	13.71	4	False
177058	0.58	0.61	12.19	11.88	12.05	1	False
177068	0.54	0.57	12.60	12.29	12.47	1	False
177070	0.50	0.51	13.00	12.90	13.08	1	False
177074	0.85	0.86	8.85	8.68	8.83	1	False
177083	0.68	0.68	11.13	11.13	11.30	1	False
177088	0.79	0.76	9.77	10.17	10.34	1	False
177091	0.87	0.86	8.49	8.68	8.83	1	False
177098	0.87	0.85	8.49	8.85	9.01	1	False
177115	0.85	0.85	8.85	8.85	9.01	1	False
177117	0.65	0.79	11.46	9.77	9.93	1	True
177121	0.60	0.60	11.99	11.99	12.16	1	False
177130	0.64	0.67	11.57	11.24	11.41	1	False
177137	0.52	0.49	12.77	13.08	13.25	4	False
95405	0.56	0.59	12.40	12.09	12.26	1	False
95405	0.59	0.59	12.09	12.09	12.26	1	False
95409	0.80	0.74	9.63	10.43	10.59	1	False
95410	0.74	0.66	10.43	11.35	11.52	1	False
95421	0.85	0.83	8.85	9.18	9.34	1	False
95425	0.81	0.84	9.49	9.02	9.18	1	False
95425	0.81	0.84	9.49	9.02	9.18	1	False
95431	0.65	0.62	11.46	11.78	11.95	1	False
95441	0.77	0.77	10.04	10.04	10.21	1	False
95441	0.76	0.77	10.17	10.04	10.21	1	False

Figure K-12. 2011–12 Montana CRT: Delta Plot – Reading Grade 7

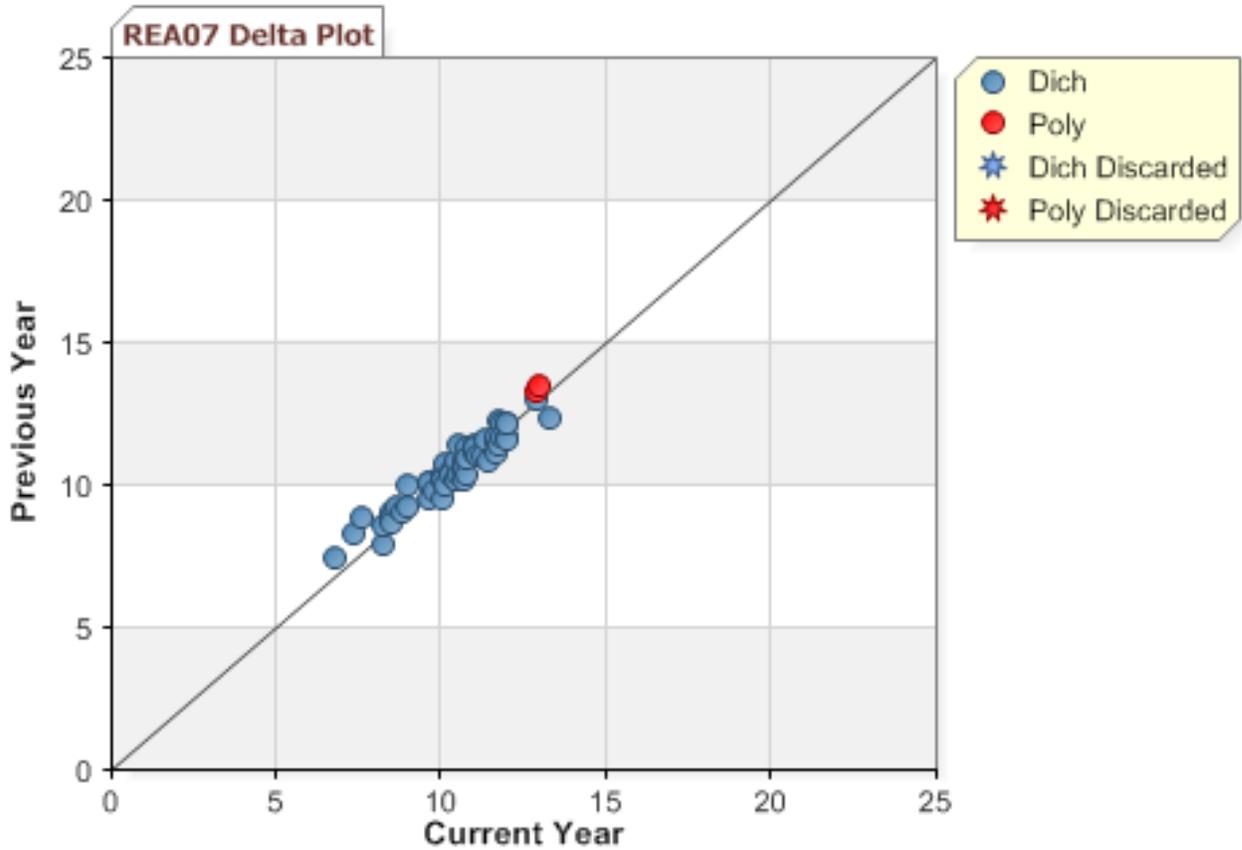


Table K-12. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 7

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
148645	0.77	0.80	10.04	9.63	9.80	1	False
148645	0.77	0.80	10.04	9.63	9.80	1	False
148652	0.84	0.85	9.02	8.85	9.10	1	False
148656	0.75	0.77	10.30	10.04	10.17	1	False
148661	0.67	0.69	11.24	11.02	11.04	1	False
148661	0.68	0.69	11.13	11.02	11.04	1	False
148663	0.63	0.60	11.67	11.99	11.91	1	False
148663	0.64	0.60	11.57	11.99	11.91	1	False
148664	0.59	0.60	12.09	11.99	11.91	1	False
148670	0.58	0.62	12.19	11.78	11.73	1	False
148681	0.69	0.68	11.02	11.13	11.14	1	False
148697	0.78	0.84	9.91	9.02	9.25	1	False
148723	0.59	0.61	12.09	11.88	11.82	1	False
148733	0.76	0.77	10.17	10.04	10.17	1	False
148742	0.48	0.51	13.25	12.90	12.73	4	False
149106	0.68	0.63	11.13	11.67	11.63	1	False
149107	0.92	0.94	7.38	6.78	7.23	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
149110	0.84	0.87	9.02	8.49	8.77	1	False
149111	0.85	0.91	8.85	7.64	8.00	1	False
149119	0.57	0.47	12.29	13.30	13.09	1	False
149121	0.66	0.73	11.35	10.55	10.62	1	False
149125	0.88	0.92	8.30	7.38	7.77	1	False
176211	0.71	0.74	10.79	10.43	10.51	1	False
176216	0.67	0.71	11.24	10.79	10.83	1	False
176217	0.81	0.77	9.49	10.04	10.17	1	False
176218	0.70	0.71	10.90	10.79	10.83	1	False
176219	0.74	0.75	10.43	10.30	10.40	1	False
176221	0.63	0.61	11.67	11.88	11.82	1	False
176230	0.83	0.84	9.18	9.02	9.25	1	False
176234	0.71	0.65	10.79	11.46	11.44	1	False
176235	0.87	0.88	8.49	8.30	8.60	1	False
176235	0.90	0.88	7.87	8.30	8.60	1	False
176238	0.71	0.72	10.79	10.67	10.73	1	False
176241	0.76	0.74	10.17	10.43	10.51	1	False
176250	0.46	0.50	13.40	12.97	12.80	4	False
176272	0.79	0.79	9.77	9.77	9.92	1	False
176273	0.75	0.71	10.30	10.79	10.83	1	False
176276	0.81	0.80	9.49	9.63	9.80	1	False
176282	0.78	0.76	9.91	10.17	10.28	1	False
176283	0.50	0.51	13.00	12.90	12.73	1	False
176290	0.85	0.87	8.85	8.49	8.77	1	False
176292	0.76	0.74	10.17	10.43	10.51	1	False
176307	0.73	0.72	10.55	10.67	10.73	1	False
176307	0.76	0.72	10.17	10.67	10.73	1	False
176310	0.66	0.69	11.35	11.02	11.04	1	False
176312	0.66	0.62	11.35	11.78	11.73	1	False
176317	0.86	0.87	8.68	8.49	8.77	1	False
176318	0.83	0.86	9.18	8.68	8.94	1	False
176319	0.73	0.72	10.55	10.67	10.73	1	False
176322	0.72	0.76	10.67	10.17	10.28	1	False
177549	0.59	0.60	12.09	11.99	11.91	1	False
92341	0.63	0.63	11.67	11.67	11.63	1	False
92342	0.64	0.66	11.57	11.35	11.34	1	False
92343	0.75	0.75	10.30	10.30	10.40	1	False
92345	0.76	0.77	10.17	10.04	10.17	1	False
92347	0.65	0.63	11.46	11.67	11.63	1	False
92348	0.69	0.67	11.02	11.24	11.24	1	False
92350	0.75	0.73	10.30	10.55	10.62	1	False

Figure K-13. 2011–12 Montana CRT: Delta Plot – Reading Grade 8

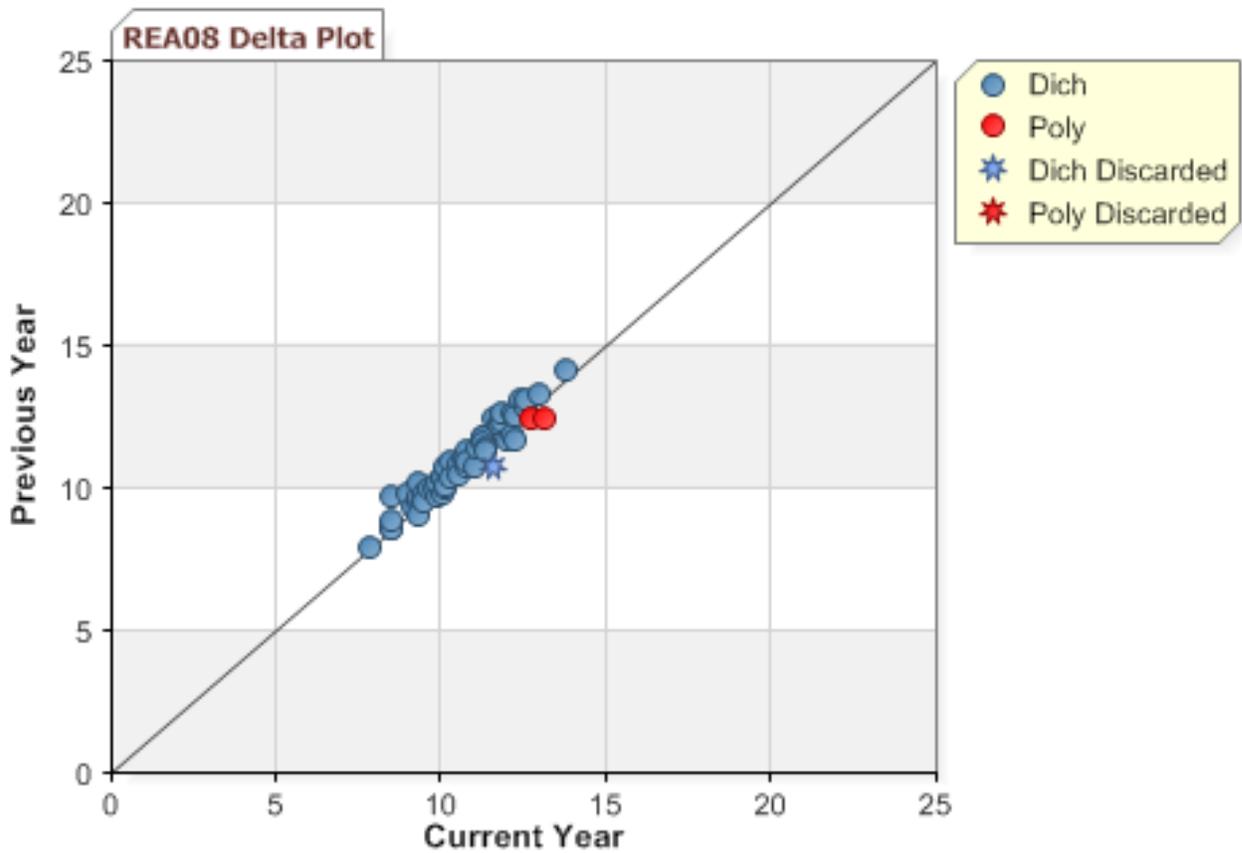


Table K-13. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 8

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
149317	0.74	0.73	10.43	10.55	10.71	1	False
149321	0.84	0.82	9.02	9.34	9.50	1	False
149322	0.75	0.77	10.30	10.04	10.21	1	False
149324	0.76	0.78	10.17	9.91	10.07	1	False
152479	0.72	0.64	10.67	11.57	11.73	1	True
152490	0.72	0.71	10.67	10.79	10.95	1	False
152507	0.90	0.90	7.87	7.87	8.04	1	False
176875	0.79	0.81	9.77	9.49	9.65	1	False
176891	0.78	0.80	9.91	9.63	9.80	1	False
176900	0.75	0.75	10.30	10.30	10.47	1	False
176904	0.82	0.83	9.34	9.18	9.35	1	False
176907	0.81	0.81	9.49	9.49	9.65	1	False
176914	0.80	0.82	9.63	9.34	9.50	1	False
176933	0.66	0.68	11.35	11.13	11.29	1	False
176943	0.75	0.77	10.30	10.04	10.21	1	False
176956	0.78	0.79	9.91	9.77	9.94	1	False
176958	0.80	0.87	9.63	8.49	8.66	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
176960	0.86	0.87	8.68	8.49	8.66	1	False
176960	0.87	0.87	8.49	8.49	8.66	1	False
176998	0.77	0.76	10.04	10.17	10.34	1	False
177000	0.81	0.82	9.49	9.34	9.50	1	False
177002	0.79	0.84	9.77	9.02	9.19	1	False
177004	0.67	0.66	11.24	11.35	11.51	1	False
177012	0.54	0.58	12.60	12.19	12.36	1	False
177018	0.57	0.61	12.29	11.88	12.05	1	False
177020	0.72	0.76	10.67	10.17	10.34	1	False
177031	0.78	0.76	9.91	10.17	10.34	1	False
177035	0.80	0.78	9.63	9.91	10.07	1	False
177037	0.66	0.66	11.35	11.35	11.51	1	False
177038	0.71	0.73	10.79	10.55	10.71	1	False
177046	0.47	0.50	13.30	13.00	13.16	1	False
177048	0.49	0.56	13.10	12.40	12.56	1	False
177050	0.61	0.58	11.88	12.19	12.36	1	False
177051	0.69	0.72	11.02	10.67	10.83	1	False
177055	0.79	0.77	9.77	10.04	10.21	1	False
177057	0.58	0.62	12.19	11.78	11.94	1	False
177060	0.75	0.77	10.30	10.04	10.21	1	False
177065	0.72	0.69	10.67	11.02	11.18	1	False
177073	0.56	0.49	12.42	13.13	13.29	4	False
177095	0.49	0.54	13.10	12.60	12.76	1	False
177112	0.76	0.82	10.17	9.34	9.50	1	False
177116	0.64	0.67	11.57	11.24	11.40	1	False
177116	0.62	0.67	11.78	11.24	11.40	1	False
177119	0.63	0.57	11.67	12.29	12.46	1	False
177123	0.55	0.57	12.50	12.29	12.46	1	False
177131	0.63	0.60	11.67	11.99	12.15	1	False
177135	0.62	0.67	11.78	11.24	11.40	1	False
177136	0.56	0.64	12.40	11.57	11.73	1	False
177141	0.52	0.54	12.80	12.60	12.76	1	False
177146	0.70	0.75	10.90	10.30	10.47	1	False
177155	0.54	0.61	12.60	11.88	12.05	1	False
177158	0.39	0.42	14.12	13.81	13.97	1	False
177159	0.56	0.53	12.42	12.75	12.91	4	False
178079	0.67	0.71	11.24	10.79	10.95	1	False
178079	0.70	0.71	10.90	10.79	10.95	1	False
178082	0.87	0.87	8.49	8.49	8.66	1	False
178102	0.85	0.87	8.85	8.49	8.66	1	False

Figure K-14. 2011–12 Montana CRT: Delta Plot – Reading Grade 10

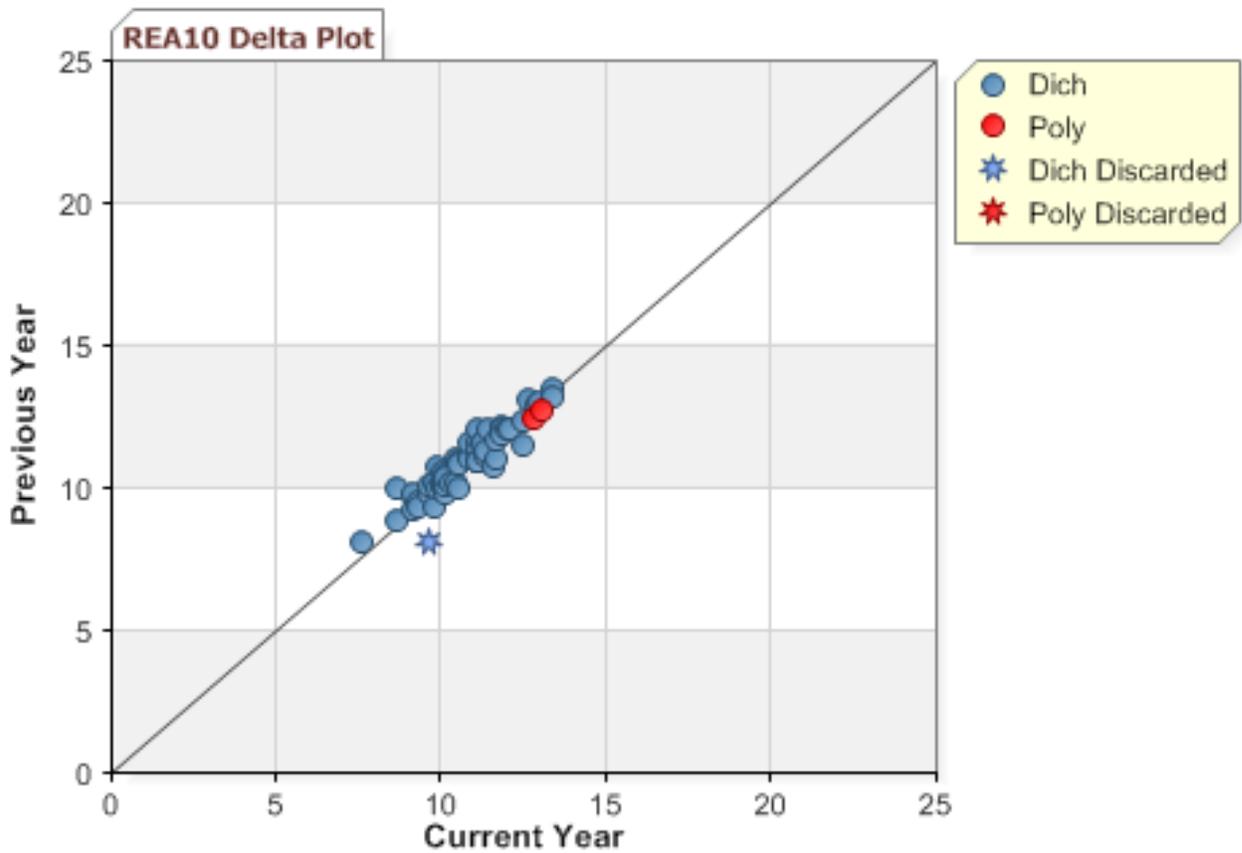


Table K-14. 2011–12 Montana CRT: Delta Analysis Results – Reading Grade 10

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
149802	0.63	0.63	11.67	11.67	11.68	1	False
149813	0.76	0.74	10.17	10.43	10.48	1	False
149822	0.70	0.68	10.90	11.13	11.16	1	False
149838	0.60	0.65	11.99	11.46	11.48	1	False
149839	0.51	0.51	12.90	12.90	12.86	1	False
149858	0.68	0.70	11.13	10.90	10.94	1	False
149862	0.89	0.80	8.09	9.63	9.72	1	True
177170	0.77	0.77	10.04	10.04	10.12	1	False
177171	0.73	0.77	10.55	10.04	10.12	1	False
177173	0.89	0.91	8.09	7.64	7.81	1	False
177175	0.77	0.76	10.04	10.17	10.24	1	False
177178	0.79	0.80	9.77	9.63	9.72	1	False
177180	0.80	0.83	9.63	9.18	9.29	1	False
177181	0.72	0.78	10.67	9.91	9.99	1	False
177185	0.85	0.86	8.85	8.68	8.81	1	False
177186	0.69	0.74	11.02	10.43	10.48	1	False
177189	0.71	0.73	10.79	10.55	10.60	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
177190	0.72	0.64	10.67	11.57	11.58	1	False
177191	0.65	0.55	11.46	12.50	12.47	1	False
177191	0.57	0.55	12.29	12.50	12.47	1	False
177193	0.60	0.59	11.99	12.09	12.08	1	False
177195	0.77	0.80	10.04	9.63	9.72	1	False
177196	0.76	0.75	10.17	10.30	10.37	1	False
177197	0.67	0.66	11.24	11.35	11.37	1	False
177198	0.77	0.76	10.04	10.17	10.24	1	False
177198	0.79	0.76	9.77	10.17	10.24	1	False
177199	0.70	0.68	10.90	11.13	11.16	1	False
177200	0.78	0.78	9.91	9.91	9.99	1	False
177202	0.64	0.67	11.57	11.24	11.27	1	False
177203	0.70	0.68	10.90	11.13	11.16	1	False
177207	0.82	0.79	9.34	9.77	9.86	1	False
177209	0.67	0.68	11.24	11.13	11.16	1	False
177213	0.77	0.77	10.04	10.04	10.12	1	False
177213	0.77	0.77	10.04	10.04	10.12	1	False
177214	0.69	0.63	11.02	11.67	11.68	1	False
177215	0.46	0.46	13.40	13.40	13.34	1	False
177215	0.48	0.46	13.20	13.40	13.34	1	False
177218	0.54	0.50	12.65	13.05	13.00	4	False
177220	0.79	0.83	9.77	9.18	9.29	1	False
177221	0.83	0.83	9.18	9.18	9.29	1	False
177224	0.64	0.70	11.57	10.90	10.94	1	False
177224	0.69	0.70	11.02	10.90	10.94	1	False
177225	0.64	0.67	11.57	11.24	11.27	1	False
177228	0.74	0.76	10.43	10.17	10.24	1	False
177230	0.64	0.68	11.57	11.13	11.16	1	False
177231	0.49	0.53	13.10	12.70	12.66	1	False
177232	0.81	0.82	9.49	9.34	9.44	1	False
177232	0.82	0.82	9.34	9.34	9.44	1	False
177234	0.61	0.61	11.88	11.88	11.88	1	False
177235	0.60	0.60	11.99	11.99	11.98	1	False
177240	0.75	0.76	10.30	10.17	10.24	1	False
177241	0.68	0.66	11.13	11.35	11.37	1	False
177242	0.56	0.52	12.45	12.85	12.81	4	False
177247	0.78	0.73	9.91	10.55	10.60	1	False
177250	0.60	0.68	11.99	11.13	11.16	1	False
177252	0.78	0.86	9.91	8.68	8.81	1	False
177253	0.70	0.73	10.90	10.55	10.60	1	False
177254	0.50	0.50	13.00	13.00	12.95	1	False
177255	0.59	0.61	12.09	11.88	11.88	1	False
177255	0.60	0.61	11.99	11.88	11.88	1	False
177256	0.76	0.79	10.17	9.77	9.86	1	False

