

**New York State Examination in Grade 4
Elementary-Level Science**

**2012 Field Test Analysis,
Equating Procedure, and Scaling of
Operational Test Forms**

Technical Report



Prepared for the New York State Education Department
by Pearson

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Section I: Introduction

PURPOSE

The purpose of this report is to document the psychometric work on the New York State Examination in Grade 4 Elementary-Level Science in 2012. Specifically, contained within this report are procedures for, and results of, field test analysis, equating, and scaling of operational test forms that were conducted by Pearson.

Section II: Field Test Analysis

In May 2012, field testing was conducted for the New York State Examination in Grade 4 Elementary-Level Science to better understand the psychometric quality of the items. The results of this testing are used to help determine which items will be selected for use on operational tests.

Target student samples for participation in this testing were selected such that each would represent the student population expected to take the operational test. The Need/Resource Capacity Categories were used as variables in the sampling plan. See Table 1 for the seven Need/Resource Capacity Categories and their definitions.

Table 1. Need/Resource Capacity Category Definitions

| Need/Resource Capacity (N/RC) Category | Definition |
|---|---|
| High N/RC Districts: New York City | New York City |
| Large Cities | Buffalo, Rochester, Syracuse, Yonkers |
| Urban-Suburban | Districts at or above the 70 th percentile on the index with at least 100 students per square mile or enrollment greater than 2500 |
| Rural | All districts at or above the 70 th percentile with fewer than 50 students per square mile or enrollment of fewer than 2500 |
| Average N/RC Districts | All districts between the 20 th and 70 th percentiles on the index |
| Low N/RC Districts | All districts below the 20 th percentile on the index |
| Charter Schools | Each charter school is a district |

The data collected from field testing were scored by the New York State Education Department. Both classical-test and item response theory analyses were conducted using the data to evaluate the quality of the test items.

DATA CLEANUP

Field test forms contained multiple-choice and constructed-response item types. Response data were contained in one file that contained 15765 student records. After the exclusion rules¹ were applied, the resulting field test data file contained 15690 records.

Multiple-choice response data were then compared to the answer key. All item responses not matching the answer key were assigned scores of 0. The responses matching the answer key were assigned scores of 1. With respect to the constructed-response items, scores from 0 to the maximum point value available for each tested item were kept, while out-of-range values were assigned scores of 0. For Item Response Theory (IRT) calibrations, blanks (i.e., missing data) were assigned scores of 0 to be consistent with how operational test items are scored.

The final data file contained both the scored and unscored student responses. Unscored data were used to calculate the percentage of students who selected the various answer choices for the multiple-choice items or the percentage of students who received the range of possible raw score points for the constructed-response items. Thus, the frequency of students leaving items blank could be calculated. The scored data were used for all other analyses.

CLASSICAL ANALYSIS

Classical Test Theory is based on the assumption that an observed test score x is composed of both true score t and error score e . This assumption is expressed as follows:

$$x = t + e$$

In other words, error is associated with measuring a student's true score. For example, the choice of test items or administration conditions might influence student responses, making a student's observed score higher or lower than the student's true score. The error is considered random. After repeated administrations, the mean of the error scores is virtually zero (0). Thus, a student's observed score is expected to equal his or her true score. This expectation is expressed as follows:

$$E(x) = t$$

Using a Classical Test Theory framework, field test data can be analyzed to provide information about the quality of test items. Item difficulties, point-biserial correlations,

¹ Exclusion rules define which test records are to be considered invalid. Such records include those without both an MC and a CR component, records with invalid or out-of-range form numbers, records without any responses, and duplicate records. These records were dropped and not included in any analyses.

reliability estimates, and various statistics related to rater agreement have been calculated and are summarized in the following section.

Item Difficulty

Item difficulty is an indication of students' achievement on a specific item. Because this examination contains polytomous items, item means are not appropriate for comparing difficulty across items. Instead, weighted-item means were calculated by dividing an item's mean by the maximum points possible for that item.

For multiple-choice items, the item difficulty is determined by the proportion of students who answer an item correctly. For example, an item where 90% of the student responses to a multiple-choice item are correct is easier than a multiple-choice item having correct responses from only 30% of the students.

Point-Biserial Correlation

The point-biserial correlation is another classical statistic that can be used to evaluate items. For multiple-choice items, it is the correlation between students' performance on a given item (item score) and overall performance scores. This statistic is used to evaluate how well an item identifies students who understand the concept being measured and can be generalized to constructed-response items. The possible range for the point-biserial correlation is -1.0 to 1.0 , with higher values being more desirable.

Table 2 presents a summary of the classical item analysis for each of the field test forms. The first three columns from left to right identify the form number, the number of students who took each form, and the number of items on each field test form, respectively. The remaining columns are divided into two sections (i.e., item difficulty and point-biserial correlations). Recall that for constructed-response items, item means were divided by the maximum number of points possible in order to place them in the same metric as the multiple-choice items. Only 11 items had item difficulties greater than 0.90. With respect to the point-biserial correlations, none fell below 0.25.

Table 2. Classical Item Analysis

| Form | N-Count | No. of Items | Item Difficulty | | | Point-Biserial | | |
|------|---------|--------------|-----------------|--------------|-------|----------------|--------------|-------|
| | | | <0.50 | 0.50 to 0.90 | >0.90 | <0.25 | 0.25 to 0.50 | >0.50 |
| 501 | 1,116 | 25 | 1 | 23 | 1 | 0 | 20 | 5 |
| 502 | 1,138 | 13 | 1 | 12 | 0 | 0 | 10 | 3 |
| 503 | 1,118 | 12 | 1 | 10 | 0 | 0 | 6 | 5 |
| 504 | 1,127 | 13 | 0 | 12 | 0 | 0 | 9 | 3 |
| 505 | 1,147 | 12 | 2 | 8 | 1 | 0 | 11 | 0 |
| 506 | 1,113 | 11 | 0 | 10 | 1 | 0 | 4 | 7 |
| 507 | 1,135 | 11 | 1 | 8 | 1 | 0 | 6 | 4 |
| 508 | 1,128 | 11 | 2 | 8 | 1 | 0 | 9 | 2 |
| 509 | 1,130 | 10 | 0 | 10 | 0 | 0 | 8 | 2 |
| 510 | 1,118 | 11 | 0 | 10 | 1 | 0 | 6 | 5 |
| 511 | 1,120 | 13 | 2 | 9 | 1 | 0 | 8 | 4 |
| 512 | 1,115 | 12 | 1 | 9 | 2 | 0 | 9 | 3 |
| 513 | 1,089 | 12 | 1 | 11 | 0 | 0 | 8 | 4 |
| 514 | 1,096 | 13 | 2 | 9 | 2 | 0 | 12 | 1 |

*For some forms, the item counts in the “Item Difficulty” and “Point-Biserial” columns may not sum to the value in the “No. of Items” column due to DNS (do not score) items.

In addition to the summary information provided in Table 2, all classical item statistics are provided in Appendix A. “Max” is the maximum number of possible points. “N-Count” refers to the number of student records in the analysis. “Alpha” contains the internal consistency statistics discussed below. For multiple-choice items, “B” represents the proportion of students who left the item blank and “M1” through “M4” are the proportions of students who selected each of the four answer choices. For constructed-response items, “B” represents the proportion of students who left the items blank and “M0” through “M2” are the proportions of students who received scores of 0 through 2. “Mean” is the average of the scores received by the students. The final (right-most) column contains the point-biserial correlation for each item. There are some instances of items with missing statistics; this occurs when an item was not scored.

Test Reliability

Classical analysis can also be used to measure the reliability of the test. Reliability is the consistency of the results obtained from a measurement with respect to time or among items or subjects that constitute a test. As such, test reliability can be estimated in a variety of ways. Internal consistency indices are a measure of how consistently examinees respond to items within a test. Two factors influence estimates of internal consistency: (1) test length and (2) homogeneity of the items. In general, the more items

on the examination, the higher the reliability, and the more similar the items are, the higher the reliability.

Cronbach's α (alpha) (Cronbach, 1951) has an important use as a measure of the internal consistency of a test. This formula is the extension of an earlier version, the Kuder-Richardson Formula 20 (KR-20; Kuder and Richardson, 1937), which is the equivalent for dichotomous items.

Table 3 contains the internal consistency statistics for all of the field test forms. These statistics range from 0.52 to 0.83 and are based solely on the items in the individual field test forms. It is expected that these statistics would be greater when these items are used operationally since operational test forms contain more items than the field test forms.

Table 3. Test and Scoring Reliability

| Form Number | Test Reliability | Scoring Reliability |
|-------------|------------------|---------------------|
| 501 | 0.83 | n/a |
| 502 | 0.68 | 0.98 |
| 503 | 0.68 | 0.89 |
| 504 | 0.64 | 0.85 |
| 505 | 0.55 | 0.87 |
| 506 | 0.69 | 0.93 |
| 507 | 0.59 | 0.85 |
| 508 | 0.62 | 0.96 |
| 509 | 0.52 | 0.80 |
| 510 | 0.63 | 0.91 |
| 511 | 0.60 | 0.70 |
| 512 | 0.60 | 0.86 |
| 513 | 0.66 | 0.98 |
| 514 | 0.58 | 0.84 |

Scoring Reliability

One concern with constructed-response items is the reliability of the scoring process (i.e., consistency of the score assignment). Constructed-response items must be read by scorers who assign scores based on a comparison between the rubric and student responses. Consistency, in the way scores are assigned, is a critical part of the reliability of the assessment. To measure this consistency, 10% of the test booklets are scored a second time (i.e., second read scores) and compared to the original set of scores (i.e., first read scores).

As an overall measure of scoring reliability, the Pearson Correlation Coefficient between the first and second scores for each of the constructed-response items was computed. This statistic is often used as an overall indicator of scoring reliability and generally ranges from 0.00 to near 1.00. Table 3 contains the results from these analyses in the column headed “Scoring Reliability.” The correlations ranged from 0.70 to 0.98, indicating high scoring reliability.

Inter-rater Agreement

For each constructed-response item, the difference between the first and second reads was computed. When examining inter-rater agreement statistics, it should be kept in mind that the maximum number of points per item varies, as shown in the “Score Points” column of the following tables.

Table 4 contains the proportion of occurrences of these differences for each item. The proportion of perfect agreement between the first and second reads ranged from 0.84 to 1.00. Most were at 0.90 or above.

Table 4. Point Differences Between First and Second Reads

| Form | Item | Score Points | Difference (First Read Minus Second Read) | | |
|------|------|--------------|---|------|------|
| | | | -1 | 0 | 1 |
| 502 | 41 | 1 | 0.01 | 0.97 | 0.02 |
| 502 | 42 | 1 | 0.00 | 1.00 | 0.00 |
| 502 | 43 | 1 | 0.00 | 0.99 | 0.01 |
| 502 | 44 | 1 | 0.00 | 1.00 | 0.00 |
| 503 | 42 | 1 | 0.00 | 0.99 | 0.01 |
| 503 | 43 | 1 | 0.04 | 0.95 | 0.01 |
| 503 | 44 | 1 | 0.06 | 0.89 | 0.05 |
| 504 | 41 | 1 | 0.04 | 0.96 | 0.00 |
| 504 | 42 | 1 | 0.03 | 0.94 | 0.04 |
| 505 | 41 | 1 | 0.03 | 0.95 | 0.02 |
| 505 | 42 | 1 | 0.03 | 0.95 | 0.03 |
| 505 | 43 | 1 | 0.08 | 0.88 | 0.04 |
| 505 | 44 | 1 | 0.00 | 1.00 | 0.00 |
| 506 | 41 | 1 | 0.00 | 1.00 | 0.00 |
| 506 | 42 | 1 | 0.00 | 1.00 | 0.00 |
| 506 | 43 | 1 | 0.05 | 0.92 | 0.04 |
| 506 | 44 | 1 | 0.00 | 1.00 | 0.00 |
| 506 | 45 | 1 | 0.03 | 0.96 | 0.01 |
| 507 | 41 | 1 | 0.02 | 0.92 | 0.06 |

Table 4. Point Differences Between First and Second Reads (*continued*)

| Form | Item | Score Points | Difference (First Read Minus Second Read) | | |
|------|------|--------------|---|------|------|
| | | | -1 | 0 | 1 |
| 507 | 42 | 1 | 0.01 | 0.96 | 0.03 |
| 507 | 43 | 1 | 0.01 | 0.93 | 0.06 |
| 508 | 41 | 1 | 0.00 | 1.00 | 0.00 |
| 508 | 42 | 1 | 0.01 | 0.99 | 0.00 |
| 508 | 43 | 1 | 0.01 | 0.99 | 0.00 |
| 508 | 44 | 1 | 0.03 | 0.95 | 0.03 |
| 509 | 41 | 1 | 0.00 | 0.97 | 0.03 |
| 509 | 42 | 1 | 0.01 | 0.90 | 0.09 |
| 509 | 43 | 1 | 0.07 | 0.84 | 0.08 |
| 509 | 44 | 1 | 0.01 | 0.94 | 0.05 |
| 510 | 41 | 1 | 0.00 | 1.00 | 0.00 |
| 510 | 42 | 1 | 0.00 | 0.96 | 0.04 |
| 510 | 43 | 1 | 0.06 | 0.93 | 0.01 |
| 511 | 41 | 1 | 0.04 | 0.91 | 0.04 |
| 511 | 42 | 1 | 0.03 | 0.92 | 0.04 |
| 511 | 43 | 1 | 0.09 | 0.88 | 0.03 |
| 511 | 44 | 1 | 0.07 | 0.93 | 0.00 |
| 512 | 41 | 1 | 0.03 | 0.94 | 0.04 |
| 512 | 42 | 1 | 0.04 | 0.91 | 0.05 |
| 512 | 43 | 1 | 0.03 | 0.95 | 0.02 |
| 512 | 44 | 1 | 0.04 | 0.94 | 0.03 |
| 513 | 41 | 1 | 0.00 | 1.00 | 0.00 |
| 513 | 42 | 1 | 0.01 | 0.97 | 0.02 |
| 513 | 43 | 1 | 0.00 | 1.00 | 0.00 |
| 514 | 41 | 1 | 0.05 | 0.92 | 0.03 |
| 514 | 42 | 1 | 0.03 | 0.94 | 0.03 |
| 514 | 43 | 1 | 0.00 | 1.00 | 0.00 |
| 514 | 44 | 1 | 0.03 | 0.94 | 0.02 |
| 514 | 45 | 1 | 0.07 | 0.86 | 0.07 |

Table 5 contains additional summary information regarding the first and second reads. In the fifth column from the left, the percent of exact matches between the first and second scores is provided. “Adj.” is the percentage of differences with a magnitude of 1. “Total” is the sum of the two prior columns and contains values of 100%. Since all

items are worth one point, the sum of the exact and adjacent columns all sum to 100%. As previously discussed, most items had exact agreement rates between their first and second reads of 90% or greater.