Figure K-15. 2011–12 Montana CRT: Delta Plot – Science Grade 4

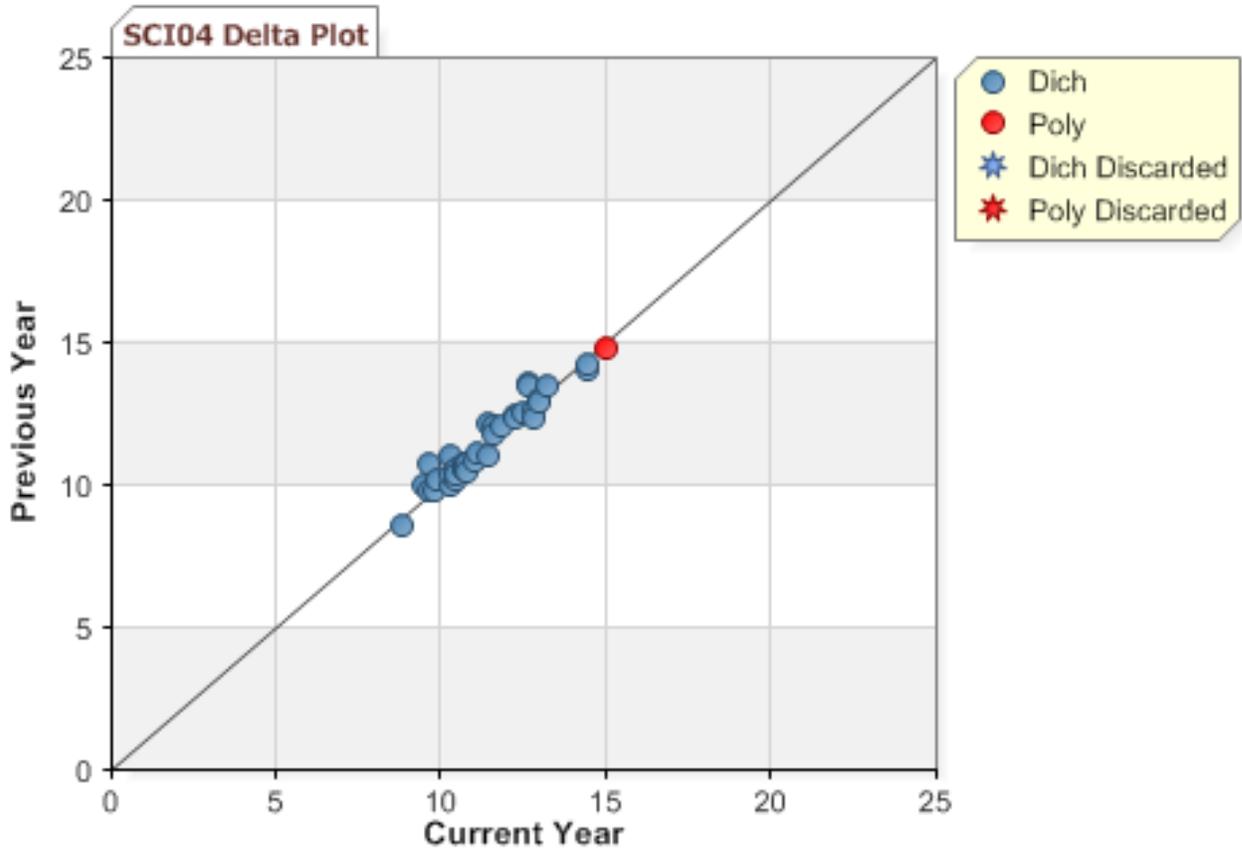


Table K-15. 2011–12 Montana CRT: Delta Analysis Results – Science Grade 4

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
119971	0.87	0.85	8.49	8.85	8.92	1	False
119973	0.60	0.61	11.99	11.88	11.92	1	False
119984	0.72	0.71	10.67	10.79	10.83	1	False
120014	0.73	0.72	10.55	10.67	10.72	1	False
120167	0.72	0.80	10.67	9.63	9.69	1	False
120548	0.73	0.72	10.55	10.67	10.72	1	False
120572	0.76	0.78	10.17	9.91	9.97	1	False
134675	0.68	0.68	11.13	11.13	11.17	1	False
159619	0.51	0.50	12.90	13.00	13.02	1	False
159624	0.71	0.69	10.79	11.02	11.06	1	False
159626	0.50	0.50	13.00	13.00	13.02	1	False
166239	0.72	0.72	10.67	10.67	10.72	1	False
166253	0.55	0.55	12.50	12.50	12.53	1	False
166767	0.78	0.81	9.91	9.49	9.55	1	False
166777	0.59	0.65	12.09	11.46	11.50	1	False
166779	0.69	0.75	11.02	10.30	10.35	1	False
53958	0.38	0.36	14.22	14.43	14.44	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
53958	0.40	0.36	14.01	14.43	14.44	1	False
55789	0.79	0.79	9.77	9.77	9.83	1	False
57863	0.57	0.57	12.29	12.29	12.33	1	False
57863	0.56	0.57	12.40	12.29	12.33	1	False
60053	0.79	0.80	9.77	9.63	9.69	1	False
60156	0.74	0.71	10.43	10.79	10.83	1	False
75408	0.54	0.52	12.60	12.80	12.83	1	False
75427	0.33	0.31	14.79	15.04	15.04	4	False
75690	0.57	0.52	12.29	12.80	12.83	1	False
75717	0.69	0.65	11.02	11.46	11.50	1	False
75782	0.46	0.48	13.40	13.20	13.22	1	False
75824	0.75	0.75	10.30	10.30	10.35	1	False
75828	0.72	0.71	10.67	10.79	10.83	1	False
75908	0.73	0.74	10.55	10.43	10.48	1	False
76278	0.75	0.74	10.30	10.43	10.48	1	False
76278	0.76	0.74	10.17	10.43	10.48	1	False
76283	0.45	0.53	13.50	12.70	12.73	1	False
76283	0.46	0.53	13.40	12.70	12.73	1	False
76291	0.78	0.75	9.91	10.30	10.35	1	False
76405	0.60	0.64	11.99	11.57	11.61	1	False
76405	0.62	0.64	11.78	11.57	11.61	1	False

Figure K-16. 2011–12 Montana CRT: Delta Plot – Science Grade 8

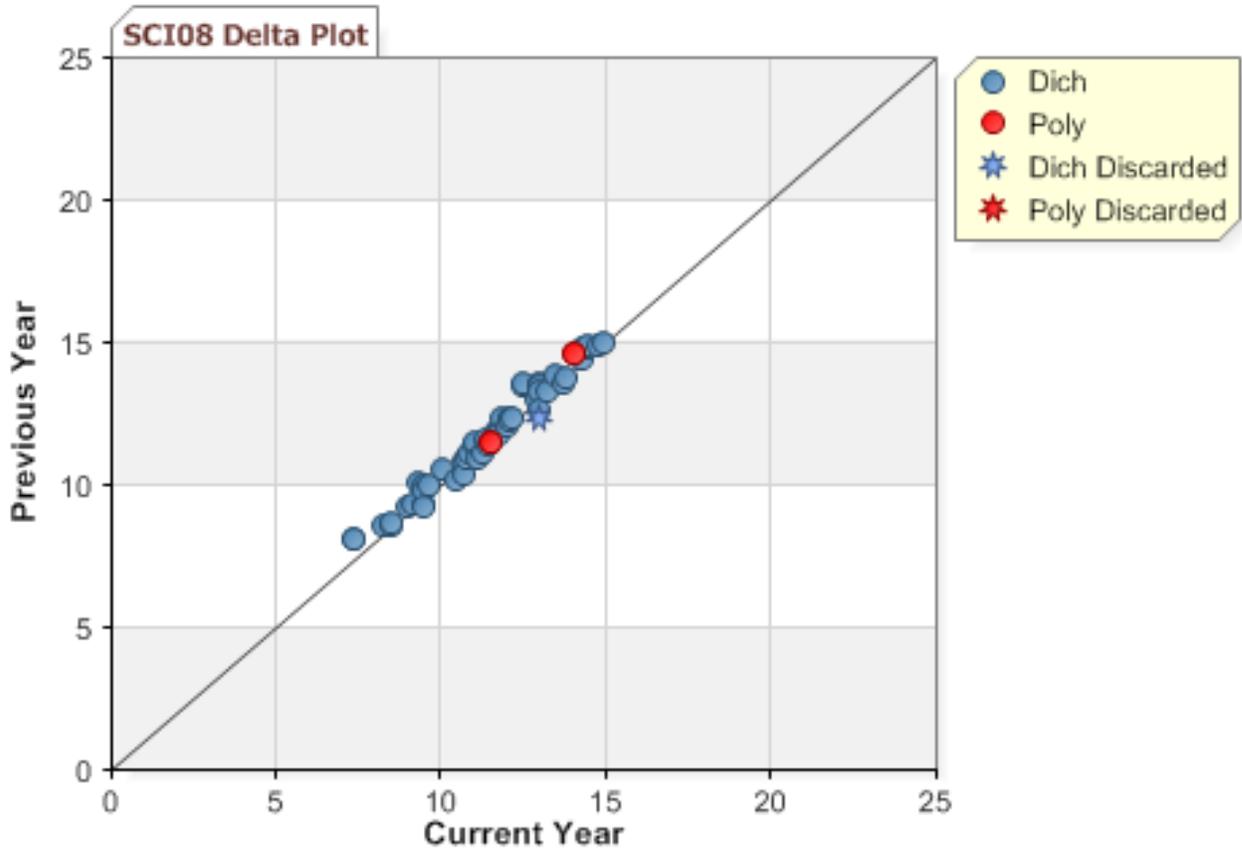


Table K-16. 2011–12 Montana CRT: Delta Analysis Results – Science Grade 8

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
121184	0.62	0.63	11.78	11.67	11.86	1	False
121193	0.58	0.59	12.19	12.09	12.27	1	False
121212	0.32	0.33	14.87	14.76	14.95	1	False
121222	0.68	0.70	11.13	10.90	11.08	1	False
121229	0.68	0.67	11.13	11.24	11.42	1	False
121233	0.65	0.65	11.43	11.49	11.67	4	False
121233	0.65	0.65	11.49	11.49	11.67	4	False
121617	0.70	0.68	10.90	11.13	11.31	1	False
122035	0.57	0.58	12.29	12.19	12.38	1	False
122039	0.70	0.71	10.90	10.79	10.97	1	False
122710	0.57	0.50	12.29	13.00	13.19	1	True
122722	0.43	0.42	13.71	13.81	14.00	1	False
122725	0.60	0.60	11.99	11.99	12.17	1	False
122748	0.36	0.37	14.43	14.33	14.52	1	False
122762	0.54	0.50	12.60	13.00	13.19	1	False
125947	0.73	0.77	10.55	10.04	10.22	1	False
125949	0.76	0.74	10.17	10.43	10.61	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
125959	0.75	0.72	10.30	10.67	10.85	1	False
134459	0.64	0.66	11.57	11.35	11.53	1	False
134553	0.71	0.72	10.79	10.67	10.85	1	False
158485	0.66	0.65	11.35	11.46	11.64	1	False
158493	0.33	0.37	14.76	14.33	14.52	1	False
158518	0.77	0.82	10.04	9.34	9.51	1	False
158528	0.57	0.61	12.29	11.88	12.07	1	False
158535	0.87	0.88	8.49	8.30	8.47	1	False
158538	0.50	0.51	13.00	12.90	13.09	1	False
158540	0.42	0.45	13.81	13.50	13.69	1	False
158553	0.45	0.43	13.50	13.71	13.89	1	False
158559	0.31	0.31	14.98	14.98	15.18	1	False
158569	0.47	0.50	13.30	13.00	13.19	1	False
158576	0.47	0.48	13.30	13.20	13.39	1	False
158582	0.61	0.63	11.88	11.67	11.86	1	False
53303	0.87	0.87	8.49	8.49	8.67	1	False
53303	0.86	0.87	8.68	8.49	8.67	1	False
54264	0.78	0.80	9.91	9.63	9.81	1	False
54339	0.78	0.81	9.91	9.49	9.66	1	False
54339	0.79	0.81	9.77	9.49	9.66	1	False
56814	0.83	0.81	9.18	9.49	9.66	1	False
56814	0.82	0.81	9.34	9.49	9.66	1	False
75920	0.57	0.59	12.29	12.09	12.27	1	False
89420	0.82	0.83	9.34	9.18	9.36	1	False
89513	0.83	0.84	9.18	9.02	9.20	1	False
89539	0.34	0.40	14.62	14.04	14.23	4	False
89539	0.35	0.40	14.54	14.04	14.23	4	False
89588	0.45	0.55	13.50	12.50	12.68	1	False
89588	0.46	0.55	13.40	12.50	12.68	1	False
89719	0.65	0.69	11.46	11.02	11.20	1	False
89719	0.66	0.69	11.35	11.02	11.20	1	False
89762	0.46	0.50	13.40	13.00	13.19	1	False
89762	0.45	0.50	13.50	13.00	13.19	1	False
89764	0.33	0.36	14.76	14.43	14.62	1	False
89764	0.32	0.36	14.87	14.43	14.62	1	False
89798	0.89	0.92	8.09	7.38	7.55	1	False
89798	0.89	0.92	8.09	7.38	7.55	1	False
89884	0.62	0.62	11.78	11.78	11.96	1	False

Figure K-17. 2011–12 Montana CRT: Delta Plot – Science Grade 10

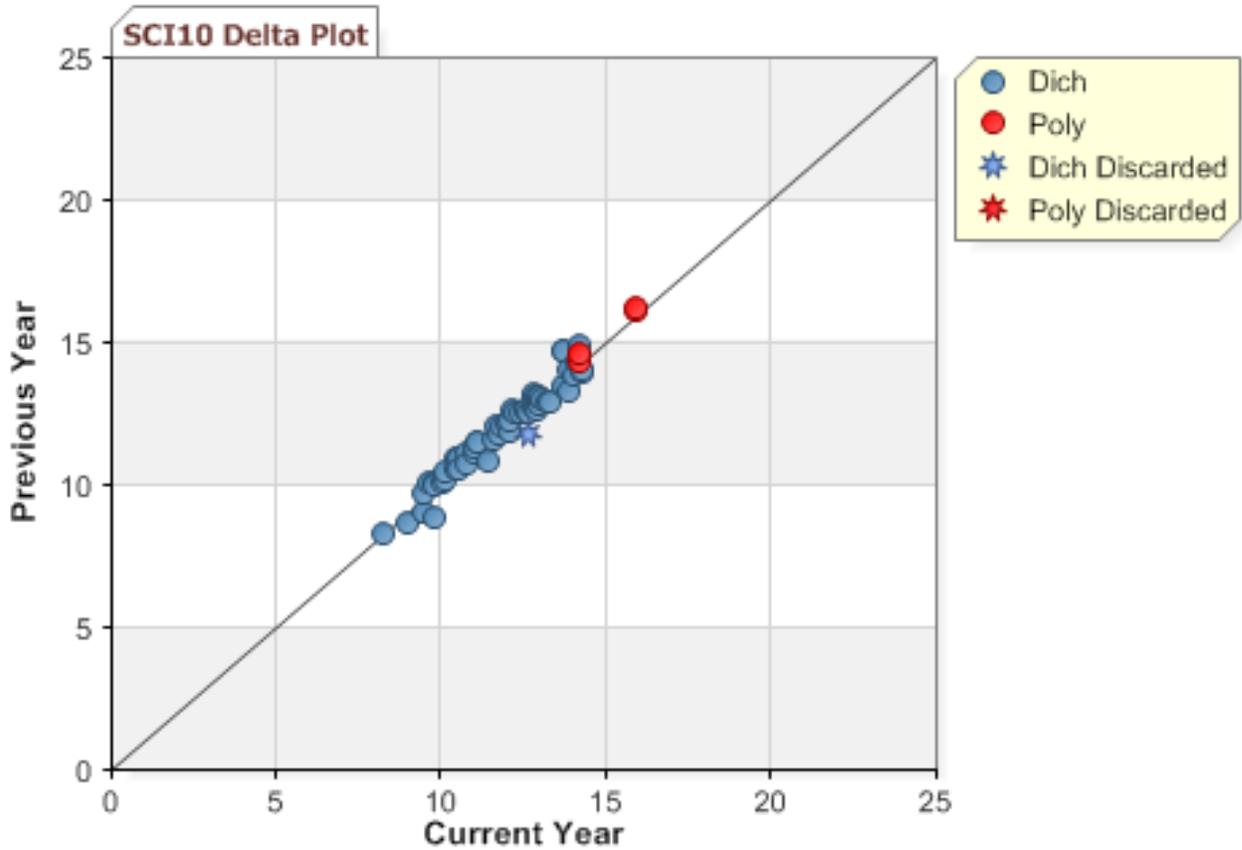


Table K-17. 2011–12 Montana CRT: Delta Analysis Results – Science Grade 10

IREF	Mean		Delta		Maximum	Discard	Standardized Difference
	Old	New	Old	New			
119664	0.47	0.41	13.30	13.91	14.00	1	False
119674	0.55	0.56	12.50	12.40	12.44	1	False
119799	0.86	0.84	8.68	9.02	8.96	1	False
119855	0.58	0.59	12.19	12.09	12.12	1	False
119955	0.51	0.47	12.90	13.30	13.37	1	False
120064	0.78	0.79	9.91	9.77	9.74	1	False
130550	0.88	0.88	8.30	8.30	8.22	1	False
130556	0.85	0.79	8.85	9.77	9.74	1	False
130592	0.64	0.64	11.57	11.57	11.59	1	False
134479	0.55	0.53	12.50	12.70	12.75	1	False
134499	0.71	0.65	10.79	11.46	11.47	1	False
134512	0.60	0.61	11.99	11.88	11.91	1	False
134795	0.51	0.50	12.90	13.00	13.06	1	False
158423	0.48	0.52	13.20	12.80	12.86	1	False
158424	0.60	0.63	11.99	11.67	11.69	1	False
158426	0.62	0.62	11.78	11.78	11.80	1	False
158427	0.68	0.71	11.13	10.79	10.78	1	False

continued

<i>IREF</i>	<i>Mean</i>		<i>Delta</i>		<i>Maximum</i>	<i>Discard</i>	<i>Standardized Difference</i>
	<i>Old</i>	<i>New</i>	<i>Old</i>	<i>New</i>			
158429	0.42	0.40	13.81	14.01	14.11	1	False
158432	0.59	0.60	12.09	11.99	12.02	1	False
158433	0.62	0.53	11.78	12.70	12.75	1	True
158437	0.54	0.54	12.60	12.60	12.65	1	False
158449	0.77	0.79	10.04	9.77	9.74	1	False
158450	0.35	0.38	14.54	14.25	14.35	4	False
158450	0.38	0.38	14.25	14.25	14.35	4	False
158595	0.61	0.59	11.88	12.09	12.12	1	False
158596	0.37	0.39	14.33	14.12	14.21	1	False
158601	0.50	0.49	13.00	13.10	13.17	1	False
158604	0.55	0.57	12.50	12.29	12.34	1	False
158617	0.53	0.52	12.70	12.80	12.86	1	False
158619	0.54	0.54	12.60	12.60	12.65	1	False
158621	0.40	0.41	14.01	13.91	14.00	1	False
158629	0.73	0.74	10.55	10.43	10.41	1	False
159433	0.77	0.80	10.04	9.63	9.59	1	False
159438	0.77	0.77	10.04	10.04	10.02	1	False
159459	0.46	0.43	13.40	13.71	13.79	1	False
159462	0.80	0.81	9.63	9.49	9.44	1	False
159476	0.72	0.71	10.67	10.79	10.78	1	False
52286	0.70	0.73	10.90	10.55	10.54	1	False
52286	0.73	0.73	10.55	10.55	10.54	1	False
52926	0.65	0.68	11.46	11.13	11.13	1	False
52926	0.65	0.68	11.46	11.13	11.13	1	False
53745	0.76	0.76	10.17	10.17	10.15	1	False
53745	0.74	0.76	10.43	10.17	10.15	1	False
53755	0.67	0.69	11.24	11.02	11.02	1	False
53755	0.68	0.69	11.13	11.02	11.02	1	False
55209	0.35	0.38	14.54	14.22	14.32	1	False
55209	0.32	0.38	14.87	14.22	14.32	1	False
55771	0.84	0.81	9.02	9.49	9.44	1	False
56086	0.49	0.51	13.10	12.90	12.96	1	False
75433	0.54	0.51	12.60	12.90	12.96	1	False
75440	0.49	0.52	13.10	12.80	12.86	1	False
75442	0.54	0.58	12.60	12.19	12.23	1	False
75445	0.38	0.38	14.22	14.22	14.32	1	False
75452	0.51	0.48	12.90	13.20	13.27	1	False
75632	0.51	0.50	12.90	13.00	13.06	1	False
75645	0.40	0.37	14.01	14.33	14.43	1	False
75645	0.41	0.37	13.91	14.33	14.43	1	False
75739	0.70	0.74	10.90	10.43	10.41	1	False
75804	0.49	0.50	13.10	13.00	13.06	1	False
75807	0.52	0.50	12.80	13.00	13.06	1	False
75882	0.21	0.23	16.19	15.92	16.08	4	False
75882	0.22	0.23	16.09	15.92	16.08	4	False
75979	0.34	0.43	14.65	13.71	13.79	1	False
75979	0.34	0.43	14.65	13.71	13.79	1	False