Table 5. First and Second Read Descriptive Statistics and Agreement

| | | | | Agreement (%) | | | Raw Score Mean | | Raw Score Standard Deviation | | | |
|------|------|--------------|---------------|---------------|------|-------|----------------|-------------|------------------------------|-------------|-------------------------|----------|
| Form | Item | Score Points | Total N-Count | Exact | Adj. | Total | First Read | Second Read | First Read | Second Read | Intra-Class Correlation | Wt Kappa |
| 502 | 41 | 1 | 111 | 97.3 | 2.7 | 100.0 | 0.5 | 0.5 | 0.50 | 0.50 | 0.95 | 0.95 |
| 502 | 42 | 1 | 109 | 100.0 | 0.0 | 100.0 | 0.8 | 0.8 | 0.38 | 0.38 | 1.00 | 1.00 |
| 502 | 43 | 1 | 107 | 99.1 | 0.9 | 100.0 | 0.6 | 0.6 | 0.49 | 0.49 | 0.98 | 0.98 |
| 502 | 44 | 1 | 106 | 100.0 | 0.0 | 100.0 | 0.9 | 0.9 | 0.35 | 0.35 | 1.00 | 1.00 |
| 503 | 42 | 1 | 103 | 99.0 | 1.0 | 100.0 | 0.7 | 0.7 | 0.44 | 0.44 | 0.97 | 0.97 |
| 503 | 43 | 1 | 102 | 95.1 | 4.9 | 100.0 | 0.4 | 0.4 | 0.48 | 0.49 | 0.90 | 0.89 |
| 503 | 44 | 1 | 104 | 89.4 | 10.6 | 100.0 | 0.5 | 0.5 | 0.50 | 0.50 | 0.79 | 0.79 |
| 504 | 41 | 1 | 109 | 96.3 | 3.7 | 100.0 | 0.9 | 0.9 | 0.35 | 0.30 | 0.84 | 0.83 |
| 504 | 42 | 1 | 110 | 93.6 | 6.4 | 100.0 | 0.7 | 0.7 | 0.45 | 0.46 | 0.84 | 0.84 |
| 505 | 41 | 1 | 111 | 95.5 | 4.5 | 100.0 | 0.4 | 0.4 | 0.49 | 0.49 | 0.91 | 0.91 |
| 505 | 42 | 1 | 111 | 94.6 | 5.4 | 100.0 | 0.7 | 0.7 | 0.46 | 0.46 | 0.87 | 0.87 |
| 505 | 43 | 1 | 108 | 88.0 | 12.0 | 100.0 | 0.8 | 0.8 | 0.42 | 0.38 | 0.63 | 0.62 |
| 505 | 44 | 1 | 111 | 100.0 | 0.0 | 100.0 | 0.9 | 0.9 | 0.34 | 0.34 | 1.00 | 1.00 |
| 506 | 41 | 1 | 107 | 100.0 | 0.0 | 100.0 | 1.0 | 1.0 | 0.21 | 0.21 | 1.00 | 1.00 |
| 506 | 42 | 1 | 106 | 100.0 | 0.0 | 100.0 | 0.8 | 0.8 | 0.43 | 0.43 | 1.00 | 1.00 |
| 506 | 43 | 1 | 107 | 91.6 | 8.4 | 100.0 | 0.7 | 0.7 | 0.47 | 0.47 | 0.81 | 0.81 |
| 506 | 44 | 1 | 102 | 100.0 | 0.0 | 100.0 | 0.7 | 0.7 | 0.47 | 0.47 | 1.00 | 1.00 |
| 506 | 45 | 1 | 102 | 96.1 | 3.9 | 100.0 | 0.8 | 0.8 | 0.41 | 0.40 | 0.88 | 0.88 |
| 507 | 41 | 1 | 125 | 92.0 | 8.0 | 100.0 | 0.5 | 0.5 | 0.50 | 0.50 | 0.84 | 0.84 |
| 507 | 42 | 1 | 125 | 96.0 | 4.0 | 100.0 | 0.8 | 0.8 | 0.41 | 0.42 | 0.89 | 0.88 |
| 507 | 43 | 1 | 124 | 92.7 | 7.3 | 100.0 | 0.8 | 0.8 | 0.38 | 0.42 | 0.78 | 0.77 |
| 508 | 41 | 1 | 114 | 100.0 | 0.0 | 100.0 | 0.7 | 0.7 | 0.45 | 0.45 | 1.00 | 1.00 |
| 508 | 42 | 1 | 114 | 99.1 | 0.9 | 100.0 | 0.8 | 0.8 | 0.43 | 0.43 | 0.98 | 0.98 |
| 508 | 43 | 1 | 111 | 99.1 | 0.9 | 100.0 | 0.3 | 0.3 | 0.46 | 0.47 | 0.98 | 0.98 |
| 508 | 44 | 1 | 111 | 94.6 | 5.4 | 100.0 | 0.7 | 0.7 | 0.45 | 0.45 | 0.86 | 0.86 |
| 509 | 41 | 1 | 107 | 97.2 | 2.8 | 100.0 | 0.8 | 0.8 | 0.38 | 0.40 | 0.91 | 0.91 |
| 509 | 42 | 1 | 107 | 89.7 | 10.3 | 100.0 | 0.6 | 0.5 | 0.49 | 0.50 | 0.80 | 0.79 |
| 509 | 43 | 1 | 107 | 84.1 | 15.9 | 100.0 | 0.6 | 0.6 | 0.48 | 0.49 | 0.66 | 0.66 |
| 509 | 44 | 1 | 107 | 94.4 | 5.6 | 100.0 | 0.8 | 0.8 | 0.39 | 0.42 | 0.83 | 0.83 |
| 510 | 41 | 1 | 106 | 100.0 | 0.0 | 100.0 | 0.7 | 0.7 | 0.45 | 0.45 | 1.00 | 1.00 |
| 510 | 42 | 1 | 104 | 96.2 | 3.8 | 100.0 | 0.5 | 0.5 | 0.50 | 0.50 | 0.93 | 0.92 |
| 510 | 43 | 1 | 106 | 93.4 | 6.6 | 100.0 | 0.9 | 0.9 | 0.33 | 0.27 | 0.66 | 0.63 |

Table 5. First and Second Read Descriptive Statistics and Agreement (continued)

| | | | | Agreement (%) | | | Raw Score Mean | | Raw Score Standard Deviation | | | |
|------|------|--------------|---------------|---------------|------|-------|----------------|-------------|------------------------------|-------------|-------------------------|----------|
| Form | Item | Score Points | Total N-Count | Exact | Adj. | Total | First Read | Second Read | First Read | Second Read | Intra-Class Correlation | Wt Kappa |
| 511 | 41 | 1 | 117 | 91.5 | 8.5 | 100.0 | 0.8 | 0.8 | 0.37 | 0.37 | 0.69 | 0.69 |
| 511 | 42 | 1 | 117 | 92.3 | 7.7 | 100.0 | 0.9 | 0.9 | 0.34 | 0.35 | 0.67 | 0.67 |
| 511 | 43 | 1 | 117 | 88.0 | 12.0 | 100.0 | 0.7 | 0.7 | 0.47 | 0.45 | 0.73 | 0.72 |
| 511 | 44 | 1 | 117 | 93.2 | 6.8 | 100.0 | 0.9 | 0.9 | 0.35 | 0.27 | 0.70 | 0.66 |
| 512 | 41 | 1 | 111 | 93.7 | 6.3 | 100.0 | 0.6 | 0.6 | 0.50 | 0.50 | 0.87 | 0.87 |
| 512 | 42 | 1 | 110 | 90.9 | 9.1 | 100.0 | 0.6 | 0.6 | 0.49 | 0.50 | 0.81 | 0.81 |
| 512 | 43 | 1 | 110 | 95.5 | 4.5 | 100.0 | 0.7 | 0.7 | 0.46 | 0.46 | 0.89 | 0.89 |
| 512 | 44 | 1 | 109 | 93.6 | 6.4 | 100.0 | 0.7 | 0.7 | 0.48 | 0.47 | 0.86 | 0.86 |
| 513 | 41 | 1 | 109 | 100.0 | 0.0 | 100.0 | 0.3 | 0.3 | 0.47 | 0.47 | 1.00 | 1.00 |
| 513 | 42 | 1 | 111 | 97.3 | 2.7 | 100.0 | 0.7 | 0.7 | 0.44 | 0.45 | 0.93 | 0.93 |
| 513 | 43 | 1 | 109 | 100.0 | 0.0 | 100.0 | 0.7 | 0.7 | 0.47 | 0.47 | 1.00 | 1.00 |
| 514 | 41 | 1 | 122 | 91.8 | 8.2 | 100.0 | 0.7 | 0.8 | 0.44 | 0.43 | 0.78 | 0.78 |
| 514 | 42 | 1 | 120 | 94.2 | 5.8 | 100.0 | 0.9 | 0.9 | 0.30 | 0.31 | 0.69 | 0.69 |
| 514 | 43 | 1 | 122 | 100.0 | 0.0 | 100.0 | 0.8 | 0.8 | 0.40 | 0.40 | 1.00 | 1.00 |
| 514 | 44 | 1 | 122 | 94.3 | 5.7 | 100.0 | 0.6 | 0.6 | 0.50 | 0.50 | 0.88 | 0.88 |
| 514 | 45 | 1 | 121 | 86.0 | 14.0 | 100.0 | 0.4 | 0.4 | 0.49 | 0.49 | 0.71 | 0.71 |

*Adj. = Difference of 1

Constructed-Response Item Means and Standard Deviations

The average score for each constructed-response item was computed based on the first and second reads. In addition, the standard deviation of the scores was computed.

Table 5 contains the means and standard deviations for the first and second read scores. The largest difference between the item means for the first and second read scores was 0.1, while there were minimal differences among the standard deviations.

Intraclass Correlation

The intraclass correlation was computed for each item. This correlation is an estimate of the reliability of scoring based on an average of the first and second read scores. Correlations greater than 0.60 are considered very strong because they explain more than one-third of the variance in the scores. All items had intraclass correlations greater than to 0.60 (see Table 5). Consistent with other information provided in the table, these values indicate a very high level of scoring reliability.

Weighted Kappa

Weighted Kappa (Cohen, 1968) was calculated for each item based on the first and second reads. This statistic produces an estimate of the reliability of the score classifications relative to what would be expected to occur by chance.

Weighted Kappa is an estimate of the reliability of the score classifications. That is, the Kappa statistic is a measure of reproducibility for categorical data. Guidelines for the evaluation of this statistic are:

- $k > 0.75$ denotes excellent reproducibility
- $0.4 < k \leq 0.75$ denotes good reproducibility
- $0 < k \leq 0.4$ denotes marginal reproducibility

The results found in Table 5 show a high degree of consistency between the first and second reads. The Weighted Kappa statistics ranged from 0.62 to 1.00, which in all cases indicates good-to-excellent reproducibility.

Based on the scoring reliability analyses, there is strong evidence that the scoring of the constructed-response items was performed in a highly reliable manner.

ITEM RESPONSE THEORY (IRT) STATISTICS

As discussed above, the item mean is a statistic used to evaluate item difficulty. However, many different test forms are used during field testing, and different samples of students are responding to these items. The average ability of the different samples of students varies, and a direct comparison of item means across test forms may lead to inaccurate interpretations. Therefore, Item Response Theory (IRT) was also used to evaluate item difficulty.

Specifically, the Rasch Partial Credit Model (PCM) (Masters, 1982) was used. With the use of this model, the difficulty of items and the ability of examinees are placed on the same metric. Thus, the difficulty of an item and the ability of a person can be meaningfully compared across field test forms. Also, the use of this model provides greater flexibility in situations where different samples or test forms are used because the parameters generated are generally not considered to be sample dependent or test dependent. A description of this model, results of the item calibration, and item fit evaluation are presented below.

The PCM provides an overall difficulty estimate for each item. Specifically, for constructed-response items when there are several points possible, individual estimates of difficulty for each of the possible score points are also calculated (i.e., step values). Each step value represents the difficulty of a student receiving a particular score point, given that he or she has already received the prior score point. For example, if a 3-point item had step values of -1.0 , 1.0 , and 0.0 , one could say that it is relatively easy to obtain a score of 1. However, it is much more difficult to obtain a 2 given the student

has the ability to score a 1 because the difference in difficulty between a 1 and a 2 is much greater than the difference between a 0 and a 1. Also, the difference between a 2 and a 3 is not as great as the difference between a 1 and a 2. Thus, with this example, a small step is needed to go from a 0 to a 1, a large step is needed to move from a 1 to a 2, and a moderate step is needed to proceed from a 2 to a 3.

Item Calibration

As discussed above, the use of Rasch item difficulty statistics provides an advantage over the use of classical item means because they can be compared across test forms. Students from different samples responded to the various test forms. Although the samples were selected to be similar with respect to student ability, there were differences. By equating the test forms (See Equating Procedure section below), the Rasch item difficulties account for those differences and these statistics can be compared across test forms.

Rasch item difficulty values generally range from -3.00 to 3.00 . An item with a Rasch difficulty greater than 2.00 is considered very difficult and should be examined carefully. If the item is measuring an important concept that students are having difficulty with, then the item can be useful. However, if the item is measuring a trivial concept or is written in a confusing manner, then it might not be appropriate to use on an operational test form. Likewise, any item with a Rasch difficulty less than -2.00 is considered very easy and usually provides little information regarding student achievement. The vast majority of test items should range between -2.00 and 2.00 . This range represents approximately two standard deviations around the average difficulty of 0.00 . Thus, one would expect that, based on chance, roughly 5% of the items will fall outside of that range, and therefore, these are items that should be closely examined for content.

Item Fit Evaluation

The INFIT statistic is used to determine whether items are functioning in a way that is congruent with the assumptions of the Rasch model. Under these assumptions, how a student will respond to an item depends on the proficiency of the student and the difficulty of the item—both of which are on the same measurement scale. If an item is as difficult as a student is able, the student will have a 50% chance of getting the item correct. If a student is more able than an item is difficult, under the assumptions of the Rasch model, that student has a greater than 50% chance of correctly answering the item. On the other hand, if the item is more difficult than the student is able, he or she has a less than 50% chance of correctly responding to the item. Rasch-fit statistics estimate the extent to which an item is functioning in this predicted manner. Items showing a poor fit with the Rasch model typically have values outside the range of 0.70 to 1.30 .

Table 6 contains a summary of the Partial Credit Model item analysis for each of the field test forms. The leftmost column lists the form numbers. The next two columns list the number of students who participated and the number of items on each field test

form, respectively. The remaining columns are divided into two sections. The first section pertains to the Rasch-item difficulty values, while the second pertains to the INFIT statistics. Nearly all of the items fell within the moderate -2.00 to 2.00 difficulty range, and only one item had an INFIT statistic outside the good-fit range.

Table 6. Partial-Credit Model Item Analysis

| Form | N-Count | No. of Items | Rasch | | | INFIT | | |
|------|---------|--------------|-------|-------------|------|-------|--------------|-------|
| | | | <-2.0 | -2.0 to 2.0 | >2.0 | <0.70 | 0.70 to 1.30 | >1.30 |
| 501 | 1,116 | 25 | 0 | 24 | 1 | 0 | 25 | 0 |
| 502 | 1,138 | 13 | 0 | 13 | 0 | 0 | 13 | 0 |
| 503 | 1,118 | 12 | 0 | 10 | 1 | 0 | 11 | 0 |
| 504 | 1,127 | 13 | 0 | 12 | 0 | 0 | 12 | 0 |
| 505 | 1,147 | 12 | 0 | 11 | 0 | 0 | 11 | 0 |
| 506 | 1,113 | 11 | 0 | 11 | 0 | 0 | 11 | 0 |
| 507 | 1,135 | 11 | 0 | 10 | 0 | 0 | 10 | 0 |
| 508 | 1,128 | 11 | 0 | 10 | 1 | 0 | 11 | 0 |
| 509 | 1,130 | 10 | 0 | 10 | 0 | 0 | 10 | 0 |
| 510 | 1,118 | 11 | 0 | 11 | 0 | 0 | 10 | 1 |
| 511 | 1,120 | 13 | 0 | 12 | 0 | 0 | 12 | 0 |
| 512 | 1,115 | 12 | 0 | 11 | 1 | 0 | 12 | 0 |
| 513 | 1,089 | 12 | 0 | 11 | 1 | 0 | 12 | 0 |
| 514 | 1,096 | 13 | 0 | 12 | 1 | 0 | 13 | 0 |

*For some forms, the item counts in the “Rasch” and “Infit” columns may not sum to the value in the “No. of Items” column due to DNS (do not score) items.

All of the individual IRT item statistics are provided in Appendix B. The column entitled “RID” contains the Rasch-item difficulty statistics. S1–S6 contain the step values for the constructed-response items. Finally, the INFIT column contains the INFIT statistic for each item.

DIFFERENTIAL ITEM FUNCTIONING (DIF) STATISTICS

Statistical procedures are employed to observe whether, on the basis of data, there exists the possibility of unfair treatment of different populations. DIF statistics are used to identify items for which members of a focal group have a different probability of getting the items correct than members of a reference group after the groups have been matched as to ability level on the test.