**Table K-18. 2011–12 Montana CRT: Rescore Analysis Results
by Subject and Grade**

Subject	Grade	IREF	Maximum	Mean		Standard Deviation		Effect Size	Discard
				Old	New	Old	New		
Mathematics	3	43261	4	2.80	2.73	0.93	0.92	-0.07	No
		138908	4	1.38	1.32	1.42	1.39	-0.04	No
	4	76921	4	2.08	2.07	1.26	1.26	-0.01	No
		77065	4	2.44	2.39	1.40	1.40	-0.03	No
	5	77278	4	1.83	1.78	1.26	1.23	-0.04	No
		146613	4	2.66	2.69	0.96	0.93	0.03	No
	6	174615	4	2.11	2.25	1.38	1.46	0.11	No
		146968	4	1.96	1.94	1.42	1.45	-0.02	No
	7	86658	4	2.06	1.97	1.39	1.44	-0.07	No
	8	248854	4	1.93	2.00	1.35	1.35	0.05	No
63305		4	2.33	2.48	1.50	1.50	0.10	No	
10	77651	4	1.61	1.63	1.45	1.43	0.01	No	
	144973	4	1.00	0.99	1.20	1.22	-0.01	No	
Reading	3	42913	4	2.05	2.07	1.05	1.01	0.02	No
		92721	4	1.73	1.53	0.96	1.01	-0.20	No
	4	178298	4	1.84	1.73	0.84	0.90	-0.14	No
		178418	4	1.38	1.46	0.89	0.90	0.09	No
	5	176371	4	2.00	1.88	0.93	0.91	-0.14	No
		176438	4	1.91	1.75	1.01	0.91	-0.16	No
	6	177052	4	1.66	1.75	0.90	1.06	0.09	No
		177137	4	2.07	2.09	0.99	1.07	0.02	No
	7	148742	4	2.00	1.91	0.99	1.02	-0.09	No
		176250	4	1.83	1.93	1.05	1.10	0.09	No
8	177159	4	2.14	1.81	0.98	1.13	-0.33	No	
	177073	4	2.25	2.03	1.10	1.19	-0.20	No	
10	177242	4	2.27	1.96	1.08	1.10	-0.30	No	
	177218	4	2.09	1.87	1.01	1.04	-0.22	No	
Science	4	75427	4	1.19	1.12	0.85	0.84	-0.08	No
	8	121233	4	2.62	2.56	1.19	1.19	-0.05	No
		89539	4	1.39	1.32	1.25	1.19	-0.05	No
	10	75882	4	0.85	0.86	0.82	0.89	0.01	No
158450		4	1.57	1.62	1.04	0.98	0.05	No	

APPENDIX L—SCORE DISTRIBUTIONS

Figure L-1. 2011–12 Montana CRT: Performance Level Distributions by Subject and Grade

Subject	Grade	Performance Level	Percent in Level		
			2011–12	2010–11	2009–10
Mathematics	3	4	31.39	29.82	28.91
		3	41.03	40.43	40.49
		2	12.37	15.93	16.16
		1	15.21	13.82	14.44
	4	4	34.35	31.37	31.97
		3	34.97	38.79	37.30
		2	16.25	16.55	17.00
		1	14.44	13.29	13.73
	5	4	37.63	34.77	32.57
		3	35.83	37.63	37.93
		2	14.44	15.96	16.50
		1	12.10	11.64	13.00
	6	4	32.87	33.12	32.42
		3	36.29	33.64	36.24
		2	17.51	20.27	17.76
		1	13.33	12.96	13.59
	7	4	33.69	36.89	35.92
		3	33.74	32.83	31.69
		2	18.70	16.29	16.39
		1	13.86	14.00	16.00
8	4	33.92	27.06	26.88	
	3	31.70	38.85	40.14	
	2	20.17	22.35	22.94	
	1	14.21	11.74	10.05	
10	4	23.31	25.20	21.67	
	3	36.98	34.19	35.74	
	2	32.06	29.83	31.27	
	1	7.65	10.78	11.32	
Reading	3	4	46.05	46.28	45.60
		3	38.41	39.30	39.45
		2	12.23	10.62	12.47
		1	3.32	3.79	2.47
	4	4	43.99	43.95	45.29
		3	41.63	39.32	38.21
		2	11.09	12.24	12.16
		1	3.30	4.49	4.35
	5	4	54.23	57.23	55.15
		3	34.15	30.20	31.32
		2	8.66	8.57	9.88
		1	2.96	4.00	3.64
	6	4	55.91	53.17	53.96
		3	32.94	34.44	32.68
		2	7.87	8.32	8.65
		1	3.28	4.08	4.71
	7	4	52.21	55.36	48.61
		3	37.30	30.64	35.75

continued

Subject	Grade	Performance Level	Percent in Level		
			2011–12	2010–11	2009–10
Reading	7	2	7.52	8.87	10.31
		1	2.97	5.13	5.33
	8	4	56.81	55.77	54.42
		3	30.68	28.71	30.23
		2	8.44	8.69	9.54
		1	4.07	6.83	5.80
	10	4	47.17	49.18	44.01
		3	36.59	33.61	36.82
		2	10.20	9.33	9.68
		1	6.03	7.88	9.49
Science	4	4	14.11	13.08	15.83
		3	53.91	48.86	50.71
		2	26.38	30.31	27.73
		1	5.59	7.75	5.73
	8	4	19.99	14.78	18.41
		3	46.71	49.73	44.36
		2	25.18	24.01	27.71
		1	8.12	11.49	9.51
	10	4	21.56	20.17	17.82
		3	24.27	27.15	25.02
2		32.60	33.06	33.66	
1		21.57	19.62	23.50	