For the multiple-choice items, the Mantel-Haenszel Delta (MHD) DIF statistics were computed (Dorans & Holland, 1992) to classify test items in three levels of DIF for each comparison: (A) negligible DIF, (B) moderate DIF, and (C) large DIF. An item was

flagged if it exhibited a B or C category of DIF, using the following rules derived from the National Assessment of Educational Progress (NAEP) guidelines (Allen, Carlson, & Zalanak, 1999):

- MHDs not significantly different from 0.00 (based on $\alpha = 0.05$) **or** $|MHD| < 1.00$ are classified as A.
- MHDs significantly different from 0.00 and $\{|MHD| \geq 1.00 \text{ and } < 1.50\}$ **or** MHDs not significantly different from 0.00 and $|MHD| \geq 1.00$ are classified as B.
- $|MHD| \geq 1.50$ and significantly different from 0.00 are classified as C.

For the constructed-response items, the effect size (ES) of the standardized mean difference (SMD) was used to flag the DIF. The SMD reflects the size of the differences in performance on constructed-response items between student groups matched on the total score. It is the difference between the unweighted item mean of the focal group and the weighted item mean of the reference group. The weights applied to the reference group are applied so that the weighted number of reference group students is the same as that in the focal group (within the same ability group). The SMD is divided by the total group item standard deviation to get a measure of the effect size (ES) for the SMD. The SMD effect size groups each item into one of three categories: (AA) negligible DIF, (BB) moderate DIF, and (CC) large DIF. Only categories BB and CC were flagged in the results.

- Probability is > 0.05 **or** if $|ES| \leq 0.17$ is classified as AA.
- Probability is > 0.05 and if $0.17 < |ES| \leq 0.25$ is classified as BB.
- Probability is > 0.05 and if $|ES| > 0.25$ is classified as CC.

Although DIF statistics are typically conducted by gender and ethnicity, the low N-counts for ethnic subgroups did not allow for these statistics to be meaningful. The N-counts for gender allowed for comparisons to be made, but they were still somewhat low, so resulting statistics should be interpreted with caution.

The DIF statistics for gender are shown in Appendix C. Flagging of items appears in the “DIF Category” column and if an item is flagged, the “Favored Group” column indicates which gender is favored.

Section III: Equating Procedure

The 2012 field test administration for the New York State Examination in Grade 4 Elementary-Level Science consisted of 13 field test forms numbered 502–514 and one anchor form labeled 501. The field test forms contained multiple-choice and constructed-response items. Each student participating in the field test was administered one of the 14 test forms. The test forms were spiraled within the

classroom so that the groups of students taking each form were equivalent. A complete listing of these field test forms can be seen in Appendix A where item type (e.g., multiple-choice, constructed-response) and the maximum points for each item are displayed.

EQUIVALENT-GROUP EQUATING DESIGN

The anchor form was equated to the item bank using a common-item equating design. The anchor item difficulty parameters were fixed to their 2011 item bank values. This places the item difficulty estimates and the ability estimates of the students taking the anchor form onto the item bank scale. After the anchor form was placed onto the bank scale, the average of the two mean ability estimates for the two forms was computed using ability estimates of nonextreme students. This average ability estimate was used to equate the remaining field test forms, as well as to update the item parameters for the anchor form.

As part of the anchor item equating, an item-stability check was performed. After fixing all of the items to their 2011 bank values, any item with a displacement value with a magnitude greater than 0.30 was no longer fixed and the test form was reanalyzed. If more than one item had a displacement value with a magnitude greater than 0.30, then the item with the largest displacement was freed and the test form was reanalyzed. In a stepwise fashion, this procedure was repeated until all remaining fixed anchor items had displacements with magnitudes less than or equal to 0.30.

Applying the anchor item-stability check to the anchor form resulted in five items having a displacement value with a magnitude greater than 0.30. This indicates stability in the items used on the anchor form.

The equated mean ability estimate for form 501 was 1.49. This value served as the target mean ability for the remainder of the equating process.

After the anchor form was equated and the target mean was computed, the field test forms were equated using the equivalent groups design. The first step was to calibrate each form separately where all the item parameters were free to estimate (without constraint). From those initial calibrations, the mean ability estimates for each field test form were obtained. The second step was to determine the equating constant for each form by subtracting the mean ability for a given field test form from the target mean ability calculated from the anchor form (i.e., form 501). The respective equating constant was then added to each of the item parameters on a given form. If the resulting mean of the ability estimates for those students did not equal that of the target mean, then the procedure was repeated until the mean abilities for each of the field test forms equaled the target mean ability. Table 7 shows the mean abilities and constants used for the equating.

Table 7. Initial Mean Abilities and Equating Constants

| Form Number | Mean Ability | Constant |
|-------------|--------------|----------|
| 502 | 1.11 | 0.35 |
| 503 | 0.82 | 0.61 |
| 504 | 1.09 | 0.36 |
| 505 | 1.02 | 0.43 |
| 506 | 1.35 | 0.13 |
| 507 | 1.06 | 0.38 |
| 508 | 1.03 | 0.42 |
| 509 | 0.79 | 0.64 |
| 510 | 1.37 | 0.11 |
| 511 | 1.05 | 0.40 |
| 512 | 1.16 | 0.31 |
| 513 | 1.09 | 0.37 |
| 514 | 1.27 | 0.20 |

The equated item parameters for the field test items can now be compared across test forms, given that the equating process places all items on the same scale. In addition, when items are combined to form unique operational test forms, raw score-to-scale score tables can be generated based on these parameters. The following section contains a description of the development of the operational test forms and scoring tables.

Section IV: Scaling of Operational Test Forms

Operational test items are selected based on content coverage, content accuracy, and statistical quality. The sets of items on each operational test conform to the coverage suggested by content experts. These expert judgments are based on the learning standards established by the New York State Education Department. With respect to statistical quality, classical and Rasch statistics are examined to determine how well items function. Also, items are selected such that they range in difficulty in order to measure students across ability levels. Appendix D contains the June 2012 operational test map with content information regarding each item included on the form.

In order to limit wide fluctuations of raw scores that correspond to scale scores of 65 and 85 across administrations, the average Rasch item difficulty for the operational test is considered. For this examination, an average Rasch difficulty of approximately 0.118 is used as a target for each administration. In most cases, meeting this target will provide raw scores of similar magnitude to other forms. However, differences with these scores also occur due to the distribution of the Rasch item difficulty parameters.

Scoring tables display the relationship between raw scores on the operational test and assigned scale scores. Appendix E contains the scoring table used for the June

2012 operational test form. Four steps are taken in order to produce this table and resulting conversion chart.

The first step is to develop a raw score (i.e., number of points on the test form) to theta (i.e., student ability) to scale score relationship for the baseline operational test form. This relationship is determined when standards are set and then used for every administration moving forward until the standards are revisited. The baseline target was determined by the New York State Education Department to be May 2005. The raw score-to-theta relationship from that examination was used, and then scale scores are calculated based on the raw score cuts according to the following formula:

$$p(x) = m_3x^3 + m_2x^2 + m_1x + m_0$$

The raw score of zero was assigned a scale score of zero (0) and the maximum raw score was assigned a scale score of 100. The raw scores corresponding to the scale scores of 65 and 85 were also fixed. The polynomial relationship shown above was then used to assign all scale scores to the remaining raw scores. The resulting values for m_1 – m_3 are the transformation constants used to produce the final raw score-to-scale-score table.

The second step is to develop a raw score-to-theta relationship for the new operational test form using the field test equated PCM item parameters. This is accomplished by doing a calibration where all items are anchored to their field test parameters. The number of points on the test form (i.e., raw score) expected across student ability levels is based on the difficulty of the items on the form. Thus, given a particular student ability level (i.e., theta), if the points are more difficult to earn on the new test than the points on the May 2005 test, the number of points expected of this student on the new test will be less than the number of points expected of this student on the baseline form.

The third step is to use linear interpolation to determine the raw score-to-theta-to-scale score relationship for the new test. The theta values associated with scale scores of 65 and 85 on the baseline form are used along with the raw score-to-theta relationship developed in the previous step. In other words, the baseline 65 and 85 theta values are used as reference points and linear interpolation assigns the other scale scores.

Finally, a conversion chart is created based on the scoring table generated in the third step. Scale scores are rounded to the nearest whole number in all cases except for 0, 65, 85, and 100. A raw score of zero (0) is assigned a scale score of zero. The maximum raw score is assigned a scale score of 100. With respect to the 65 and 85 scale scores, the raw scores with scale scores of 65 or 85, after rounding, are assigned those values.

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Appendix A: Classical Item Analysis

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|----|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 501 | MC | 01 | 1 | 1,116 | 0.83 | 0.00 | | 0.07 | 0.08 | 0.82 | 0.04 | | | 0.82 | 0.37 |
| 2012_G4Sc_FT | 501 | MC | 02 | 1 | 1,116 | 0.83 | 0.00 | | 0.09 | 0.86 | 0.02 | 0.03 | | | 0.86 | 0.38 |
| 2012_G4Sc_FT | 501 | MC | 03 | 1 | 1,116 | 0.83 | 0.00 | | 0.12 | 0.61 | 0.08 | 0.18 | | | 0.61 | 0.41 |
| 2012_G4Sc_FT | 501 | MC | 04 | 1 | 1,116 | 0.83 | 0.00 | | 0.25 | 0.61 | 0.07 | 0.07 | | | 0.61 | 0.43 |
| 2012_G4Sc_FT | 501 | MC | 05 | 1 | 1,116 | 0.83 | 0.00 | | 0.03 | 0.55 | 0.32 | 0.11 | | | 0.55 | 0.36 |
| 2012_G4Sc_FT | 501 | MC | 06 | 1 | 1,116 | 0.83 | 0.01 | | 0.01 | 0.02 | 0.84 | 0.11 | | | 0.84 | 0.45 |
| 2012_G4Sc_FT | 501 | MC | 07 | 1 | 1,116 | 0.83 | 0.00 | | 0.38 | 0.13 | 0.40 | 0.09 | | | 0.40 | 0.35 |
| 2012_G4Sc_FT | 501 | MC | 08 | 1 | 1,116 | 0.83 | 0.00 | | 0.28 | 0.68 | 0.02 | 0.02 | | | 0.68 | 0.35 |
| 2012_G4Sc_FT | 501 | MC | 09 | 1 | 1,116 | 0.83 | 0.01 | | 0.05 | 0.86 | 0.02 | 0.06 | | | 0.86 | 0.37 |
| 2012_G4Sc_FT | 501 | MC | 10 | 1 | 1,116 | 0.83 | 0.01 | | 0.87 | 0.04 | 0.04 | 0.04 | | | 0.87 | 0.50 |
| 2012_G4Sc_FT | 501 | MC | 11 | 1 | 1,116 | 0.83 | 0.01 | | 0.16 | 0.05 | 0.73 | 0.05 | | | 0.73 | 0.53 |
| 2012_G4Sc_FT | 501 | MC | 12 | 1 | 1,116 | 0.83 | 0.02 | | 0.83 | 0.08 | 0.04 | 0.03 | | | 0.83 | 0.43 |
| 2012_G4Sc_FT | 501 | MC | 13 | 1 | 1,116 | 0.83 | 0.02 | | 0.06 | 0.20 | 0.07 | 0.66 | | | 0.66 | 0.43 |
| 2012_G4Sc_FT | 501 | MC | 14 | 1 | 1,116 | 0.83 | 0.02 | | 0.63 | 0.10 | 0.19 | 0.07 | | | 0.63 | 0.52 |
| 2012_G4Sc_FT | 501 | MC | 15 | 1 | 1,116 | 0.83 | 0.02 | | 0.87 | 0.03 | 0.03 | 0.05 | | | 0.87 | 0.49 |
| 2012_G4Sc_FT | 501 | MC | 16 | 1 | 1,116 | 0.83 | 0.02 | | 0.06 | 0.04 | 0.06 | 0.82 | | | 0.82 | 0.53 |
| 2012_G4Sc_FT | 501 | MC | 17 | 1 | 1,116 | 0.83 | 0.02 | | 0.04 | 0.02 | 0.88 | 0.03 | | | 0.88 | 0.52 |
| 2012_G4Sc_FT | 501 | MC | 18 | 1 | 1,116 | 0.83 | 0.02 | | 0.80 | 0.05 | 0.05 | 0.09 | | | 0.80 | 0.47 |
| 2012_G4Sc_FT | 501 | MC | 19 | 1 | 1,116 | 0.83 | 0.02 | | 0.11 | 0.75 | 0.04 | 0.07 | | | 0.75 | 0.47 |
| 2012_G4Sc_FT | 501 | MC | 20 | 1 | 1,116 | 0.83 | 0.02 | | 0.01 | 0.10 | 0.76 | 0.12 | | | 0.76 | 0.43 |
| 2012_G4Sc_FT | 501 | MC | 21 | 1 | 1,116 | 0.83 | 0.02 | | 0.11 | 0.02 | 0.08 | 0.77 | | | 0.77 | 0.42 |
| 2012_G4Sc_FT | 501 | MC | 22 | 1 | 1,116 | 0.83 | 0.02 | | 0.01 | 0.91 | 0.02 | 0.03 | | | 0.91 | 0.44 |
| 2012_G4Sc_FT | 501 | MC | 23 | 1 | 1,116 | 0.83 | 0.02 | | 0.07 | 0.06 | 0.03 | 0.82 | | | 0.82 | 0.56 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 501 | MC | 24 | 1 | 1,116 | 0.83 | 0.03 | | 0.14 | 0.63 | 0.08 | 0.12 | | | 0.63 | 0.44 |
| 2012_G4Sc_FT | 501 | MC | 25 | 1 | 1,116 | 0.83 | 0.04 | | 0.03 | 0.02 | 0.09 | 0.81 | | | 0.81 | 0.49 |
| 2012_G4Sc_FT | 502 | MC | 01 | 1 | 1,138 | 0.68 | 0.00 | | 0.04 | 0.77 | 0.06 | 0.13 | | | 0.77 | 0.46 |
| 2012_G4Sc_FT | 502 | MC | 02 | 1 | 1,138 | 0.68 | 0.00 | | 0.08 | 0.72 | 0.16 | 0.04 | | | 0.72 | 0.53 |
| 2012_G4Sc_FT | 502 | MC | 03 | 1 | 1,138 | 0.68 | 0.00 | | 0.10 | 0.05 | 0.77 | 0.09 | | | 0.77 | 0.39 |
| 2012_G4Sc_FT | 502 | MC | 04 | 1 | 1,138 | 0.68 | 0.00 | | 0.59 | 0.20 | 0.08 | 0.12 | | | 0.59 | 0.47 |
| 2012_G4Sc_FT | 502 | MC | 05 | 1 | 1,138 | 0.68 | 0.00 | | 0.02 | 0.04 | 0.08 | 0.86 | | | 0.86 | 0.37 |
| 2012_G4Sc_FT | 502 | MC | 06 | 1 | 1,138 | 0.68 | 0.00 | | 0.03 | 0.04 | 0.83 | 0.10 | | | 0.83 | 0.47 |