Figure L-2. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 3

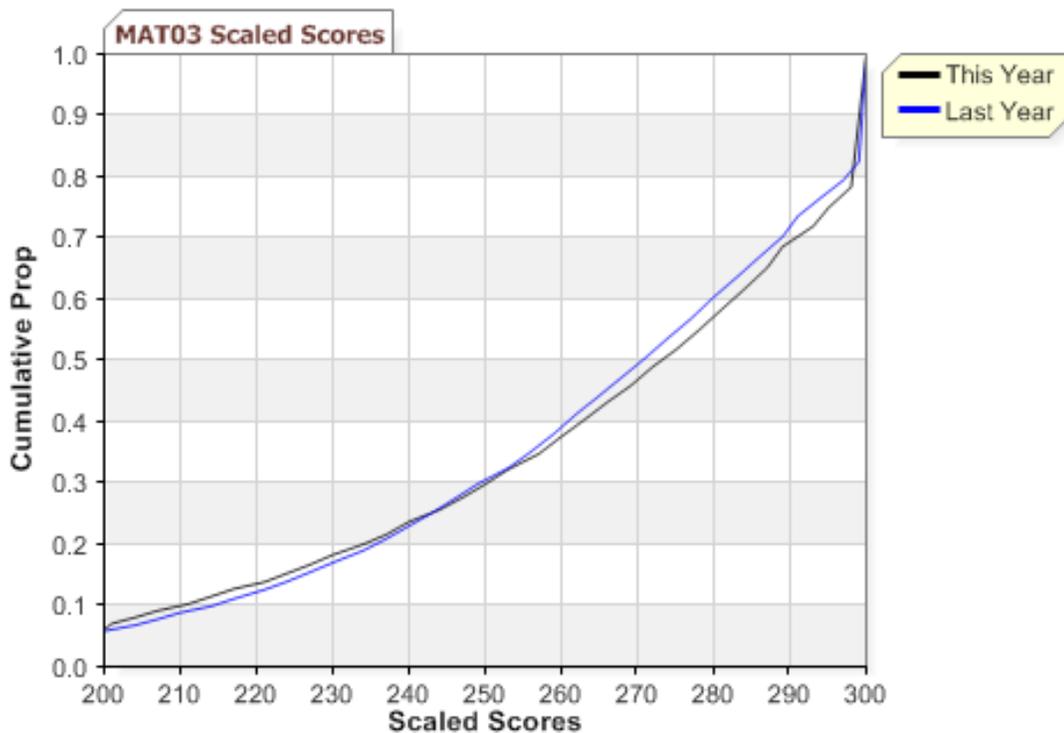


Figure L-3. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 4

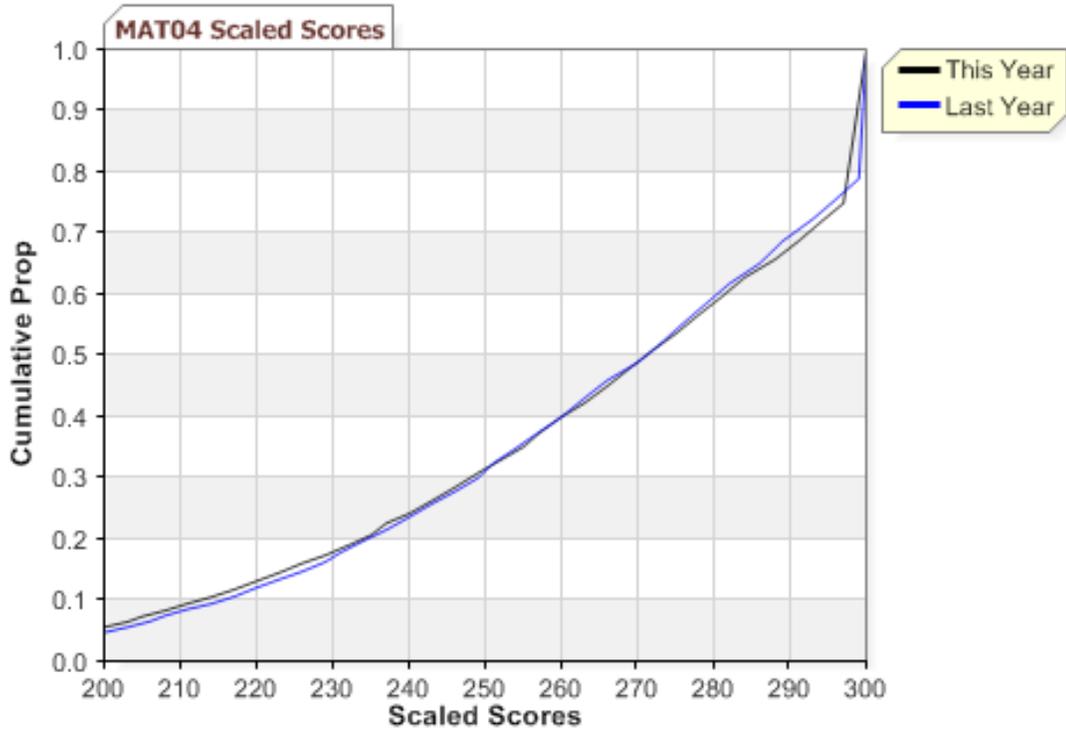


Figure L-4. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 5

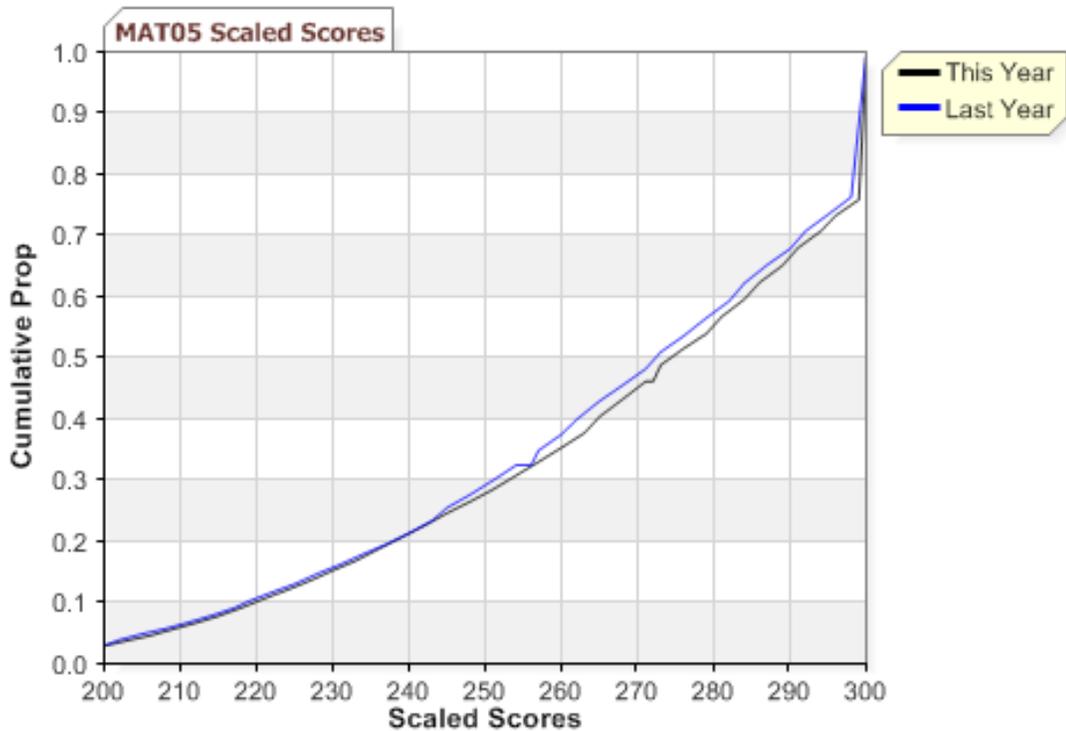


Figure L-5. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 6

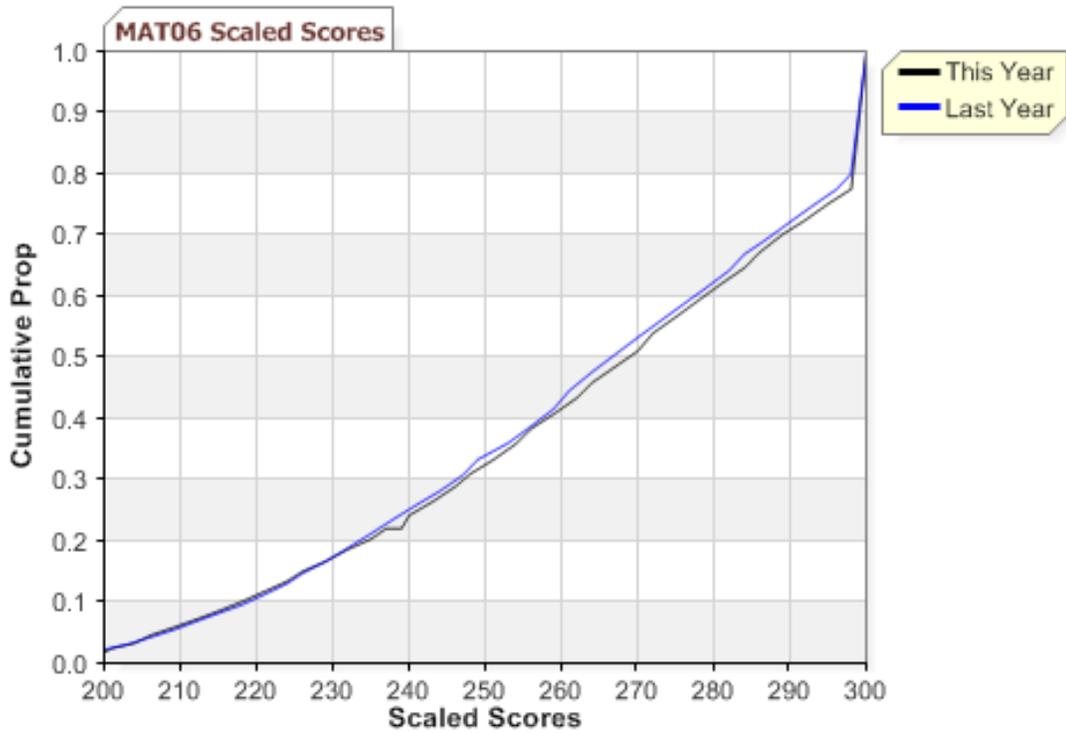


Figure L-6. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 7

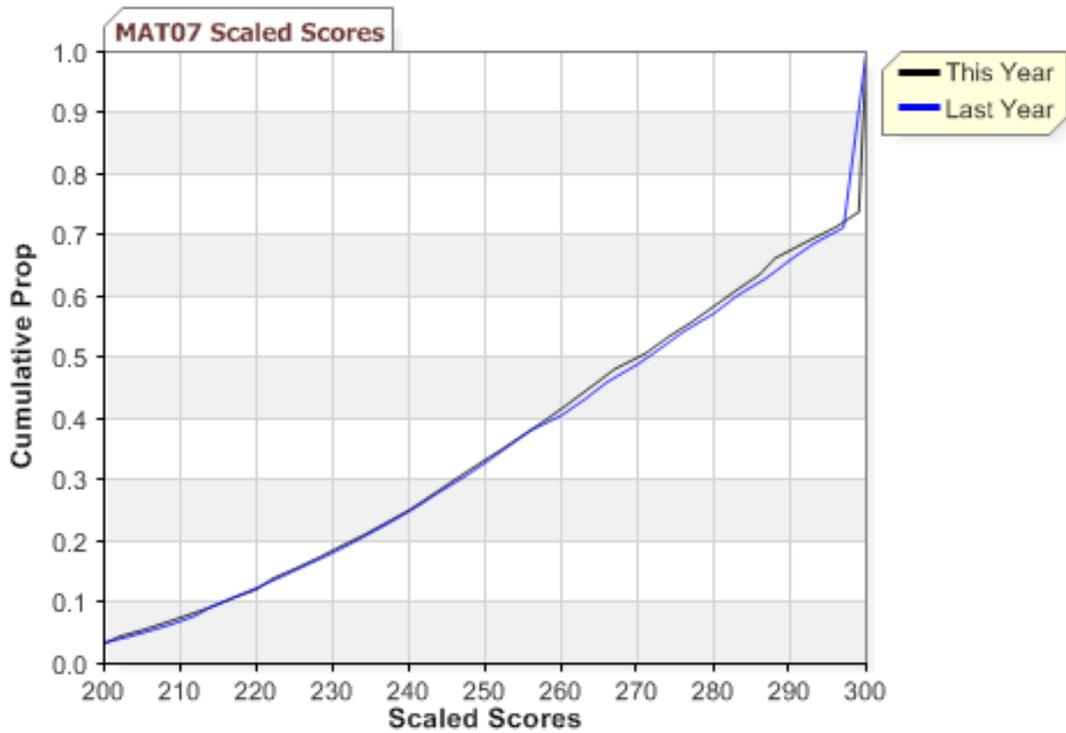


Figure L-7. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 8

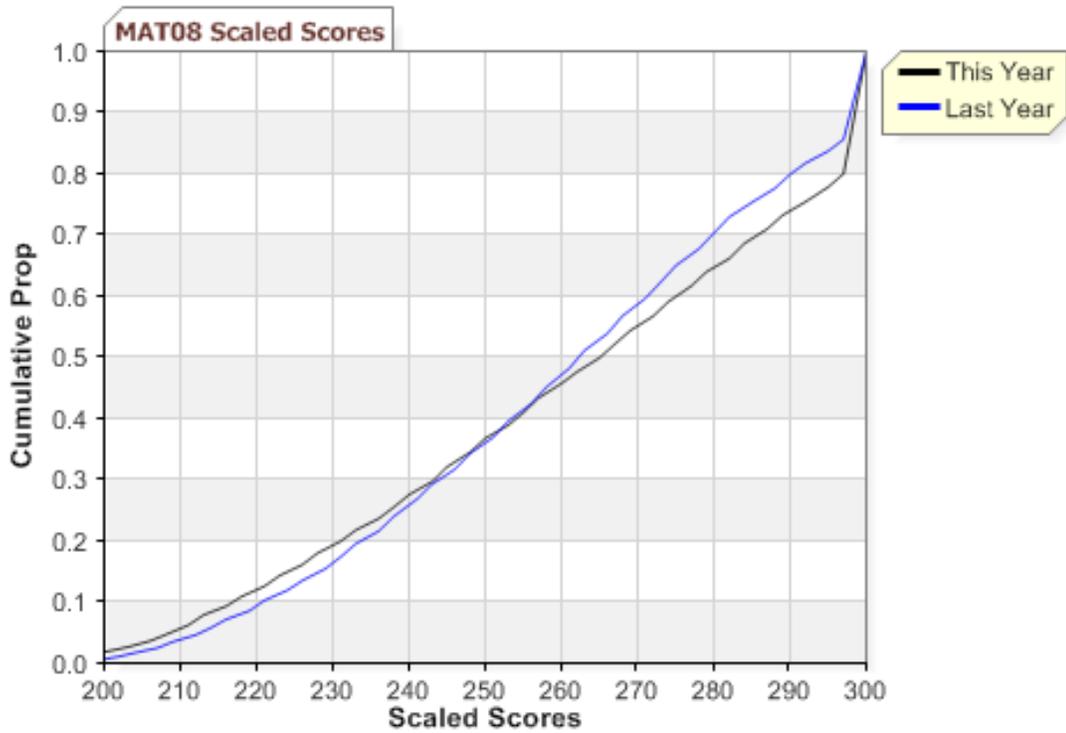


Figure L-8. 2011–12 Montana CRT: Scaled Score Percentages – Mathematics Grade 10

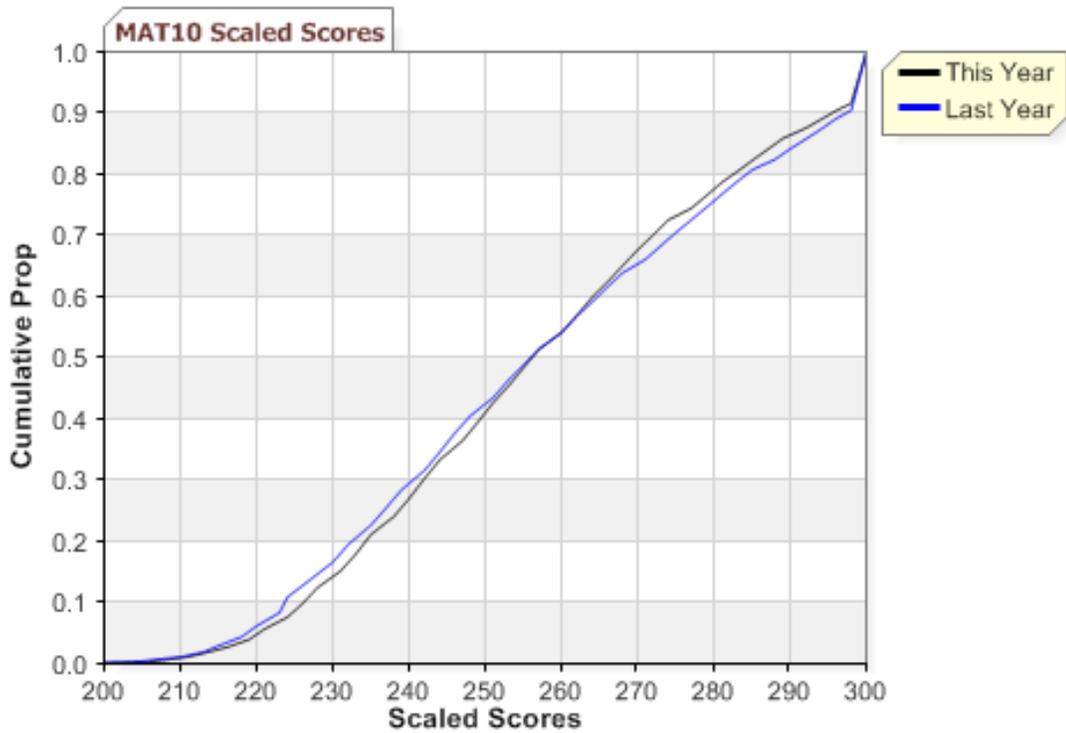


Figure L-9. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 3

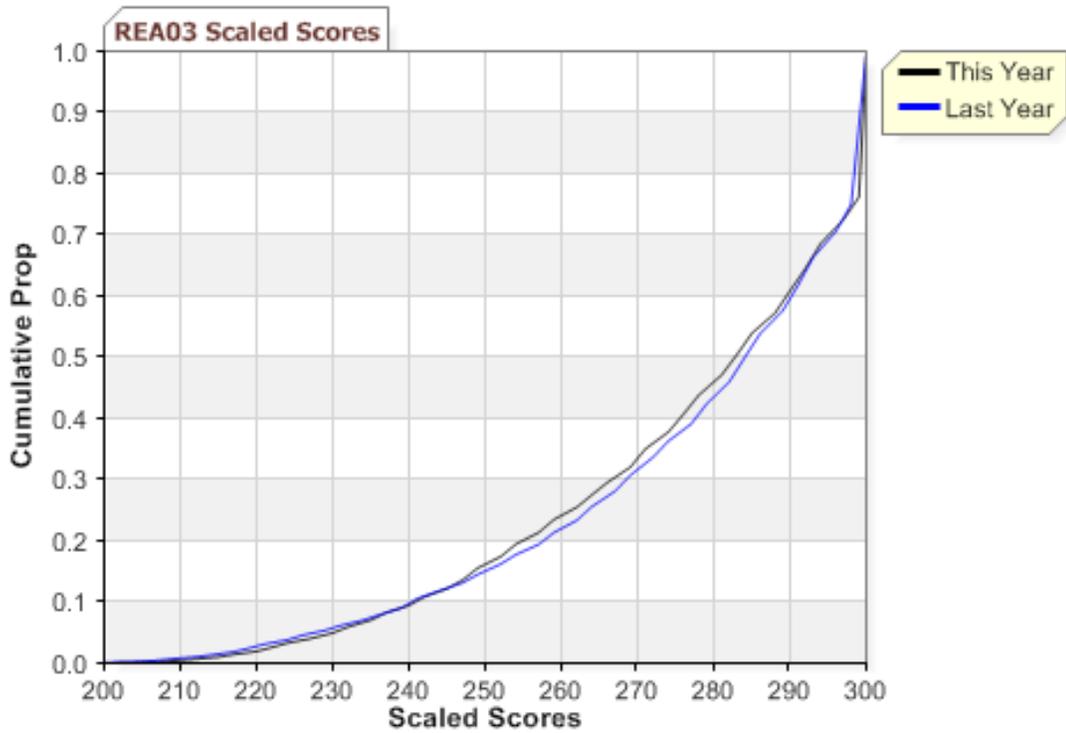


Figure L-10. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 4

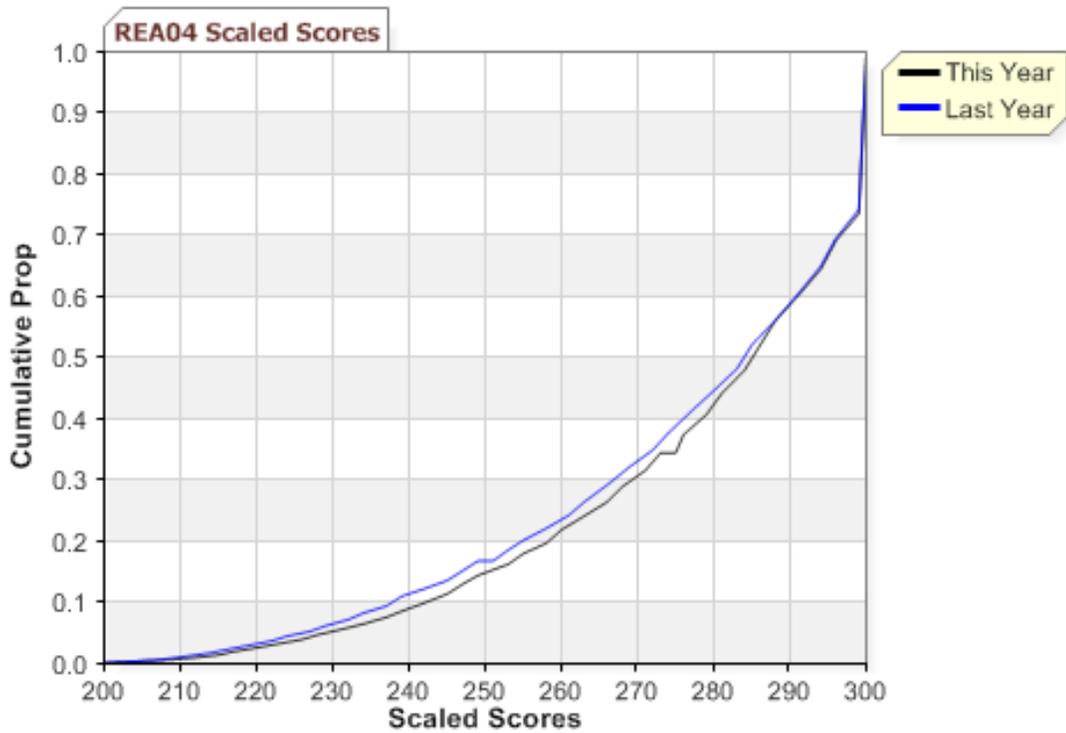


Figure L-11. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 5

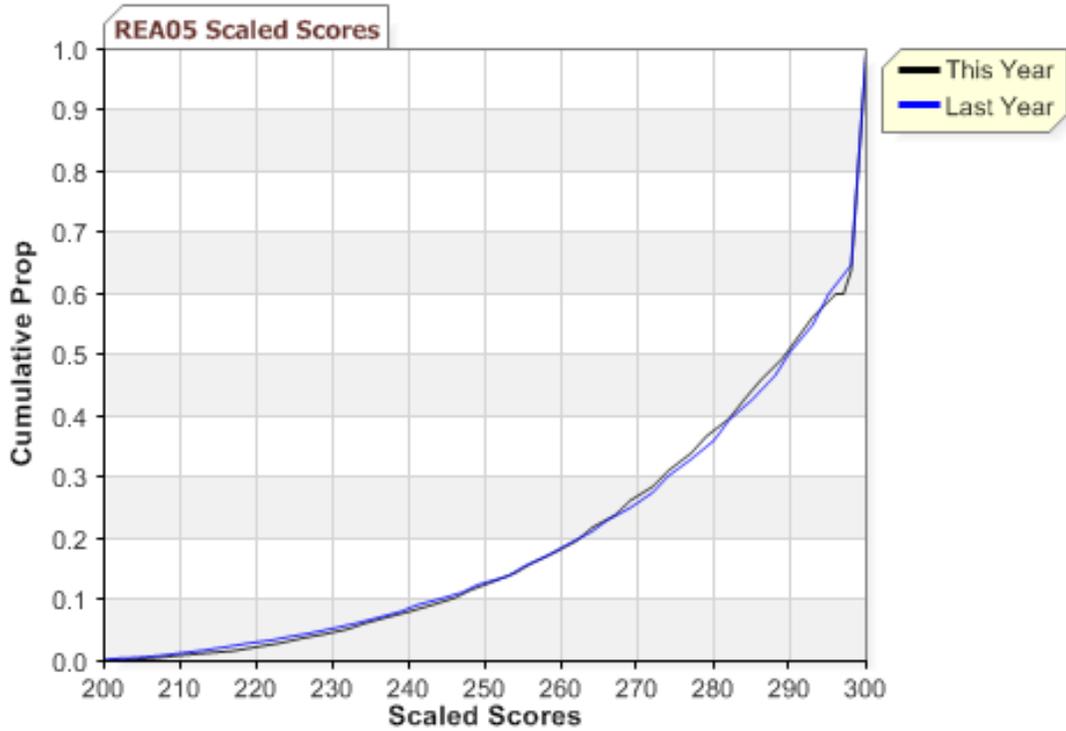


Figure L-12. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 6

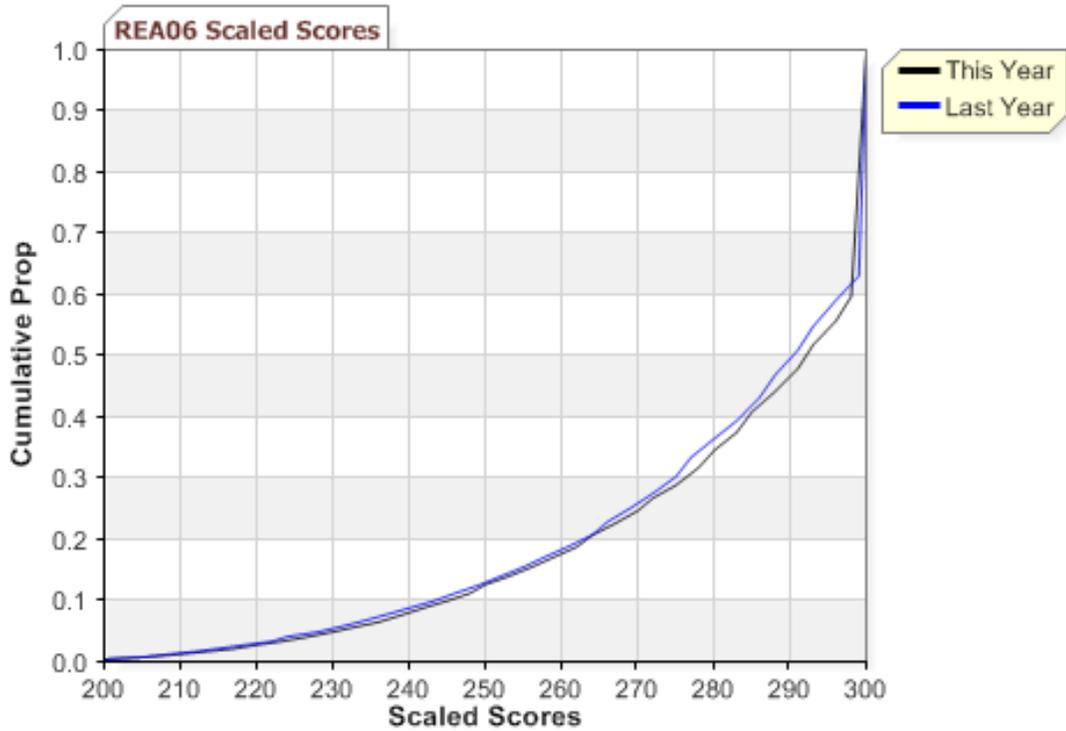


Figure L-13. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 7

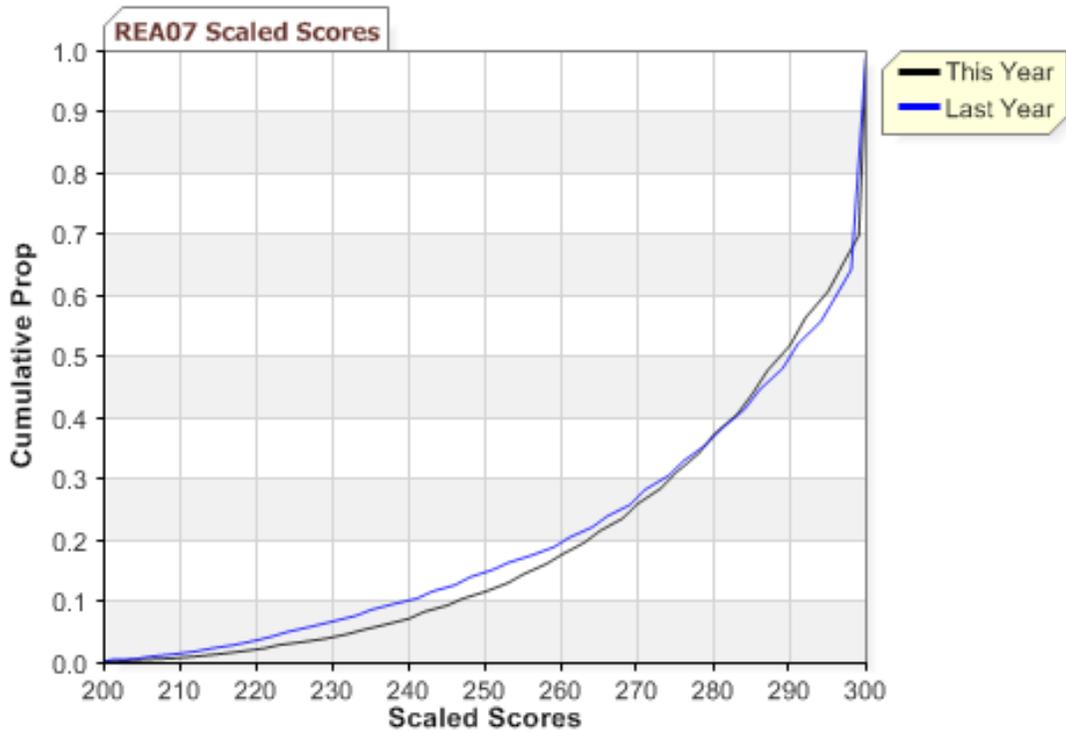


Figure L-14. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 8

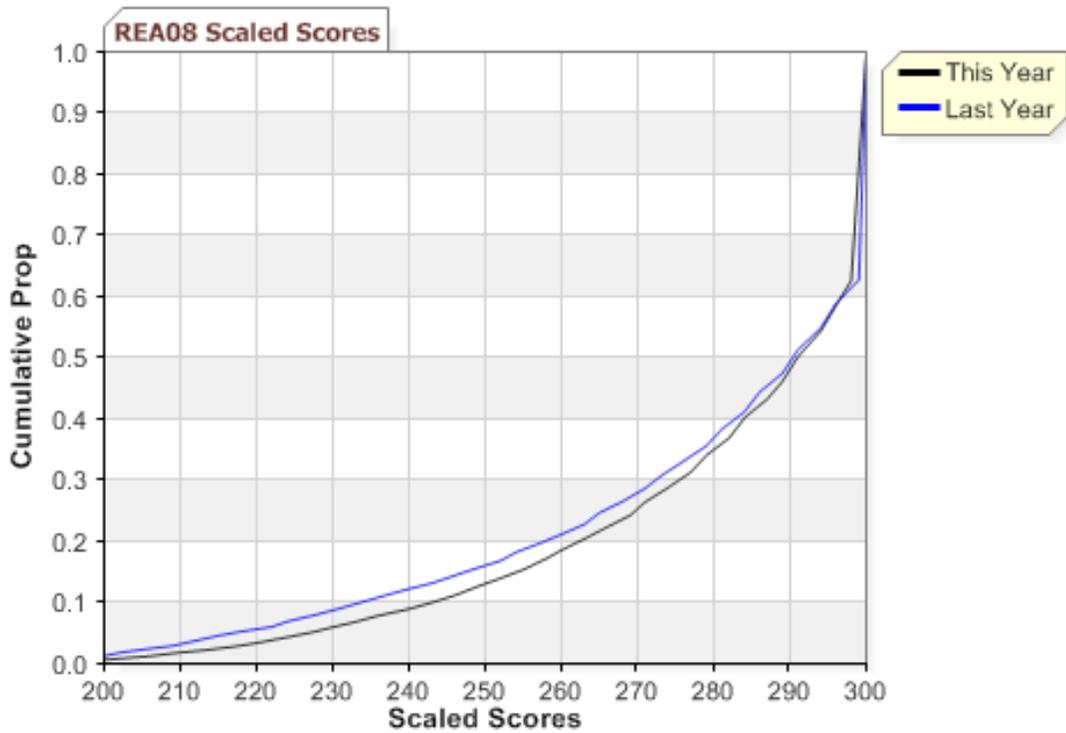


Figure L-15. 2011–12 Montana CRT: Scaled Score Percentages – Reading Grade 10

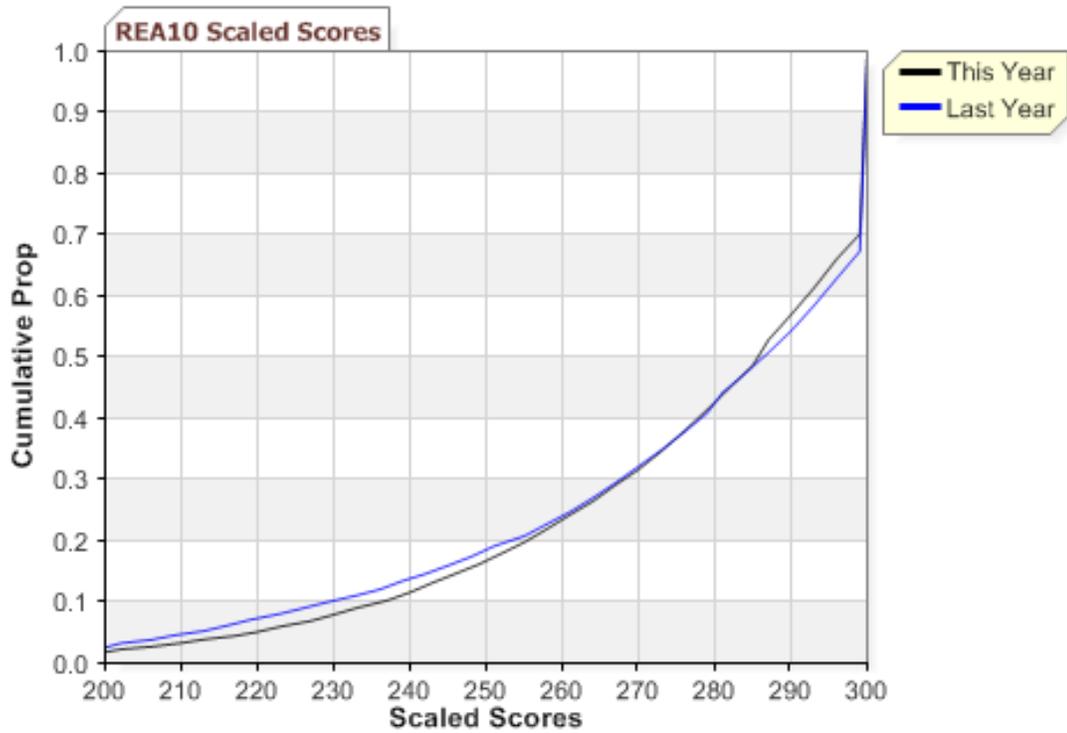


Figure L-16. 2011–12 Montana CRT: Scaled Score Percentages – Science Grade 4

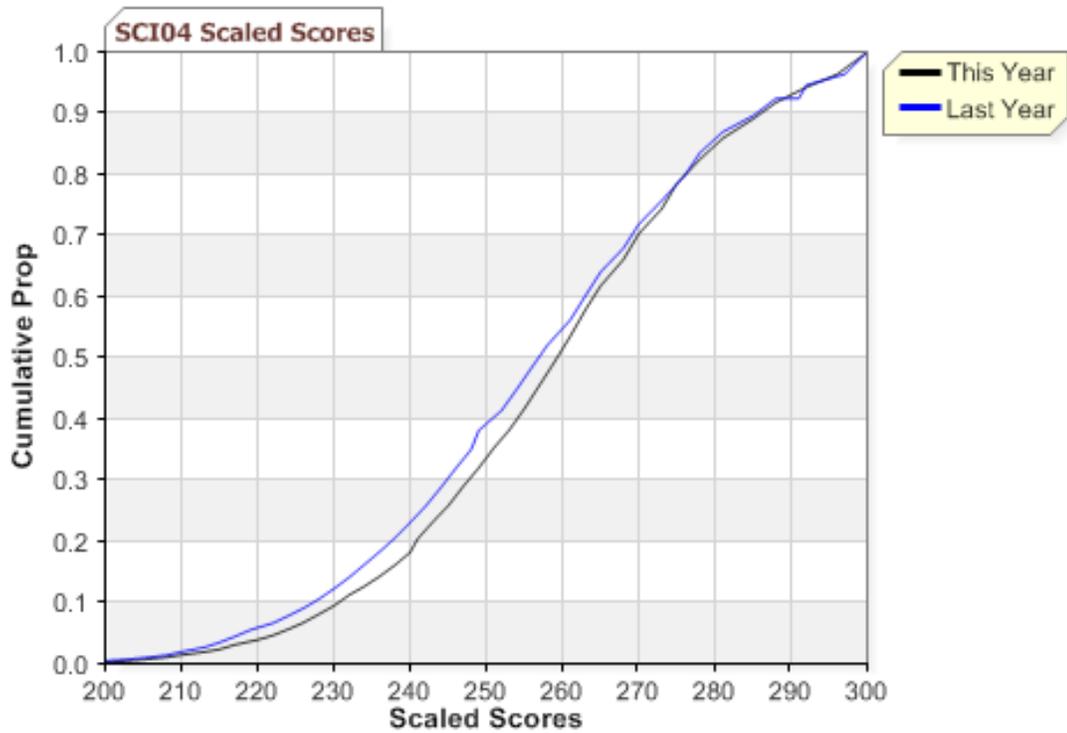


Figure L-17. 2011–12 Montana CRT: Scaled Score Percentages – Science Grade 8

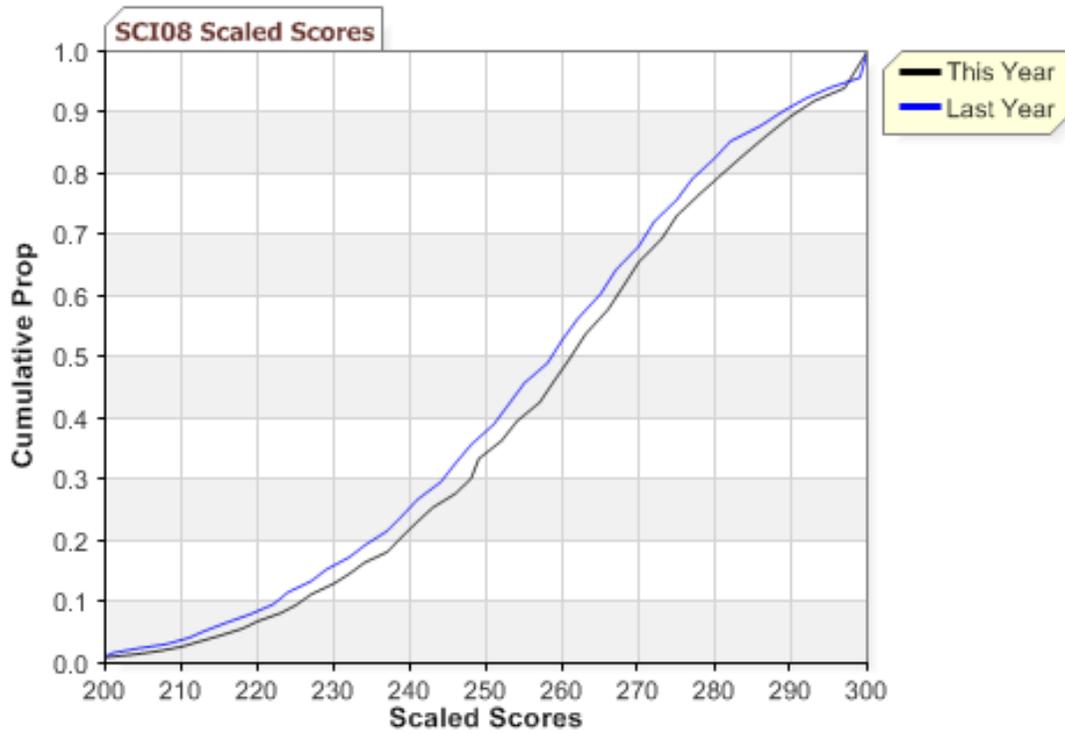
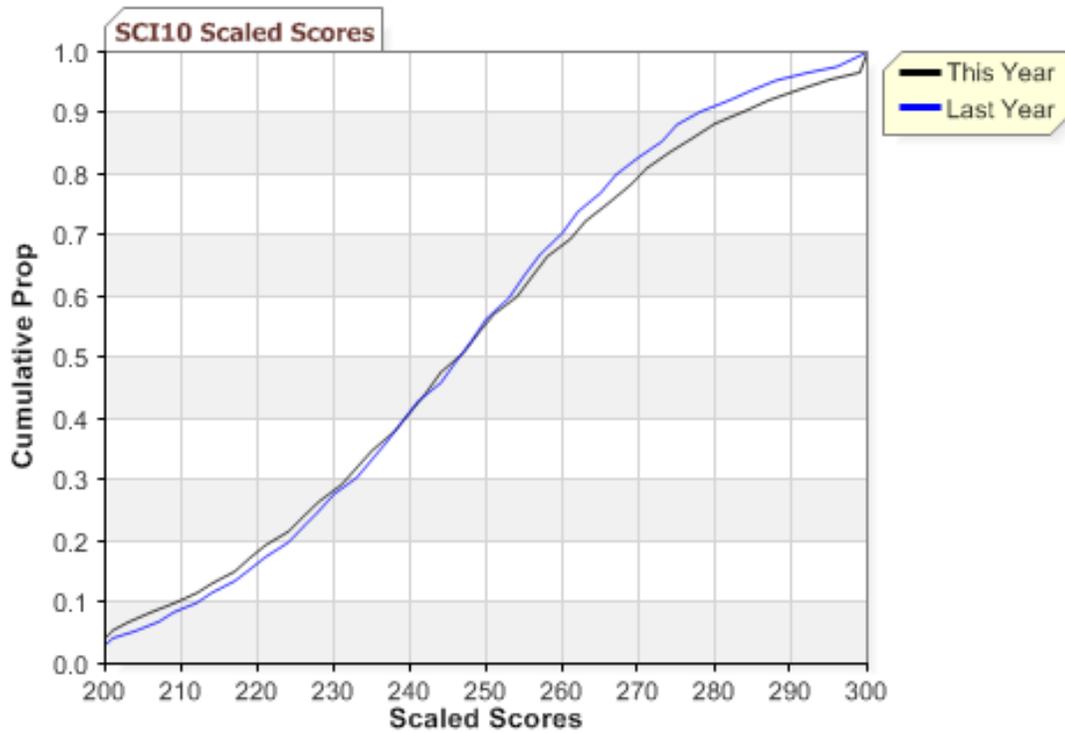


Figure L-18. 2011–12 Montana CRT: Scaled Score Percentages – Science Grade 10



APPENDIX M—RAW TO SCALED SCORE LOOK-UP TABLES

Table M-1. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 3

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	210	200	1	200	210
15	200	1	200	210	200	1	200	210
16	200	1	200	210	200	1	200	210
17	200	1	200	210	200	1	200	210
18	200	1	200	210	200	1	200	210
19	200	1	200	210	200	1	200	210
20	200	1	200	210	200	1	200	210
21	200	1	200	210	200	1	200	210
22	200	1	200	210	200	1	200	210
23	201	1	200	211	200	1	200	210
24	204	1	200	214	204	1	200	214
25	207	1	200	217	207	1	200	217
26	211	1	201	221	210	1	200	220
27	214	1	204	224	214	1	204	224
28	217	1	207	227	217	1	207	227
29	221	1	211	231	221	1	211	231
30	224	1	214	234	224	1	214	234
31	227	2	217	237	227	2	217	237
32	230	2	220	240	230	2	220	240
33	234	2	224	244	234	2	224	244
34	237	2	227	247	237	2	227	247
35	240	2	230	250	240	2	230	250
36	244	2	234	254	243	2	233	253
37	247	2	237	257	246	2	236	256
38	250	3	240	260	249	2	239	259
39	253	3	243	263	253	3	243	263
40	257	3	247	267	256	3	246	266
41	260	3	250	270	259	3	249	269
42	263	3	253	273	262	3	252	272
43	266	3	256	276	265	3	255	275
44	269	3	259	279	268	3	258	278
45	272	3	262	282	271	3	261	281
46	275	3	265	285	274	3	264	284

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	278	3	268	288	277	3	267	287
48	281	3	271	291	280	3	270	290
49	284	3	274	294	283	3	273	293
50	287	3	277	297	286	3	276	296
51	289	3	279	299	289	3	279	299
52	293	4	283	300	291	4	281	300
53	295	4	285	300	294	4	284	300
54	298	4	288	300	297	4	287	300
55	300	4	290	300	299	4	289	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-2. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 4

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	210	200	1	200	210
15	200	1	200	210	200	1	200	210
16	200	1	200	210	200	1	200	210
17	200	1	200	210	200	1	200	210
18	200	1	200	210	200	1	200	210
19	200	1	200	210	200	1	200	210
20	200	1	200	210	200	1	200	210

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
21	203	1	200	213	203	1	200	213
22	205	1	200	215	206	1	200	216
23	208	1	200	218	208	1	200	218
24	211	1	201	221	211	1	201	221
25	214	1	204	224	214	1	204	224
26	217	1	207	227	217	1	207	227
27	220	1	210	230	220	1	210	230
28	223	1	213	233	223	1	213	233
29	226	2	216	236	226	2	216	236
30	229	2	219	239	229	2	219	239
31	232	2	222	242	231	2	221	241
32	235	2	225	245	234	2	224	244
33	237	2	227	247	237	2	227	247
34	240	2	230	250	240	2	230	250
35	243	2	233	253	243	2	233	253
36	246	2	236	256	246	2	236	256
37	249	2	239	259	249	2	239	259
38	252	3	242	262	251	3	241	261
39	255	3	245	265	254	3	244	264
40	257	3	247	267	257	3	247	267
41	260	3	250	270	260	3	250	270
42	263	3	253	273	263	3	253	273
43	266	3	256	276	266	3	256	276
44	269	3	259	279	270	3	260	280
45	272	3	262	282	273	3	263	283
46	275	3	265	285	276	3	266	286
47	278	3	268	288	279	3	269	289
48	281	3	271	291	282	3	272	292
49	284	3	274	294	286	3	276	296
50	288	3	278	298	289	3	279	299
51	291	4	281	300	293	4	283	300
52	294	4	284	300	296	4	286	300
53	297	4	287	300	299	4	289	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-3. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 5

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	210	200	1	200	210
15	200	1	200	210	200	1	200	210
16	203	1	200	213	200	1	200	210
17	206	1	200	216	202	1	200	212
18	209	1	200	219	205	1	200	215
19	212	1	202	222	208	1	200	218
20	215	1	205	225	211	1	201	221
21	218	1	208	228	214	1	204	224
22	221	1	211	231	217	1	207	227
23	224	1	214	234	219	1	209	229
24	227	2	217	237	222	1	212	232
25	230	2	220	240	225	2	215	235
26	233	2	223	243	228	2	218	238
27	236	2	226	246	231	2	221	241
28	239	2	229	249	234	2	224	244
29	242	2	232	252	237	2	227	247
30	245	2	235	255	240	2	230	250
31	248	2	238	258	243	2	233	253
32	251	3	241	261	245	2	235	255
33	254	3	244	264	248	2	238	258
34	257	3	247	267	251	3	241	261
35	260	3	250	270	254	3	244	264
36	263	3	253	273	257	3	247	267
37	265	3	255	275	260	3	250	270
38	268	3	258	278	262	3	252	272
39	271	3	261	281	265	3	255	275
40	273	3	263	283	268	3	258	278
41	276	3	266	286	271	3	261	281
42	279	3	269	289	273	3	263	283
43	281	3	271	291	276	3	266	286
44	284	3	274	294	279	3	269	289
45	286	3	276	296	282	3	272	292
46	289	4	279	299	284	3	274	294

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	291	4	281	300	287	3	277	297
48	294	4	284	300	290	4	280	300
49	296	4	286	300	292	4	282	300
50	299	4	289	300	295	4	285	300
51	300	4	290	300	298	4	288	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-4. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 6

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	201	1	200	211	200	1	200	210
15	204	1	200	214	203	1	200	213
16	206	1	200	216	206	1	200	216
17	209	1	200	219	209	1	200	219
18	212	1	202	222	212	1	202	222
19	215	1	205	225	215	1	205	225
20	218	1	208	228	218	1	208	228

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
21	221	1	211	231	221	1	211	231
22	224	1	214	234	224	1	214	234
23	226	2	216	236	226	2	216	236
24	229	2	219	239	229	2	219	239
25	232	2	222	242	232	2	222	242
26	235	2	225	245	235	2	225	245
27	237	2	227	247	238	2	228	248
28	240	2	230	250	241	2	231	251
29	243	2	233	253	244	2	234	254
30	246	2	236	256	247	2	237	257
31	248	2	238	258	249	2	239	259
32	251	3	241	261	253	3	243	263
33	254	3	244	264	256	3	246	266
34	256	3	246	266	259	3	249	269
35	259	3	249	269	261	3	251	271
36	262	3	252	272	264	3	254	274
37	264	3	254	274	267	3	257	277
38	267	3	257	277	270	3	260	280
39	270	3	260	280	273	3	263	283
40	272	3	262	282	276	3	266	286
41	275	3	265	285	279	3	269	289
42	278	3	268	288	282	3	272	292
43	281	3	271	291	284	3	274	294
44	284	3	274	294	287	4	277	297
45	286	3	276	296	290	4	280	300
46	289	4	279	299	293	4	283	300
47	292	4	282	300	296	4	286	300
48	295	4	285	300	298	4	288	300
49	298	4	288	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-5. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 7

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	210	200	1	200	210
15	202	1	200	212	200	1	200	210
16	205	1	200	215	203	1	200	213
17	208	1	200	218	206	1	200	216
18	211	1	201	221	209	1	200	219
19	214	1	204	224	212	1	202	222
20	217	1	207	227	214	1	204	224
21	220	1	210	230	217	1	207	227
22	222	1	212	232	220	1	210	230
23	225	2	215	235	223	1	213	233
24	228	2	218	238	226	2	216	236
25	231	2	221	241	229	2	219	239
26	234	2	224	244	232	2	222	242
27	237	2	227	247	235	2	225	245
28	240	2	230	250	238	2	228	248
29	243	2	233	253	241	2	231	251
30	246	2	236	256	244	2	234	254
31	249	2	239	259	247	2	237	257
32	252	3	242	262	250	3	240	260
33	255	3	245	265	253	3	243	263
34	258	3	248	268	256	3	246	266
35	261	3	251	271	260	3	250	270
36	264	3	254	274	263	3	253	273
37	267	3	257	277	266	3	256	276
38	271	3	261	281	270	3	260	280
39	274	3	264	284	273	3	263	283
40	277	3	267	287	276	3	266	286
41	280	3	270	290	280	3	270	290
42	283	3	273	293	283	3	273	293
43	286	3	276	296	287	3	277	297
44	288	3	278	298	290	4	280	300
45	292	4	282	300	293	4	283	300
46	296	4	286	300	297	4	287	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	299	4	289	300	300	4	290	300
48	300	4	290	300	300	4	290	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-6. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 8

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	203	1	200	213	202	1	200	212
13	206	1	200	216	204	1	200	214
14	208	1	200	218	207	1	200	217
15	211	1	201	221	209	1	200	219
16	213	1	203	223	212	1	202	222
17	216	1	206	226	214	1	204	224
18	218	1	208	228	216	1	206	226
19	221	1	211	231	219	1	209	229
20	223	1	213	233	221	1	211	231

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
21	226	2	216	236	224	1	214	234
22	228	2	219	237	226	2	216	236
23	231	2	222	240	229	2	220	238
24	233	2	224	242	231	2	222	240
25	236	2	227	245	233	2	224	242
26	238	2	229	247	236	2	227	245
27	240	2	231	249	238	2	229	247
28	243	2	234	252	241	2	232	250
29	245	2	236	254	243	2	234	252
30	248	2	239	257	246	2	237	255
31	250	3	241	259	248	2	239	257
32	253	3	244	262	251	3	242	260
33	255	3	246	264	253	3	244	262
34	257	3	248	266	256	3	247	265
35	260	3	251	269	258	3	249	267
36	262	3	253	271	261	3	252	270
37	265	3	256	274	263	3	254	272
38	267	3	258	276	266	3	257	275
39	269	3	260	278	268	3	259	277
40	272	3	263	281	271	3	262	280
41	274	3	265	283	273	3	264	282
42	277	3	268	286	275	3	266	284
43	279	3	269	289	278	3	269	287
44	282	3	272	292	280	3	271	289
45	284	4	274	294	282	3	273	291
46	287	4	277	297	285	4	275	295
47	289	4	279	299	288	4	278	298
48	292	4	282	300	290	4	280	300
49	295	4	285	300	292	4	282	300
50	297	4	287	300	295	4	285	300
51	300	4	290	300	297	4	287	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66					300	4	290	300

Table M-7. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Mathematics Grade 10