| 2012_G4Sc_FT | 502 | MC | 07 | 1 | 1,138 | 0.68 | 0.00 | | 0.04 | 0.15 | 0.09 | 0.71 | | | 0.71 | 0.38 |
| 2012_G4Sc_FT | 502 | MC | 08 | 1 | 1,138 | 0.68 | 0.00 | | 0.21 | 0.15 | 0.04 | 0.59 | | | 0.59 | 0.56 |
| 2012_G4Sc_FT | 502 | MC | 09 | 1 | 1,138 | 0.68 | 0.03 | | 0.72 | 0.14 | 0.09 | 0.03 | | | 0.72 | 0.44 |
| 2012_G4Sc_FT | 502 | CR | 41 | 1 | 1,138 | 0.68 | 0.01 | 0.50 | 0.49 | | | | | | 0.49 | 0.43 |
| 2012_G4Sc_FT | 502 | CR | 42 | 1 | 1,138 | 0.68 | 0.04 | 0.12 | 0.85 | | | | | | 0.85 | 0.45 |
| 2012_G4Sc_FT | 502 | CR | 43 | 1 | 1,138 | 0.68 | 0.03 | 0.35 | 0.62 | | | | | | 0.62 | 0.54 |
| 2012_G4Sc_FT | 502 | CR | 44 | 1 | 1,138 | 0.68 | 0.03 | 0.10 | 0.86 | | | | | | 0.86 | 0.43 |
| 2012_G4Sc_FT | 503 | MC | 01 | 1 | 1,118 | 0.68 | 0.00 | | 0.29 | 0.06 | 0.61 | 0.04 | | | 0.61 | 0.51 |
| 2012_G4Sc_FT | 503 | MC | 02 | 1 | 1,118 | 0.68 | 0.00 | | 0.09 | 0.78 | 0.07 | 0.06 | | | 0.78 | 0.46 |
| 2012_G4Sc_FT | 503 | MC | 03 | 1 | 1,118 | 0.68 | 0.00 | | 0.58 | 0.08 | 0.10 | 0.25 | | | 0.58 | 0.41 |
| 2012_G4Sc_FT | 503 | MC | 04 | 1 | 1,118 | 0.68 | 0.00 | | 0.10 | 0.66 | 0.03 | 0.21 | | | 0.66 | 0.52 |
| 2012_G4Sc_FT | 503 | MC | 05 | 1 | 1,118 | 0.68 | 0.00 | | 0.09 | 0.09 | 0.73 | 0.09 | | | 0.73 | 0.50 |
| 2012_G4Sc_FT | 503 | MC | 06 | 1 | 1,118 | 0.68 | 0.00 | | 0.04 | 0.02 | 0.08 | 0.85 | | | 0.85 | 0.45 |
| 2012_G4Sc_FT | 503 | MC | 07 | 1 | 1,118 | 0.68 | 0.01 | | 0.07 | 0.27 | 0.02 | 0.64 | | | 0.64 | 0.50 |
| 2012_G4Sc_FT | 503 | MC | 08 | 1 | 1,118 | 0.68 | 0.02 | | 0.78 | 0.06 | 0.02 | 0.12 | | | 0.78 | 0.51 |
| 2012_G4Sc_FT | 503 | CR | 41 | | | | | | | | | | | | | |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 503 | CR | 42 | 1 | 1,118 | 0.68 | 0.01 | 0.18 | 0.81 | | | | | | 0.81 | 0.50 |
| 2012_G4Sc_FT | 503 | CR | 43 | 1 | 1,118 | 0.68 | 0.02 | 0.62 | 0.36 | | | | | | 0.36 | 0.54 |
| 2012_G4Sc_FT | 503 | CR | 44 | 1 | 1,118 | 0.68 | 0.02 | 0.48 | 0.50 | | | | | | 0.50 | 0.52 |
| 2012_G4Sc_FT | 504 | MC | 01 | 1 | 1,127 | 0.64 | 0.00 | | 0.85 | 0.02 | 0.10 | 0.03 | | | 0.85 | 0.40 |
| 2012_G4Sc_FT | 504 | MC | 02 | 1 | 1,127 | 0.64 | 0.00 | | 0.73 | 0.17 | 0.04 | 0.05 | | | 0.73 | 0.36 |
| 2012_G4Sc_FT | 504 | MC | 03 | 1 | 1,127 | 0.64 | 0.00 | | 0.02 | 0.07 | 0.09 | 0.81 | | | 0.81 | 0.40 |
| 2012_G4Sc_FT | 504 | MC | 04 | 1 | 1,127 | 0.64 | 0.00 | | 0.33 | 0.62 | 0.04 | 0.01 | | | 0.62 | 0.53 |
| 2012_G4Sc_FT | 504 | MC | 05 | 1 | 1,127 | 0.64 | 0.00 | | 0.83 | 0.11 | 0.04 | 0.01 | | | 0.83 | 0.51 |
| 2012_G4Sc_FT | 504 | MC | 06 | 1 | 1,127 | 0.64 | 0.00 | | 0.20 | 0.07 | 0.05 | 0.67 | | | 0.67 | 0.49 |
| 2012_G4Sc_FT | 504 | MC | 07 | 1 | 1,127 | 0.64 | 0.01 | | 0.21 | 0.70 | 0.04 | 0.03 | | | 0.70 | 0.59 |
| 2012_G4Sc_FT | 504 | MC | 08 | 1 | 1,127 | 0.64 | 0.01 | | 0.04 | 0.06 | 0.17 | 0.72 | | | 0.72 | 0.50 |
| 2012_G4Sc_FT | 504 | MC | 09 | 1 | 1,127 | 0.64 | 0.02 | | 0.02 | 0.03 | 0.08 | 0.86 | | | 0.86 | 0.38 |
| 2012_G4Sc_FT | 504 | MC | 10 | 1 | 1,127 | 0.64 | 0.03 | | 0.06 | 0.28 | 0.05 | 0.59 | | | 0.59 | 0.42 |
| 2012_G4Sc_FT | 504 | CR | 41 | 1 | 1,127 | 0.64 | 0.00 | 0.21 | 0.79 | | | | | | 0.79 | 0.37 |
| 2012_G4Sc_FT | 504 | CR | 42 | 1 | 1,127 | 0.64 | 0.00 | 0.30 | 0.70 | | | | | | 0.70 | 0.43 |
| 2012_G4Sc_FT | 504 | CR | 43 | | | | | | | | | | | | | |
| 2012_G4Sc_FT | 505 | MC | 01 | 1 | 1,147 | 0.55 | 0.00 | | 0.25 | 0.06 | 0.08 | 0.61 | | | 0.61 | 0.47 |
| 2012_G4Sc_FT | 505 | MC | 02 | 1 | 1,147 | 0.55 | 0.00 | | 0.16 | 0.22 | 0.42 | 0.20 | | | 0.42 | 0.40 |
| 2012_G4Sc_FT | 505 | MC | 03 | 1 | 1,147 | 0.55 | 0.00 | | 0.04 | 0.03 | 0.05 | 0.87 | | | 0.87 | 0.44 |
| 2012_G4Sc_FT | 505 | MC | 04 | 1 | 1,147 | 0.55 | 0.00 | | 0.18 | 0.05 | 0.06 | 0.71 | | | 0.71 | 0.38 |
| 2012_G4Sc_FT | 505 | MC | 05 | | | | | | | | | | | | | |
| 2012_G4Sc_FT | 505 | MC | 06 | 1 | 1,147 | 0.55 | 0.00 | | 0.03 | 0.88 | 0.06 | 0.02 | | | 0.88 | 0.38 |
| 2012_G4Sc_FT | 505 | MC | 07 | 1 | 1,147 | 0.55 | 0.00 | | 0.91 | 0.03 | 0.03 | 0.03 | | | 0.91 | 0.47 |
| 2012_G4Sc_FT | 505 | MC | 08 | 1 | 1,147 | 0.55 | 0.02 | | 0.37 | 0.08 | 0.51 | 0.02 | | | 0.51 | 0.41 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 505 | CR | 41 | 1 | 1,147 | 0.55 | 0.00 | 0.60 | 0.40 | | | | | | 0.40 | 0.44 |
| 2012_G4Sc_FT | 505 | CR | 42 | 1 | 1,147 | 0.55 | 0.00 | 0.38 | 0.62 | | | | | | 0.62 | 0.49 |