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	203	1	200	213	202	1	200	212
8	206	1	200	216	205	1	200	215
9	208	1	200	218	207	1	200	217
10	211	1	201	221	210	1	200	220
11	213	1	203	223	213	1	203	223
12	216	1	206	226	215	1	205	225
13	219	1	210	228	218	1	208	228
14	221	1	212	230	220	1	211	229
15	224	1	215	233	223	1	214	232
16	226	2	217	235	224	1	215	233
17	228	2	219	237	227	2	218	236
18	231	2	223	239	230	2	221	239
19	233	2	225	241	232	2	224	240
20	235	2	227	243	235	2	227	243
21	238	2	230	246	237	2	229	245
22	240	2	232	248	239	2	231	247
23	242	2	234	250	242	2	234	250
24	244	2	236	252	244	2	236	252
25	247	2	239	255	246	2	238	254
26	249	2	241	257	248	2	240	256
27	251	3	243	259	251	3	243	259
28	253	3	245	261	253	3	245	261
29	255	3	247	263	255	3	247	263
30	257	3	250	264	257	3	249	265
31	260	3	253	267	260	3	252	268
32	262	3	255	269	262	3	254	270
33	264	3	257	271	264	3	256	272
34	266	3	259	273	266	3	258	274
35	268	3	261	275	268	3	260	276
36	270	3	263	277	271	3	263	279
37	272	3	265	279	273	3	265	281
38	274	3	266	282	275	3	267	283
39	277	3	269	285	277	3	269	285
40	279	3	271	287	279	3	271	287
41	281	4	273	289	281	4	273	289
42	283	4	275	291	283	4	275	291
43	285	4	277	293	285	4	277	293
44	287	4	279	295	288	4	280	296
45	289	4	281	297	290	4	282	298
46	292	4	284	300	292	4	284	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	294	4	286	300	294	4	286	300
48	296	4	288	300	296	4	288	300
49	298	4	290	300	298	4	290	300
50	300	4	291	300	300	4	292	300
51	300	4	291	300	300	4	291	300
52	300	4	291	300	300	4	291	300
53	300	4	291	300	300	4	291	300
54	300	4	291	300	300	4	291	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300
62	300	4	290	300	300	4	290	300
63	300	4	290	300	300	4	290	300
64	300	4	290	300	300	4	290	300
65	300	4	290	300	300	4	290	300
66	300	4	290	300	300	4	290	300

Table M-8. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 3

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	202	1	200	212	200	1	200	210
9	205	1	200	215	202	1	200	212
10	207	1	200	217	205	1	200	215
11	210	1	200	220	207	1	200	217
12	212	1	202	222	209	1	200	219
13	215	1	205	225	212	1	202	222
14	217	1	208	226	214	1	204	224
15	220	1	211	229	217	1	208	226
16	222	1	213	231	219	1	210	228
17	224	1	215	233	221	1	212	230
18	227	2	218	236	224	1	215	233
19	230	2	221	239	226	2	217	235
20	232	2	223	241	229	2	220	238

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
21	235	2	227	243	231	2	222	240
22	237	2	229	245	234	2	225	243
23	240	2	232	248	236	2	227	245
24	242	2	234	250	239	2	231	247
25	245	2	237	253	241	2	233	249
26	247	2	239	255	244	2	236	252
27	249	2	241	257	247	2	239	255
28	252	3	244	260	249	2	241	257
29	254	3	246	262	252	3	244	260
30	257	3	249	265	254	3	246	262
31	259	3	251	267	257	3	249	265
32	262	3	254	270	259	3	251	267
33	264	3	256	272	262	3	254	270
34	266	3	258	274	264	3	256	272
35	269	3	261	277	267	3	259	275
36	271	3	263	279	269	3	260	278
37	274	3	266	282	272	3	263	281
38	276	3	267	285	274	3	265	283
39	278	3	269	287	277	3	268	286
40	281	3	272	290	279	3	270	288
41	283	3	274	292	282	3	273	291
42	285	3	276	294	284	3	275	293
43	288	4	279	297	286	3	277	295
44	290	4	281	299	289	4	280	298
45	292	4	282	300	291	4	281	300
46	294	4	284	300	293	4	283	300
47	297	4	287	300	296	4	286	300
48	299	4	289	300	298	4	288	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-9. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 4

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	201	1	200	211	200	1	200	210
10	203	1	200	213	200	1	200	210
11	206	1	200	216	202	1	200	212
12	209	1	200	219	204	1	200	214
13	212	1	202	222	207	1	200	217
14	215	1	205	225	209	1	200	219
15	217	1	207	227	211	1	201	221
16	220	1	210	230	214	1	204	224
17	223	1	213	233	216	1	206	226
18	226	2	216	236	219	1	209	229
19	228	2	218	238	222	1	212	232
20	231	2	222	240	224	1	215	233
21	234	2	225	243	227	2	218	236
22	237	2	228	246	229	2	220	238
23	239	2	230	248	232	2	223	241
24	242	2	233	251	234	2	225	243
25	245	2	236	254	237	2	228	246
26	247	2	238	256	239	2	230	248
27	249	2	240	258	242	2	233	251
28	253	3	244	262	245	2	236	254
29	255	3	246	264	247	2	238	256
30	258	3	249	267	249	2	240	258
31	260	3	251	269	253	3	244	262
32	263	3	254	272	255	3	246	264
33	266	3	257	275	258	3	249	267
34	268	3	259	277	261	3	252	270
35	271	3	262	280	263	3	254	272
36	273	3	264	282	266	3	257	275
37	276	3	267	285	269	3	260	278
38	279	3	270	288	272	3	262	282
39	281	3	271	291	274	3	264	284
40	284	3	274	294	277	3	267	287
41	286	3	276	296	280	3	270	290
42	288	3	278	298	283	3	273	293
43	291	4	281	300	285	3	275	295
44	294	4	284	300	288	3	278	298
45	296	4	286	300	291	4	281	300
46	299	4	289	300	294	4	284	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	300	4	290	300	296	4	286	300
48	300	4	290	300	299	4	289	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-10. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 5

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	201	1	200	211	200	1	200	210
11	204	1	200	214	200	1	200	210
12	207	1	200	217	201	1	200	211
13	210	1	200	220	204	1	200	214
14	214	1	204	224	207	1	200	217
15	217	1	207	227	210	1	200	220
16	220	1	210	230	213	1	203	223
17	223	1	213	233	216	1	206	226
18	226	2	216	236	219	1	209	229
19	229	2	219	239	222	1	212	232
20	232	2	222	242	224	1	214	234
21	234	2	224	244	227	2	217	237
22	237	2	227	247	230	2	220	240
23	240	2	230	250	233	2	223	243
24	243	2	233	253	236	2	226	246
25	246	2	236	256	239	2	229	249
26	248	2	238	258	241	2	231	251

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
27	251	3	241	261	244	2	234	254
28	254	3	244	264	247	2	237	257
29	256	3	246	266	249	2	239	259
30	259	3	249	269	253	3	243	263
31	262	3	252	272	255	3	245	265
32	264	3	254	274	258	3	248	268
33	267	3	257	277	261	3	251	271
34	269	3	259	279	264	3	254	274
35	272	3	262	282	266	3	256	276
36	274	3	264	284	269	3	259	279
37	277	3	267	287	272	3	262	282
38	279	3	269	289	274	3	264	284
39	282	3	272	292	277	3	267	287
40	284	3	274	294	280	3	270	290
41	286	3	276	296	282	3	272	292
42	289	4	279	299	285	3	275	295
43	291	4	281	300	288	4	278	298
44	293	4	283	300	290	4	280	300
45	296	4	286	300	293	4	283	300
46	298	4	288	300	295	4	285	300
47	300	4	290	300	298	4	288	300
48	300	4	290	300	300	4	290	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-11. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 6

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	203	1	200	213	201	1	200	211
13	207	1	200	217	205	1	200	215
14	210	1	200	220	208	1	200	218
15	213	1	203	223	212	1	202	222
16	217	1	207	227	215	1	205	225
17	220	1	210	230	218	1	208	228
18	223	1	213	233	222	1	212	232
19	226	2	216	236	224	1	214	234
20	230	2	220	240	228	2	218	238
21	233	2	223	243	231	2	221	241
22	236	2	226	246	234	2	224	244
23	239	2	229	249	237	2	227	247
24	242	2	232	252	240	2	230	250
25	245	2	235	255	243	2	233	253
26	248	2	238	258	246	2	236	256
27	250	3	240	260	249	2	239	259
28	253	3	243	263	252	3	242	262
29	256	3	246	266	255	3	245	265
30	259	3	249	269	258	3	248	268
31	262	3	252	272	261	3	251	271
32	264	3	254	274	264	3	254	274
33	267	3	257	277	266	3	256	276
34	270	3	260	280	269	3	259	279
35	272	3	262	282	272	3	262	282
36	275	3	265	285	275	3	265	285
37	278	3	268	288	277	3	267	287
38	280	3	270	290	280	3	270	290
39	283	3	273	293	283	3	273	293
40	285	3	275	295	286	3	276	296
41	288	3	278	298	288	3	278	298
42	291	4	281	300	291	4	281	300
43	293	4	283	300	293	4	283	300
44	296	4	286	300	296	4	286	300
45	298	4	288	300	299	4	289	300
46	300	4	290	300	300	4	290	300
47	300	4	290	300	300	4	290	300
48	300	4	290	300	300	4	290	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-12. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 7

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	203	1	200	213	201	1	200	211
12	206	1	200	216	204	1	200	214
13	209	1	200	219	206	1	200	216
14	212	1	202	222	209	1	200	219
15	215	1	205	225	212	1	202	222
16	218	1	208	228	214	1	204	224
17	221	1	211	231	217	1	207	227
18	223	1	213	233	220	1	210	230
19	226	2	216	236	222	1	212	232
20	229	2	219	239	224	1	214	234
21	232	2	222	242	227	2	217	237
22	234	2	224	244	230	2	221	239
23	237	2	228	246	233	2	224	242
24	240	2	231	249	235	2	226	244
25	242	2	233	251	238	2	229	247
26	245	2	236	254	241	2	232	250
27	247	2	238	256	243	2	234	252
28	250	3	241	259	246	2	237	255
29	253	3	244	262	248	2	239	257
30	255	3	246	264	251	3	242	260
31	258	3	249	267	253	3	244	262
32	260	3	251	269	256	3	247	265
33	263	3	254	272	259	3	250	268
34	265	3	256	274	261	3	252	270

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
35	268	3	259	277	264	3	255	273
36	270	3	260	280	266	3	257	275
37	273	3	263	283	269	3	259	279
38	275	3	265	285	271	3	261	281
39	278	3	268	288	274	3	264	284
40	280	3	270	290	276	3	266	286
41	283	3	273	293	279	3	269	289
42	285	3	275	295	281	3	271	291
43	287	3	277	297	284	3	274	294
44	290	4	280	300	286	3	276	296
45	292	4	282	300	289	4	279	299
46	295	4	285	300	291	4	281	300
47	297	4	287	300	294	4	284	300
48	299	4	289	300	296	4	286	300
49	300	4	290	300	298	4	288	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-13. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 8

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	202	1	200	212	200	1	200	210
14	206	1	200	216	202	1	200	212

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
15	209	1	200	219	205	1	200	215
16	213	1	203	223	209	1	200	219
17	217	1	207	227	212	1	202	222
18	220	1	210	230	215	1	205	225
19	223	1	213	233	218	1	208	228
20	227	2	217	237	222	1	212	232
21	230	2	220	240	224	1	214	234
22	233	2	223	243	228	2	218	238
23	236	2	226	246	231	2	221	241
24	240	2	230	250	234	2	224	244
25	243	2	233	253	237	2	227	247
26	246	2	236	256	240	2	230	250
27	249	2	239	259	243	2	233	253
28	252	3	242	262	246	2	236	256
29	255	3	245	265	249	2	239	259
30	258	3	248	268	252	3	242	262
31	260	3	250	270	254	3	244	264
32	263	3	253	273	257	3	247	267
33	266	3	256	276	260	3	250	270
34	269	3	259	279	263	3	253	273
35	271	3	261	281	265	3	255	275
36	274	3	264	284	268	3	258	278
37	277	3	267	287	271	3	261	281
38	279	3	269	289	273	3	263	283
39	282	3	272	292	276	3	266	286
40	284	3	274	294	279	3	269	289
41	287	3	277	297	281	3	271	291
42	289	4	279	299	284	3	274	294
43	291	4	281	300	286	3	276	296
44	294	4	284	300	289	4	279	299
45	296	4	286	300	291	4	281	300
46	298	4	288	300	294	4	284	300
47	300	4	290	300	296	4	286	300
48	300	4	290	300	299	4	289	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-14. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Reading Grade 10

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	210	200	1	200	210
15	200	1	200	210	200	1	200	210
16	202	1	200	212	200	1	200	210
17	206	1	200	216	202	1	200	212
18	210	1	200	220	206	1	200	216
19	213	1	203	223	209	1	200	219
20	217	1	207	227	213	1	203	223
21	220	1	210	230	216	1	206	226
22	223	1	213	233	219	1	209	229
23	227	2	217	237	223	1	213	233
24	230	2	220	240	226	2	216	236
25	233	2	223	243	229	2	219	239
26	237	2	227	247	233	2	223	243
27	240	2	230	250	236	2	226	246
28	243	2	233	253	239	2	229	249
29	246	2	236	256	242	2	232	252
30	249	2	239	259	245	2	235	255
31	252	3	242	262	248	2	238	258
32	255	3	245	265	251	3	241	261
33	258	3	248	268	255	3	245	265
34	261	3	251	271	258	3	248	268
35	264	3	254	274	261	3	251	271
36	267	3	257	277	264	3	254	274
37	270	3	260	280	267	3	257	277
38	273	3	263	283	270	3	260	280
39	276	3	266	286	273	3	263	283
40	279	3	269	289	276	3	266	286
41	282	3	272	292	279	3	269	289
42	285	3	275	295	281	3	271	291
43	287	3	277	297	284	3	274	294
44	290	4	280	300	287	3	277	297
45	293	4	283	300	290	4	280	300
46	296	4	286	300	293	4	283	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
47	299	4	289	300	296	4	286	300
48	300	4	290	300	299	4	289	300
49	300	4	290	300	300	4	290	300
50	300	4	290	300	300	4	290	300
51	300	4	290	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300

Table M-15. 2011–12 Montana CRT: Raw to Scaled Score Look-up Table – Science Grade 4

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	209	200	1	200	209
12	200	1	200	209	200	1	200	209
13	202	1	200	211	200	1	200	209
14	205	1	200	214	200	1	200	209
15	208	1	200	216	203	1	200	211
16	210	1	202	218	205	1	200	213
17	213	1	205	221	208	1	200	216
18	215	1	207	223	210	1	202	218
19	217	1	209	225	213	1	205	221
20	220	1	212	228	215	1	207	223
21	222	1	214	230	217	1	209	225
22	224	1	217	231	219	1	211	227
23	226	2	219	233	222	1	214	230
24	228	2	221	235	224	1	217	231
25	230	2	223	237	226	2	219	233
26	232	2	225	239	228	2	221	235

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
27	234	2	227	241	230	2	223	237
28	236	2	229	243	232	2	225	239
29	238	2	231	245	234	2	227	241
30	240	2	233	247	236	2	229	243
31	241	2	234	248	238	2	231	245
32	243	2	236	250	240	2	233	247
33	245	2	238	252	242	2	235	249
34	247	2	240	254	244	2	237	251
35	249	2	242	256	246	2	239	253
36	251	3	244	258	248	2	241	255
37	253	3	246	260	249	2	242	256
38	255	3	248	262	252	3	245	259
39	257	3	250	264	254	3	247	261
40	259	3	252	266	256	3	248	264
41	261	3	253	269	258	3	250	266
42	263	3	255	271	261	3	253	269
43	265	3	257	273	263	3	255	271
44	268	3	260	276	265	3	257	273
45	270	3	262	278	268	3	260	276
46	273	3	265	281	270	3	262	278
47	275	3	266	284	273	3	265	281
48	278	3	269	287	276	3	267	285
49	281	3	272	290	278	3	269	287
50	285	4	276	294	281	3	272	290
51	288	4	278	298	285	4	276	294
52	292	4	282	300	288	4	278	298
53	296	4	286	300	292	4	282	300
54	300	4	290	300	297	4	287	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300

Table M-16. 2011–12 Montana CRT: Scaled Score Percentages – Science Grade 8

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	201	1	200	211
14	204	1	200	214	204	1	200	214
15	207	1	200	216	208	1	200	218
16	210	1	201	219	211	1	202	220
17	212	1	203	221	213	1	204	222
18	215	1	206	224	216	1	207	225
19	218	1	209	227	219	1	210	228
20	220	1	211	229	222	1	213	231
21	223	1	214	232	224	1	215	233
22	225	2	217	233	227	2	218	236
23	227	2	219	235	229	2	220	238
24	230	2	222	238	232	2	223	241
25	232	2	224	240	234	2	226	242
26	234	2	226	242	237	2	229	245
27	237	2	229	245	239	2	231	247
28	239	2	231	247	241	2	233	249
29	241	2	233	249	244	2	236	252
30	243	2	235	251	246	2	238	254
31	246	2	238	254	248	2	240	256
32	248	2	240	256	251	3	243	259
33	249	2	241	257	253	3	245	261
34	252	3	244	260	255	3	247	263
35	254	3	246	262	258	3	250	266
36	257	3	249	265	260	3	252	268
37	259	3	251	267	262	3	254	270
38	261	3	253	269	265	3	257	273
39	263	3	255	271	267	3	258	276
40	266	3	258	274	270	3	261	279
41	268	3	260	276	272	3	263	281
42	270	3	261	279	275	3	266	284
43	273	3	264	282	277	3	268	286
44	275	3	266	284	280	3	271	289
45	278	3	269	287	282	3	273	291
46	281	3	272	290	286	4	277	295
47	284	4	275	293	289	4	279	299
48	287	4	277	297	292	4	282	300
49	290	4	280	300	295	4	285	300
50	293	4	283	300	299	4	289	300
51	297	4	287	300	300	4	290	300
52	300	4	290	300	300	4	290	300
53	300	4	290	300	300	4	290	300

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300

Table M-17. 2011–12 Montana CRT: Scaled Score Percentages – Science Grade 10

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
0	200	1	200	210	200	1	200	210
1	200	1	200	210	200	1	200	210
2	200	1	200	210	200	1	200	210
3	200	1	200	210	200	1	200	210
4	200	1	200	210	200	1	200	210
5	200	1	200	210	200	1	200	210
6	200	1	200	210	200	1	200	210
7	200	1	200	210	200	1	200	210
8	200	1	200	210	200	1	200	210
9	200	1	200	210	200	1	200	210
10	200	1	200	210	200	1	200	210
11	200	1	200	210	200	1	200	210
12	200	1	200	210	200	1	200	210
13	200	1	200	210	200	1	200	210
14	200	1	200	209	200	1	200	209
15	201	1	200	210	201	1	200	210
16	203	1	200	212	204	1	200	213
17	206	1	200	215	207	1	200	216
18	209	1	200	218	209	1	200	218
19	212	1	203	221	212	1	203	221
20	214	1	205	223	214	1	206	222
21	217	1	209	225	217	1	209	225
22	219	1	211	227	219	1	211	227
23	221	1	213	229	221	1	213	229
24	224	1	216	232	224	1	216	232
25	226	2	218	234	226	2	218	234
26	228	2	220	236	228	2	220	236
27	231	2	223	239	230	2	222	238
28	233	2	225	241	233	2	225	241
29	235	2	227	243	235	2	227	243
30	238	2	230	246	237	2	229	245
31	240	2	232	248	239	2	231	247
32	242	2	234	250	241	2	233	249

continued

Raw Score	2011–12				2010–11			
	Scaled Score	Performance Level	Expected Score Range		Scaled Score	Performance Level	Expected Score Range	
			Low	High			Low	High
33	244	2	236	252	244	2	236	252
34	247	2	239	255	246	2	238	254
35	249	2	241	257	248	2	240	256
36	251	3	243	259	250	3	242	258
37	254	3	246	262	253	3	245	261
38	256	3	248	264	255	3	247	263
39	258	3	250	266	257	3	249	265
40	261	3	252	270	260	3	252	268
41	263	3	254	272	262	3	254	270
42	266	3	257	275	265	3	256	274
43	269	3	260	278	267	3	258	276
44	271	4	262	280	270	4	261	279
45	274	4	265	283	273	4	264	282
46	277	4	268	286	275	4	266	284
47	280	4	270	290	278	4	269	287
48	284	4	274	294	282	4	272	292
49	287	4	277	297	285	4	275	295
50	291	4	281	300	288	4	278	298
51	295	4	285	300	292	4	282	300
52	299	4	289	300	296	4	286	300
53	300	4	290	300	300	4	290	300
54	300	4	290	300	300	4	290	300
55	300	4	290	300	300	4	290	300
56	300	4	290	300	300	4	290	300
57	300	4	290	300	300	4	290	300
58	300	4	290	300	300	4	290	300
59	300	4	290	300	300	4	290	300
60	300	4	290	300	300	4	290	300
61	300	4	290	300	300	4	290	300

APPENDIX N—CLASSICAL RELIABILITY

Table N-1. 2011–12 Montana CRT: Subgroup Reliabilities – Mathematics

Grade	Group	Number of Students	Raw score			Alpha	SEM	
			Maximum	Mean	Standard Deviation			
3	Special Education	1,217	66	34.35	13.25	0.93	3.60	
	Title 1	4,473	66	40.69	12.74	0.92	3.50	
	Low Income	5,124	66	40.50	12.27	0.92	3.51	
	American Indian or Alaskan Native	1,427	66	35.91	12.62	0.92	3.58	
	Asian	113	66	46.50	12.13	0.93	3.30	
	Hispanic	410	66	40.62	12.11	0.92	3.53	
	Black or African American	149	66	41.11	12.33	0.92	3.47	
	White, Non-Hispanic	8,463	66	45.69	11.29	0.91	3.36	
	Native Hawaiian/Other Pacific Islander	29	66	44.03	11.94	0.92	3.47	
	Female	5,154	66	43.69	11.87	0.92	3.39	
	Male	5,438	66	44.52	12.17	0.92	3.41	
	Limited English Proficient	377	66	30.98	11.33	0.90	3.66	
	Migrant	28	66	40.93	11.79	0.91	3.47	
	Plan 504	32	66	44.94	13.03	0.93	3.38	
	All Students	10,606	66	44.11	12.03	0.92	3.41	
	4	Special Education	1,158	66	32.34	13.55	0.92	3.75
		Title 1	4,414	66	40.09	13.10	0.92	3.68
Low Income		5,066	66	39.44	12.74	0.92	3.70	
American Indian or Alaskan Native		1,435	66	34.38	12.88	0.91	3.76	
Asian		107	66	47.66	11.71	0.91	3.46	
Hispanic		395	66	41.02	11.81	0.90	3.69	
Black or African American		137	66	39.19	12.76	0.92	3.69	
White, Non-Hispanic		8,414	66	45.15	11.80	0.91	3.55	
Native Hawaiian/Other Pacific Islander		43	66	42.95	11.78	0.90	3.66	
Female		5,150	66	43.37	12.24	0.91	3.60	
Male		5,381	66	43.57	12.82	0.92	3.59	
Limited English Proficient		329	66	28.77	12.24	0.90	3.79	
Migrant		26	66	37.62	13.23	0.92	3.72	
Plan 504		36	66	42.14	14.92	0.94	3.59	
All Students		10,536	66	43.47	12.54	0.92	3.60	
5		Special Education	1,188	66	27.73	12.27	0.91	3.70
		Title 1	4,322	66	36.66	13.05	0.92	3.67
	Low Income	4,895	66	35.93	12.53	0.91	3.69	
	American Indian or Alaskan Native	1,336	66	30.73	12.24	0.91	3.71	
	Asian	109	66	44.61	12.05	0.92	3.49	
	Hispanic	418	66	36.37	12.14	0.91	3.70	
	Black or African American	158	66	35.78	12.52	0.91	3.70	
	White, Non-Hispanic	8,519	66	41.78	12.13	0.91	3.57	
	Native Hawaiian/Other Pacific Islander	40	66	41.73	11.23	0.90	3.57	
	Female	5,210	66	39.83	12.44	0.92	3.61	
	Male	5,371	66	40.37	12.98	0.92	3.60	
	Limited English Proficient	260	66	24.79	10.43	0.88	3.66	
	Migrant	32	66	34.31	11.83	0.90	3.66	
	Plan 504	71	66	40.11	12.13	0.91	3.64	
	All Students	10,592	66	40.10	12.72	0.92	3.61	

continued

Grade	Group	Number of Students	Raw score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
6	Special Education	1,102	66	24.61	10.37	0.87	3.73
	Title 1	3,878	66	34.59	12.87	0.91	3.83
	Low Income	4,567	66	34.34	12.42	0.90	3.84
	American Indian or Alaskan Native	1,315	66	30.25	12.06	0.90	3.83
	Asian	107	66	44.15	14.09	0.93	3.61
	Hispanic	392	66	34.20	12.35	0.90	3.87
	Black or African American	128	66	34.94	13.25	0.92	3.80
	White,Non-Hispanic	8,394	66	40.00	12.34	0.91	3.74
	Native Hawaiian/Other Pacific Islander	31	66	40.26	15.08	0.94	3.66
	Female	4,992	66	38.34	12.45	0.91	3.79
	Male	5,375	66	38.70	13.13	0.92	3.75
	Limited English Proficient	268	66	24.20	10.69	0.88	3.73
	Migrant	38	66	34.82	13.04	0.91	3.87
	Plan 504	71	66	37.48	12.01	0.90	3.85
	All Students	10,375	66	38.52	12.81	0.91	3.77
	7	Special Education	1,079	66	23.80	10.86	0.89
Title 1		3,679	66	33.93	13.07	0.92	3.75
Low Income		4,539	66	33.46	12.39	0.91	3.77
American Indian or Alaskan Native		1,339	66	29.04	12.17	0.91	3.72
Asian		98	66	41.42	12.79	0.92	3.72
Hispanic		392	66	34.38	11.65	0.89	3.79
Black or African American		162	66	34.01	13.82	0.93	3.76
White,Non-Hispanic		8,599	66	39.54	12.47	0.91	3.72
Native Hawaiian/Other Pacific Islander		31	66	39.13	13.02	0.92	3.69
Female		5,121	66	38.53	12.64	0.91	3.76
Male		5,500	66	37.42	13.17	0.92	3.69
Limited English Proficient		261	66	22.64	10.12	0.87	3.65
Migrant		22	66	33.82	12.21	0.90	3.89
Plan 504		102	66	35.48	12.47	0.91	3.74
All Students		10,624	66	37.95	12.93	0.92	3.73
8		Special Education	1,087	65	21.85	10.24	0.88
	Title 1	3,485	65	32.22	13.64	0.92	3.80
	Low Income	4,205	65	32.02	13.13	0.92	3.82
	American Indian or Alaskan Native	1,171	65	27.04	12.36	0.91	3.77
	Asian	94	65	41.48	14.54	0.94	3.65
	Hispanic	394	65	32.32	12.83	0.91	3.83
	Black or African American	117	65	28.96	11.33	0.88	3.84
	White,Non-Hispanic	8,702	65	38.75	13.27	0.92	3.73
	Native Hawaiian/Other Pacific Islander	32	65	38.44	12.18	0.90	3.78
	Female	5,133	65	37.33	13.38	0.92	3.76
	Male	5,378	65	36.92	14.01	0.93	3.74
	Limited English Proficient	234	65	18.96	8.75	0.84	3.51
	Migrant	22	65	31.36	8.98	0.81	3.92
	Plan 504	112	65	35.79	11.98	0.90	3.79
	All Students	10,518	65	37.11	13.71	0.92	3.76
	10	Special Education	839	66	19.70	7.66	0.79
Title 1		2,928	66	27.35	11.38	0.89	3.72
Low Income		3,384	66	26.77	10.78	0.88	3.71

continued

Grade	Group	Number of Students	Raw score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
10	American Indian or Alaskan Native	1,027	66	23.42	9.69	0.86	3.64
	Asian	110	66	37.02	12.24	0.90	3.81
	Hispanic	320	66	27.44	11.29	0.89	3.72
	Black or African American	114	66	25.11	9.28	0.84	3.66
	White, Non-Hispanic	8,528	66	32.30	11.74	0.90	3.76
	Native Hawaiian/Other Pacific Islander	30	66	26.37	11.12	0.89	3.72
	Female	4,899	66	30.81	11.60	0.90	3.76
	Male	5,230	66	31.57	12.12	0.90	3.74
	Limited English Proficient	143	66	17.04	6.21	0.70	3.41
	Migrant	18	66	25.72	10.68	0.89	3.58
	Plan 504	117	66	28.69	10.79	0.88	3.74
	All Students	10,138	66	31.19	11.88	0.90	3.75

Table N-2. 2011–12 Montana CRT: Subgroup Reliabilities – Reading

Grade	Group	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
3	Special Education	1,189	60	30.46	11.38	0.91	3.38
	Title 1	4,683	60	36.23	10.91	0.91	3.29
	Low Income	5,099	60	36.31	10.75	0.91	3.29
	American Indian or Alaskan Native	1,425	60	32.47	10.61	0.90	3.37
	Asian	112	60	42.54	10.59	0.91	3.09
	Hispanic	410	60	37.16	10.90	0.91	3.28
	Black or African American	147	60	37.93	10.67	0.91	3.23
	White, Non-Hispanic	8,438	60	40.97	10.17	0.90	3.14
	Native Hawaiian/Other Pacific Islander	29	60	39.38	9.38	0.88	3.32
	Female	5,143	60	40.65	10.46	0.91	3.17
	Male	5,419	60	38.69	10.81	0.91	3.19
	Limited English Proficient	373	60	27.50	9.48	0.87	3.45
	Migrant	28	60	38.50	11.23	0.92	3.19
	Plan 504	32	60	38.75	10.38	0.90	3.28
	All Students	10,576	60	39.64	10.69	0.91	3.19
4	Special Education	1,147	60	30.00	10.98	0.90	3.41
	Title 1	4,475	60	36.35	10.37	0.90	3.31
	Low Income	5,061	60	35.93	10.31	0.90	3.32
	American Indian or Alaskan Native	1,433	60	31.91	10.53	0.89	3.42
	Asian	107	60	42.42	9.48	0.89	3.08
	Hispanic	392	60	36.99	9.74	0.88	3.32
	Black or African American	136	60	36.49	10.78	0.91	3.29
	White, Non-Hispanic	8,409	60	40.53	9.28	0.88	3.16
	Native Hawaiian/Other Pacific Islander	43	60	38.35	10.10	0.90	3.19
	Female	5,149	60	39.99	9.87	0.90	3.19
	Male	5,372	60	38.40	10.01	0.90	3.21

continued

Grade	Group	Number of Students	Raw Score			Alpha	SEM	
			Maximum	Mean	Standard Deviation			
4	Limited English Proficient	328	60	25.33	9.27	0.86	3.51	
	Migrant	26	60	34.27	9.70	0.89	3.28	
	Plan 504	36	60	36.06	10.59	0.90	3.35	
	All Students	10,526	60	39.18	9.97	0.90	3.21	
5	Special Education	1,173	60	29.32	10.86	0.90	3.43	
	Title 1	4,310	60	37.94	10.89	0.91	3.27	
	Low Income	4,885	60	37.13	10.80	0.91	3.30	
	American Indian or Alaskan Native	1,334	60	32.73	10.97	0.90	3.40	
	Asian	107	60	43.88	9.96	0.91	3.04	
	Hispanic	417	60	38.29	10.32	0.90	3.27	
	Black or African American	157	60	38.41	10.35	0.90	3.29	
	White, Non-Hispanic	8,507	60	42.15	9.90	0.90	3.12	
	Native Hawaiian/Other Pacific Islander	41	60	39.78	10.21	0.90	3.23	
	Female	5,201	60	42.09	10.18	0.90	3.14	
	Male	5,363	60	39.47	10.75	0.91	3.19	
	Limited English Proficient	258	60	26.31	9.61	0.87	3.51	
	Migrant	32	60	37.81	9.96	0.89	3.28	
	Plan 504	71	60	41.45	8.26	0.86	3.15	
	All Students	10,575	60	40.75	10.56	0.91	3.17	
	6	Special Education	1,098	60	28.50	10.28	0.88	3.49
		Title 1	3,735	60	37.83	11.03	0.91	3.31
		Low Income	4,557	60	37.59	10.75	0.90	3.32
		American Indian or Alaskan Native	1,314	60	33.65	10.95	0.90	3.42
Asian		107	60	43.65	10.17	0.91	3.07	
Hispanic		390	60	37.85	10.63	0.90	3.33	
Black or African American		128	60	38.30	11.56	0.92	3.30	
White, Non-Hispanic		8,391	60	42.44	9.75	0.90	3.13	
Native Hawaiian/Other Pacific Islander		31	60	43.58	9.04	0.89	3.04	
Female		4,986	60	42.75	9.93	0.90	3.13	
Male		5,375	60	39.59	10.62	0.91	3.21	
Limited English Proficient		267	60	26.25	8.88	0.84	3.56	
Migrant		38	60	38.32	11.68	0.92	3.37	
Plan 504		71	60	40.13	10.37	0.90	3.28	
All Students		10,369	60	41.11	10.42	0.91	3.19	
7		Special Education	1,079	60	30.03	10.72	0.90	3.47
		Title 1	3,493	60	39.06	10.96	0.91	3.27
		Low Income	4,539	60	38.55	10.61	0.90	3.30
		American Indian or Alaskan Native	1,341	60	34.84	11.10	0.91	3.41
	Asian	98	60	43.86	8.95	0.88	3.08	
	Hispanic	391	60	39.68	9.43	0.88	3.28	
	Black or African American	162	60	38.92	11.37	0.92	3.26	
	White, Non-Hispanic	8,599	60	43.22	9.49	0.89	3.11	
	Native Hawaiian/Other Pacific Islander	31	60	42.13	9.64	0.89	3.18	
	Female	5,117	60	43.79	9.39	0.89	3.09	
	Male	5,505	60	40.27	10.50	0.91	3.19	

continued

Grade	Group	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
7	Limited English Proficient	260	60	27.17	9.65	0.87	3.54
	Migrant	22	60	36.32	11.71	0.92	3.32
	Plan 504	102	60	40.31	9.19	0.88	3.20
	All Students	10,625	60	41.96	10.13	0.90	3.16
8	Special Education	1,104	60	27.92	9.91	0.87	3.50
	Title 1	3,304	60	37.72	11.39	0.91	3.36
	Low Income	4,218	60	37.38	10.95	0.91	3.37
	American Indian or Alaskan Native	1,178	60	33.10	11.33	0.91	3.48
	Asian	94	60	42.99	11.10	0.92	3.13
	Hispanic	395	60	38.92	9.70	0.88	3.36
	Black or African American	117	60	37.65	10.43	0.89	3.39
	White, Non-Hispanic	8,715	60	42.50	9.86	0.90	3.17
	Native Hawaiian/Other Pacific Islander	32	60	42.56	9.55	0.89	3.14
	Female	5,142	60	42.72	9.88	0.90	3.18
	Male	5,390	60	39.87	10.85	0.91	3.24
	Limited English Proficient	237	60	23.92	8.86	0.84	3.53
	Migrant	22	60	38.09	8.66	0.85	3.32
	Plan 504	115	60	40.77	8.67	0.85	3.32
	All Students	10,539	60	41.26	10.49	0.91	3.23
	10	Special Education	854	60	28.58	9.84	0.87
Title 1		2,741	60	37.88	10.83	0.90	3.40
Low Income		3,399	60	37.55	10.57	0.90	3.42
American Indian or Alaskan Native		1,034	60	34.52	10.68	0.89	3.51
Asian		110	60	44.62	10.68	0.91	3.12
Hispanic		324	60	38.35	10.31	0.89	3.38
Black or African American		114	60	37.82	10.48	0.90	3.39
White, Non-Hispanic		8,543	60	41.81	9.74	0.89	3.26
Native Hawaiian/Other Pacific Islander		29	60	38.86	9.29	0.87	3.34
Female		4,908	60	42.41	9.56	0.88	3.25
Male		5,246	60	39.56	10.46	0.90	3.32
Limited English Proficient		147	60	24.63	9.79	0.87	3.56
Migrant		18	60	38.67	10.47	0.89	3.50
Plan 504		117	60	39.65	9.07	0.86	3.39
All Students		10,163	60	40.92	10.15	0.89	3.30

Table N-3. 2011–12 Montana CRT: Subgroup Reliabilities – Science

Grade	Group	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
4	Special Education	1,165	61	33.25	10.25	0.87	3.65
	Title 1	3	61				
	Low Income	5,067	61	36.34	9.68	0.86	3.60
	American Indian or Alaskan Native	1,436	61	32.05	9.85	0.86	3.68
	Asian	107	61	41.90	8.76	0.84	3.47
	Hispanic	392	61	36.73	8.85	0.84	3.59
	Black or African American	136	61	36.23	9.80	0.86	3.61

continued

Grade	Group	Number of Students	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
4	White,Non-Hispanic	8,415	61	40.81	8.78	0.85	3.44
	Native Hawaiian/Other Pacific Islander	43	61	38.09	9.88	0.87	3.54
	Female	5,150	61	39.06	9.35	0.86	3.51
	Male	5,380	61	39.73	9.56	0.87	3.47
	Limited English Proficient	329	61	27.00	9.00	0.83	3.71
	Migrant	26	61	37.85	8.40	0.82	3.58
	Plan 504	35	61	38.11	11.12	0.90	3.47
	All Students	10,536	61	39.40	9.47	0.86	3.49
8	Special Education	1,112	61	27.33	9.43	0.85	3.62
	Title 1	26	61	32.65	7.99	0.79	3.62
	Low Income	4,214	61	33.62	10.16	0.87	3.61
	American Indian or Alaskan Native	1,175	61	29.15	9.96	0.87	3.63
	Asian	94	61	39.06	10.41	0.89	3.48
	Hispanic	394	61	33.94	9.76	0.86	3.63
	Black or African American	117	61	33.20	9.29	0.85	3.62
	White,Non-Hispanic	8,711	61	38.64	9.54	0.87	3.50
	Native Hawaiian/Other Pacific Islander	32	61	37.19	10.55	0.89	3.50
	Female	5,139	61	37.14	9.86	0.87	3.54
	Male	5,385	61	37.54	10.30	0.88	3.51
	Limited English Proficient	235	61	22.06	7.56	0.77	3.62
	Migrant	22	61	35.18	9.57	0.86	3.61
	Plan 504	115	61	37.66	8.82	0.84	3.57
	All Students	10,531	61	37.34	10.09	0.88	3.53
	10	Special Education	867	61	22.96	9.38	0.87
Title 1		81	61	28.57	7.68	0.79	3.56
Low Income		3,393	61	30.10	10.70	0.90	3.46
American Indian or Alaskan Native		1,024	61	26.40	9.92	0.88	3.47
Asian		110	61	38.08	11.18	0.91	3.30
Hispanic		325	61	30.84	10.97	0.90	3.47
Black or African American		114	61	29.95	10.35	0.89	3.49
White,Non-Hispanic		8,543	61	34.95	10.71	0.90	3.40
Native Hawaiian/Other Pacific Islander		30	61	31.30	10.31	0.89	3.44
Female		4,906	61	33.33	10.47	0.89	3.45
Male		5,240	61	34.48	11.41	0.91	3.38
Limited English Proficient		144	61	18.52	7.14	0.78	3.37
Migrant		18	61	31.00	11.15	0.90	3.59
Plan 504		117	61	32.00	10.12	0.88	3.46
All Students		10,155	61	33.91	10.99	0.90	3.41

Table N-4. 2011–12 Montana CRT: Reliabilities by Reporting Category – Mathematics

Grade	Item Reporting Category	Number of Items	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
3	2	19	22	14.73	4.44	0.81	1.92
	3	8	8	4.88	1.88	0.64	1.13
	4	7	10	5.55	2.38	0.53	1.64
	5	10	10	7.43	1.91	0.63	1.17
	6	8	8	5.63	1.87	0.64	1.12
	7	8	8	5.89	1.85	0.65	1.09
	4	2	19	22	14.04	4.57	0.78
3		8	8	5.35	1.98	0.65	1.18
4		10	10	7.21	1.84	0.54	1.25
5		7	10	6.48	2.33	0.53	1.59
6		8	8	5.37	1.98	0.64	1.18
7		8	8	5.01	2.17	0.71	1.17
5		2	18	21	12.05	4.90	0.82
	3	8	8	5.17	1.92	0.63	1.18
	4	11	11	7.60	2.32	0.64	1.39
	5	8	8	4.72	1.82	0.56	1.21
	6	7	10	5.96	2.29	0.58	1.48
	7	8	8	4.59	1.85	0.53	1.27
	6	2	17	20	10.98	4.86	0.80
3		6	9	5.04	2.53	0.59	1.62
4		11	11	6.41	2.13	0.54	1.44
5		8	8	4.16	1.75	0.54	1.18
6		10	10	6.54	2.14	0.61	1.33
7		8	8	5.38	1.87	0.59	1.19
7		2	15	18	9.66	4.25	0.77
	3	8	8	4.64	2.14	0.68	1.21
	4	12	12	6.99	2.72	0.69	1.52
	5	8	8	3.98	1.86	0.58	1.21
	6	9	12	6.77	2.70	0.55	1.80
	7	8	8	5.92	1.75	0.62	1.07
	8	2	18	18	9.68	4.15	0.81
3		8	8	4.98	2.38	0.77	1.13
4		9	12	7.89	2.71	0.60	1.72
5		8	8	4.45	1.99	0.61	1.24
6		11	11	5.50	2.49	0.64	1.50
7		5	8	4.61	2.39	0.52	1.66
10		2	13	13	5.66	2.99	0.72
	3	8	11	5.15	2.74	0.58	1.77
	4	13	13	7.10	2.73	0.63	1.65
	5	8	8	3.87	1.83	0.52	1.27
	6	10	13	5.64	2.51	0.59	1.60
	7	8	8	3.76	1.73	0.52	1.20

* Please note: 2 – Numbers and Operations; 3 – Algebra; 4 – Geometry; 5 – Measurement; 6 – Data Analysis, Statistics, and Probability; 7 – Patterns, Relations, and Functions.

Table N-5. 2011–12 Montana CRT: Reliabilities by Reporting Category – Reading

Grade	Item Reporting Category	Number of Items	Raw Score			Alpha	SEM
			Maximum	Mean	Standard Deviation		
3	1	19	22	14.43	4.17	0.79	1.93
	2	16	16	11.18	3.29	0.76	1.61
	4	10	13	8.11	2.64	0.67	1.51
	5	9	9	5.92	1.92	0.58	1.24
4	1	16	19	12.00	3.53	0.75	1.78
	2	18	18	12.91	3.17	0.72	1.69
	4	11	11	7.19	2.21	0.59	1.42
	5	9	12	7.07	2.46	0.63	1.50
5	1	17	20	13.67	3.62	0.74	1.84
	2	18	21	13.52	4.19	0.79	1.91
	4	9	9	6.54	1.88	0.60	1.19
	5	10	10	7.02	2.16	0.65	1.27
6	1	15	21	13.13	3.87	0.74	1.96
	2	19	19	13.27	3.73	0.77	1.78
	4	9	9	6.55	1.88	0.59	1.20
	5	11	11	8.15	2.29	0.68	1.29
7	1	16	19	13.10	3.44	0.73	1.78
	2	18	18	12.42	3.65	0.77	1.76
	4	9	9	7.17	1.79	0.64	1.08
	5	11	14	9.27	2.63	0.63	1.60
8	1	15	21	13.28	4.25	0.78	1.99
	2	16	16	11.08	3.06	0.70	1.67
	4	10	10	7.35	1.95	0.60	1.24
	5	13	13	9.55	2.58	0.69	1.43
10	1	11	14	9.60	2.75	0.67	1.58
	2	18	21	14.10	3.77	0.72	1.98
	4	12	12	8.07	2.37	0.60	1.50
	5	13	13	9.15	2.68	0.69	1.50

* Please note:

- 1 – Students construct meaning as they comprehend, interpret, and respond to what they read;
- 2 – Students apply a range of skills and strategies to read;
- 4 – Students select, read, and respond to print and non-print material for a variety of purposes;
- 5 – Students gather, analyze, synthesize, and evaluate information from a variety of sources, and communicate their findings in ways appropriate for their purposes and audiences.

Table N-6. 2011–12 Montana CRT: Reliabilities by Reporting Category – Science

<i>Grade</i>	<i>Item Reporting Category</i>	<i>Number of Items</i>	<i>Raw Score</i>			<i>Alpha</i>	<i>SEM</i>
			<i>Maximum</i>	<i>Mean</i>	<i>Standard Deviation</i>		
4	1	14	14	9.09	2.74	0.67	1.58
	2	14	14	10.39	2.47	0.64	1.49
	3	11	14	9.09	2.88	0.54	1.95
	4	11	14	7.43	2.33	0.50	1.64
	5	2	2	1.26	0.70	0.12	0.66
	6	3	3	2.13	0.91	0.39	0.71
8	1	11	14	8.50	3.06	0.67	1.77
	2	14	14	9.18	2.44	0.59	1.57
	3	11	14	8.63	2.87	0.62	1.77
	4	14	14	7.60	2.53	0.56	1.67
	5	3	3	2.03	0.94	0.39	0.73
	6	2	2	1.40	0.68	0.27	0.58
10	1	14	14	8.18	2.98	0.70	1.62
	2	11	14	6.75	2.90	0.65	1.72
	3	14	14	7.87	3.00	0.69	1.68
	4	11	14	7.83	2.88	0.73	1.50
	5	3	3	1.82	0.89	0.26	0.76
	6	2	2	1.46	0.69	0.35	0.56

* Please note: 1 – Science Investigations; 2 – Physical Science; 3 – Life Science; 4 – Earth/Space Science; 5 – Impact on Society; 6 – Historical Development.

APPENDIX O—INTERRATER AGREEMENT

**Table O-1. 2011–12 Montana CRT: Item level Interrater Consistency Statistics
by Subject and Grade**

Subject	Grade	Item	Number of		Percent		Correlation	Percent of Third Scores	
			Score Categories	Responses Scored Twice	Exact	Adjacent			
Mathematics	3	77039	2	211	99.05	0.95	0.97	0.00	
		139049	2	219	99.09	0.91	0.98	0.00	
		43261	5	223	86.10	13.45	0.91	0.45	
		173708	2	213	99.53	0.47	0.99	0.00	
		138908	5	224	89.73	7.59	0.95	2.68	
	4	173321	2	217	94.93	5.07	0.88	0.00	
		61779	2	212	97.64	2.36	0.93	0.00	
		76921	5	217	86.64	12.44	0.96	0.92	
		43199	2	211	97.63	2.37	0.95	0.00	
		77065	5	214	84.58	14.02	0.95	1.40	
	5	140971	2	218	99.54	0.46	0.99	0.00	
		77294	2	219	99.54	0.46	0.99	0.00	
		77278	5	211	92.42	7.11	0.97	0.47	
		140970	2	212	99.06	0.94	0.98	0.00	
		146613	5	228	82.46	17.11	0.94	0.44	
	6	43904	2	218	99.08	0.92	0.98	0.00	
		174613	2	213	98.59	1.41	0.97	0.00	
		174610	2	211	99.05	0.95	0.98	0.00	
		174615	5	206	82.04	16.99	0.95	0.97	
		146968	5	215	91.63	7.44	0.97	0.93	
	7	86339	2	212	99.06	0.94	0.98	0.00	
		86350	2	217	99.08	0.92	0.98	0.00	
		43799	2	220	97.27	2.73	0.93	0.00	
		86658	5	211	88.15	11.85	0.97	0.00	
		43756	5	217	80.18	15.21	0.91	4.15	
	8	87841	2	219	98.17	1.83	0.96	0.00	
		175672	2	213	100.00	0.00	1.00	0.00	
		175810	2	215	98.14	1.86	0.96	0.00	
		248854	5	191	79.58	19.90	0.94	0.52	
		63305	5	226	75.66	19.47	0.91	4.87	
	10	145015	2	204	99.51	0.49	0.99	0.00	
		144888	2	203	100.00	0.00	1.00	0.00	
		77632	2	206	100.00	0.00	1.00	0.00	
		77651	5	186	78.49	16.13	0.90	5.38	
		144973	5	217	82.03	16.13	0.89	1.84	
	Reading	3	42913	5	218	69.72	30.28	0.84	0.00
			92721	5	228	60.96	35.53	0.75	3.07
		4	178298	5	222	63.96	34.23	0.76	1.35
			178418	5	219	63.01	34.70	0.70	2.28
		5	176371	5	224	59.82	37.50	0.74	2.23
			176438	5	236	66.10	32.20	0.80	0.85
		6	177052	5	217	53.92	38.71	0.69	6.45
			177137	5	213	62.44	36.62	0.81	0.47
		7	148742	5	218	60.09	38.53	0.75	1.38
			176250	5	227	59.47	38.33	0.77	2.20

Subject	Grade	Item	Number of		Percent		Correlation	Percent of Third Scores
			Score Categories	Responses Scored Twice	Exact	Adjacent		
continued								
Reading	8	177159	5	221	65.16	34.39	0.82	0.45
		177073	5	217	65.44	33.64	0.85	0.92
	10	177242	5	206	60.68	33.98	0.77	5.34
		177218	5	209	57.89	37.80	0.76	4.31
Science	4	56126	5	213	58.69	32.39	0.79	8.92
		75427	5	211	73.93	22.75	0.80	2.84
	8	121233	5	218	72.02	27.06	0.89	0.92
		89539	5	224	59.82	33.93	0.82	6.25
	10	75882	5	201	74.63	23.88	0.80	1.49
		158450	5	213	63.85	32.39	0.76	3.76

APPENDIX P—DECISION ACCURACY AND CONSISTENCY RESULTS

Table P-1. 2011–12 Montana CRT: Summary of Decision Accuracy (and Consistency) Results by Subject and Grade—Overall and Conditional on Performance Level

Subject	Grade	Overall	Kappa	Conditional on Level			
				Novice	Nearing Proficiency	Proficient	Advanced
Mathematics	3	0.80 (0.73)	0.61	0.84 (0.77)	0.57 (0.45)	0.79 (0.72)	0.90 (0.82)
	4	0.80 (0.72)	0.61	0.83 (0.76)	0.63 (0.52)	0.76 (0.68)	0.90 (0.83)
	5	0.80 (0.73)	0.61	0.80 (0.71)	0.61 (0.50)	0.77 (0.70)	0.91 (0.85)
	6	0.78 (0.71)	0.58	0.78 (0.69)	0.63 (0.52)	0.76 (0.68)	0.90 (0.83)
	7	0.79 (0.72)	0.60	0.82 (0.74)	0.65 (0.54)	0.75 (0.68)	0.90 (0.83)
	8	0.79 (0.71)	0.60	0.78 (0.70)	0.66 (0.56)	0.75 (0.67)	0.91 (0.85)
	10	0.78 (0.70)	0.57	0.78 (0.67)	0.72 (0.63)	0.78 (0.71)	0.87 (0.77)
Reading	3	0.84 (0.78)	0.64	0.73 (0.59)	0.71 (0.60)	0.80 (0.74)	0.92 (0.87)
	4	0.84 (0.77)	0.63	0.77 (0.63)	0.71 (0.61)	0.81 (0.75)	0.90 (0.85)
	5	0.86 (0.80)	0.66	0.75 (0.61)	0.68 (0.56)	0.80 (0.74)	0.93 (0.89)
	6	0.86 (0.80)	0.65	0.77 (0.64)	0.64 (0.52)	0.80 (0.74)	0.93 (0.89)
	7	0.85 (0.79)	0.63	0.74 (0.57)	0.66 (0.53)	0.81 (0.76)	0.92 (0.86)
	8	0.86 (0.80)	0.65	0.78 (0.66)	0.64 (0.52)	0.78 (0.72)	0.93 (0.90)
	10	0.81 (0.74)	0.59	0.76 (0.63)	0.61 (0.49)	0.76 (0.70)	0.91 (0.85)
Science	4	0.78 (0.69)	0.51	0.75 (0.60)	0.74 (0.66)	0.80 (0.75)	0.78 (0.60)
	8	0.78 (0.69)	0.54	0.77 (0.64)	0.74 (0.65)	0.78 (0.72)	0.83 (0.71)
	10	0.76 (0.67)	0.56	0.83 (0.76)	0.73 (0.64)	0.64 (0.54)	0.87 (0.77)

**Table P-2. 2011–12 Montana CRT: Summary of Decision Accuracy (and Consistency) Results
by Subject and Grade—Conditional on Cutpoint**

Subject	Grade	Novice / Nearing Proficiency			Nearing Proficiency / Proficient			Proficient / Advanced		
		Accuracy (Consistency)	False		Accuracy (Consistency)	False		Accuracy (Consistency)	False	
			Positive	Negative		Positive	Negative		Positive	Negative
Mathematics	3	0.95 (0.93)	0.02	0.02	0.93 (0.90)	0.04	0.03	0.91 (0.88)	0.05	0.03
	4	0.95 (0.93)	0.02	0.02	0.93 (0.90)	0.04	0.03	0.91 (0.88)	0.05	0.03
	5	0.95 (0.94)	0.02	0.02	0.93 (0.90)	0.04	0.03	0.92 (0.88)	0.05	0.03
	6	0.95 (0.93)	0.03	0.03	0.92 (0.89)	0.04	0.04	0.92 (0.88)	0.05	0.03
	7	0.95 (0.93)	0.02	0.02	0.92 (0.89)	0.04	0.04	0.92 (0.88)	0.05	0.03
	8	0.94 (0.92)	0.03	0.03	0.92 (0.89)	0.04	0.03	0.92 (0.89)	0.05	0.03
	10	0.96 (0.94)	0.02	0.02	0.91 (0.87)	0.05	0.04	0.92 (0.89)	0.05	0.03
Reading	3	0.98 (0.98)	0.01	0.01	0.95 (0.93)	0.02	0.02	0.91 (0.87)	0.05	0.04
	4	0.99 (0.98)	0.01	0.01	0.95 (0.93)	0.02	0.02	0.90 (0.86)	0.06	0.04
	5	0.99 (0.98)	0.01	0.01	0.96 (0.94)	0.02	0.02	0.91 (0.88)	0.05	0.04
	6	0.99 (0.98)	0.01	0.01	0.96 (0.95)	0.02	0.02	0.91 (0.88)	0.05	0.04
	7	0.99 (0.98)	0.00	0.01	0.96 (0.94)	0.02	0.02	0.90 (0.86)	0.06	0.04
	8	0.98 (0.98)	0.01	0.01	0.96 (0.94)	0.02	0.02	0.91 (0.88)	0.05	0.04
	10	0.98 (0.97)	0.01	0.01	0.94 (0.92)	0.03	0.03	0.89 (0.86)	0.06	0.04
Science	4	0.97 (0.96)	0.01	0.02	0.90 (0.86)	0.05	0.05	0.90 (0.87)	0.07	0.03
	8	0.96 (0.95)	0.02	0.02	0.91 (0.87)	0.05	0.04	0.91 (0.87)	0.06	0.03
	10	0.93 (0.90)	0.04	0.04	0.90 (0.87)	0.06	0.04	0.92 (0.89)	0.05	0.03

APPENDIX Q—SAMPLE REPORTS

MontCAS CRT

School: Demonstration School 1
System: Demonstration District A
Grade: 03
Spring 2012

Mathematics

School Summary Report

Confidential

I. Distribution of Scores

Perf. Level	Scores	School			System			State		
		N	% of Students	% of Students in Cat.	N	% of Students	% of Students in Cat.	N	% of Students	% of Students in Cat.
Advanced	299–300	5	28	44	6	15	31	2,298	22	31
	297–298	0	0		0	0		364	3	
	294–296	1	6		3	8		318	3	
	292–293	2	11		3	8		350	3	
	290–291	0	0		0	0		0	0	
Proficient	282–289	0	0	33	3	8	41	1,090	10	41
	274–281	1	6		2	5		989	9	
	266–273	1	6		5	13		922	9	
	258–265	1	6		1	3		592	6	
	250–257	3	17		5	13		759	7	
Nearing Proficiency	245–249	0	0	11	0	0	10	210	2	12
	240–244	2	11		3	8		431	4	
	235–239	0	0		0	0		168	2	
	230–234	0	0		1	3		354	3	
	225–229	0	0		0	0		149	1	
Novice	220–224	0	0	11	1	3	18	270	3	15
	215–219	0	0		0	0		134	1	
	210–214	1	6		1	3		242	2	
	205–209	0	0		0	0		117	1	
	200–204	1	6		5	13		850	8	

Results are suppressed when less than ten (10) students were assessed.

II. Subtest Results

Mathematics		Possible Points	Average Points Earned		
			School	System	State
Total Points		66	47	43	44
Standards	1. Problem Solving	This standard is assessed within the frameworks of standards 2-7.			
	2. Numbers and Operations	22	16	15	15
	3. Algebra	8	5	5	5
	4. Geometry	10	6	5	6
	5. Measurement	10	8	7	7
	6. Data Analysis, Statistics, and Probability	8	6	6	6
	7. Patterns, Relations, and Functions	8	7	6	6

CRT Performance Level Descriptors

Advanced (290–300)

This level denotes superior performance.

Proficient (250–289)

This level denotes solid academic performance for each benchmark. Students reaching this level have demonstrated competency over challenging subject matter, including subject-matter knowledge, application of such knowledge to real-world situations, and analytical skills appropriate to the subject matter.

Nearing Proficiency (225–249)

This level denotes that the student has partial mastery or prerequisite knowledge and skills fundamental for proficient work at each benchmark.

Novice (200–224)

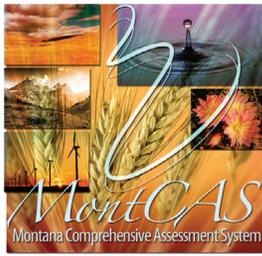
This level denotes that the student is beginning to attain the prerequisite knowledge and skills that are fundamental for work at each benchmark.

III. Results for Subgroups of Students

Reporting Category	School					System					State				
	Number	% in N	% in NP	% in P	% in A	Number	% in N	% in NP	% in P	% in A	Number	% in N	% in NP	% in P	% in A
All Students	18	11	11	33	44	39	18	10	41	31	10,607	15	12	41	31
Gender															
Male	9	*	*	*	*	23	17	17	35	30	5,438	15	12	40	33
Female	8	*	*	*	*	15	20	0	53	27	5,155	16	13	42	30
Ethnicity															
American Indian or Alaskan Native	1	*	*	*	*	7	*	*	*	*	1,427	37	17	33	13
Asian	1	*	*	*	*	1	*	*	*	*	113	12	11	35	42
Hispanic	2	*	*	*	*	2	*	*	*	*	411	22	16	41	21
Black or African American	1	*	*	*	*	3	*	*	*	*	149	18	20	40	22
Native Hawaiian or Other Pacific Islander	1	*	*	*	*	1	*	*	*	*	29	14	7	52	28
White	11	0	9	45	45	23	13	4	48	35	8,463	11	11	42	35
Special Education	4	*	*	*	*	9	*	*	*	*	1,218	43	16	30	12
Students with a 504 Plan	0	*	*	*	*	1	*	*	*	*	32	19	9	41	31
Title I (optional)	8	*	*	*	*	18	22	11	33	33	4,473	24	15	38	23
Tested with Standard Accommodation	2	*	*	*	*	7	*	*	*	*	1,697	37	19	33	11
Tested with Non-Standard Accommodation	1	*	*	*	*	1	*	*	*	*	8	*	*	*	*
Alternate Assessment	If a student in your system or school took the CRT-Alternate, please refer to Table III on the CRT-Alternate System or School Summary Report														
Migrant	0	*	*	*	*	1	*	*	*	*	28	21	21	36	21
Gifted/Talented	0	*	*	*	*	1	*	*	*	*	407	0	0	13	87
LEP/ELL	0	*	*	*	*	2	*	*	*	*	377	54	19	23	5
Former LEP Student	0	*	*	*	*	1	*	*	*	*	135	24	16	47	14
LEP Student Enrolled for First Time in a U.S. School	1	Performance levels are not reported for 1st year LEP students													
Free/Reduced Lunch	5	*	*	*	*	17	24	12	41	24	5,124	23	15	41	21

*Less than ten (10) students were assessed

APPENDIX R—SAMPLE INTERACTIVE REPORTS



Performance Level Summary

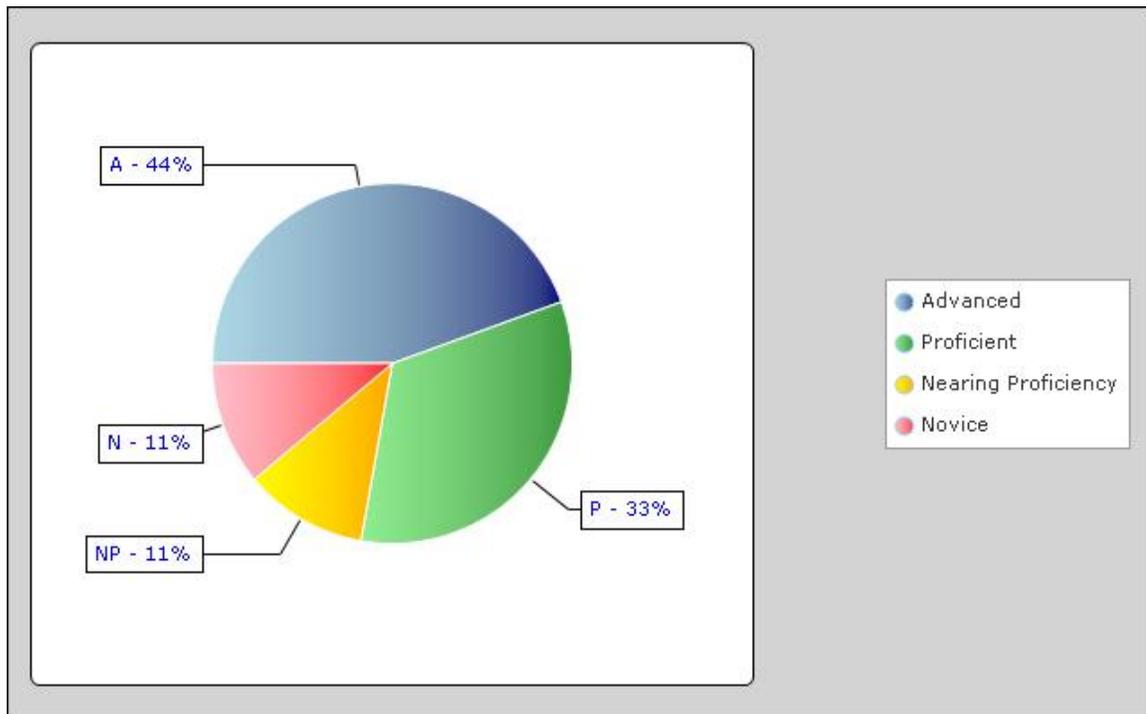
System: Demonstration District A

School: Demonstration School 1

Grade: 03

Date: 8/15/2012 11:13:55 AM

Mathematics



Performance Level	Count	Percentage %*
Advanced	8	44
Proficient	6	33
Nearing Proficiency	2	11
Novice	2	11

*Percentages may not total exactly 100% due to applied rounding.