| 2012_G4Sc_FT | 505 | CR | 43 | 1 | 1,147 | 0.55 | 0.06 | 0.20 | 0.74 | | | | | | 0.74 | 0.44 |
| 2012_G4Sc_FT | 505 | CR | 44 | 1 | 1,147 | 0.55 | 0.03 | 0.15 | 0.81 | | | | | | 0.81 | 0.46 |
| 2012_G4Sc_FT | 506 | MC | 01 | 1 | 1,113 | 0.69 | 0.00 | | 0.09 | 0.85 | 0.03 | 0.02 | | | 0.85 | 0.57 |
| 2012_G4Sc_FT | 506 | MC | 02 | 1 | 1,113 | 0.69 | 0.00 | | 0.03 | 0.04 | 0.03 | 0.90 | | | 0.90 | 0.56 |
| 2012_G4Sc_FT | 506 | MC | 03 | 1 | 1,113 | 0.69 | 0.00 | | 0.76 | 0.06 | 0.10 | 0.07 | | | 0.76 | 0.54 |
| 2012_G4Sc_FT | 506 | MC | 04 | 1 | 1,113 | 0.69 | 0.01 | | 0.05 | 0.24 | 0.63 | 0.08 | | | 0.63 | 0.43 |
| 2012_G4Sc_FT | 506 | MC | 05 | 1 | 1,113 | 0.69 | 0.01 | | 0.01 | 0.89 | 0.01 | 0.08 | | | 0.89 | 0.35 |
| 2012_G4Sc_FT | 506 | MC | 06 | 1 | 1,113 | 0.69 | 0.02 | | 0.79 | 0.06 | 0.11 | 0.02 | | | 0.79 | 0.53 |
| 2012_G4Sc_FT | 506 | CR | 41 | 1 | 1,113 | 0.69 | 0.00 | 0.06 | 0.94 | | | | | | 0.94 | 0.39 |
| 2012_G4Sc_FT | 506 | CR | 42 | 1 | 1,113 | 0.69 | 0.01 | 0.27 | 0.71 | | | | | | 0.71 | 0.56 |
| 2012_G4Sc_FT | 506 | CR | 43 | 1 | 1,113 | 0.69 | 0.00 | 0.38 | 0.62 | | | | | | 0.62 | 0.58 |
| 2012_G4Sc_FT | 506 | CR | 44 | 1 | 1,113 | 0.69 | 0.02 | 0.32 | 0.66 | | | | | | 0.66 | 0.51 |
| 2012_G4Sc_FT | 506 | CR | 45 | 1 | 1,113 | 0.69 | 0.03 | 0.19 | 0.78 | | | | | | 0.78 | 0.42 |
| 2012_G4Sc_FT | 507 | MC | 01 | 1 | 1,135 | 0.59 | 0.00 | | 0.19 | 0.07 | 0.10 | 0.64 | | | 0.64 | 0.44 |
| 2012_G4Sc_FT | 507 | MC | 02 | 1 | 1,135 | 0.59 | 0.00 | | 0.06 | 0.07 | 0.85 | 0.02 | | | 0.85 | 0.51 |
| 2012_G4Sc_FT | 507 | MC | 03 | 1 | 1,135 | 0.59 | 0.00 | | 0.01 | 0.10 | 0.04 | 0.84 | | | 0.84 | 0.46 |
| 2012_G4Sc_FT | 507 | MC | 04 | 1 | 1,135 | 0.59 | 0.00 | | 0.57 | 0.33 | 0.03 | 0.06 | | | 0.57 | 0.52 |
| 2012_G4Sc_FT | 507 | MC | 05 | 1 | 1,135 | 0.59 | 0.00 | | 0.13 | 0.01 | 0.80 | 0.07 | | | 0.80 | 0.37 |
| 2012_G4Sc_FT | 507 | MC | 06 | 1 | 1,135 | 0.59 | 0.00 | | 0.02 | 0.04 | 0.03 | 0.91 | | | 0.91 | 0.47 |
| 2012_G4Sc_FT | 507 | MC | 07 | 1 | 1,135 | 0.59 | 0.01 | | 0.58 | 0.04 | 0.06 | 0.31 | | | 0.58 | 0.51 |
| 2012_G4Sc_FT | 507 | CR | 41 | 1 | 1,135 | 0.59 | 0.00 | 0.56 | 0.44 | | | | | | 0.44 | 0.44 |
| 2012_G4Sc_FT | 507 | CR | 42 | 1 | 1,135 | 0.59 | 0.01 | 0.27 | 0.72 | | | | | | 0.72 | 0.56 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 507 | CR | 43 | 1 | 1,135 | 0.59 | 0.01 | 0.20 | 0.79 | | | | | | 0.79 | 0.41 |
| 2012_G4Sc_FT | 507 | CR | 44 | | | | | | | | | | | | | |
| 2012_G4Sc_FT | 508 | MC | 01 | 1 | 1,128 | 0.62 | 0.00 | | 0.06 | 0.08 | 0.05 | 0.81 | | | 0.81 | 0.40 |
| 2012_G4Sc_FT | 508 | MC | 02 | 1 | 1,128 | 0.62 | 0.00 | | 0.44 | 0.52 | 0.04 | 0.00 | | | 0.52 | 0.46 |
| 2012_G4Sc_FT | 508 | MC | 03 | 1 | 1,128 | 0.62 | 0.00 | | 0.01 | 0.31 | 0.49 | 0.18 | | | 0.49 | 0.49 |
| 2012_G4Sc_FT | 508 | MC | 04 | 1 | 1,128 | 0.62 | 0.00 | | 0.03 | 0.86 | 0.03 | 0.08 | | | 0.86 | 0.27 |
| 2012_G4Sc_FT | 508 | MC | 05 | 1 | 1,128 | 0.62 | 0.00 | | 0.02 | 0.01 | 0.03 | 0.94 | | | 0.94 | 0.36 |
| 2012_G4Sc_FT | 508 | MC | 06 | 1 | 1,128 | 0.62 | 0.01 | | 0.08 | 0.06 | 0.75 | 0.10 | | | 0.75 | 0.45 |
| 2012_G4Sc_FT | 508 | MC | 07 | 1 | 1,128 | 0.62 | 0.02 | | 0.08 | 0.68 | 0.02 | 0.20 | | | 0.68 | 0.55 |
| 2012_G4Sc_FT | 508 | CR | 41 | 1 | 1,128 | 0.62 | 0.01 | 0.22 | 0.78 | | | | | | 0.78 | 0.50 |
| 2012_G4Sc_FT | 508 | CR | 42 | 1 | 1,128 | 0.62 | 0.01 | 0.20 | 0.79 | | | | | | 0.79 | 0.50 |
| 2012_G4Sc_FT | 508 | CR | 43 | 1 | 1,128 | 0.62 | 0.03 | 0.67 | 0.30 | | | | | | 0.30 | 0.53 |
| 2012_G4Sc_FT | 508 | CR | 44 | 1 | 1,128 | 0.62 | 0.02 | 0.27 | 0.71 | | | | | | 0.71 | 0.47 |
| 2012_G4Sc_FT | 509 | MC | 01 | 1 | 1,130 | 0.52 | 0.00 | | 0.23 | 0.65 | 0.08 | 0.04 | | | 0.65 | 0.47 |
| 2012_G4Sc_FT | 509 | MC | 02 | 1 | 1,130 | 0.52 | 0.00 | | 0.07 | 0.70 | 0.21 | 0.01 | | | 0.70 | 0.37 |
| 2012_G4Sc_FT | 509 | MC | 03 | 1 | 1,130 | 0.52 | 0.00 | | 0.20 | 0.02 | 0.05 | 0.72 | | | 0.72 | 0.51 |
| 2012_G4Sc_FT | 509 | MC | 04 | 1 | 1,130 | 0.52 | 0.00 | | 0.03 | 0.33 | 0.54 | 0.10 | | | 0.54 | 0.34 |
| 2012_G4Sc_FT | 509 | MC | 05 | 1 | 1,130 | 0.52 | 0.00 | | 0.78 | 0.08 | 0.05 | 0.09 | | | 0.78 | 0.40 |
| 2012_G4Sc_FT | 509 | MC | 06 | 1 | 1,130 | 0.52 | 0.01 | | 0.28 | 0.50 | 0.12 | 0.09 | | | 0.50 | 0.48 |
| 2012_G4Sc_FT | 509 | CR | 41 | 1 | 1,130 | 0.52 | 0.00 | 0.14 | 0.86 | | | | | | 0.86 | 0.39 |
| 2012_G4Sc_FT | 509 | CR | 42 | 1 | 1,130 | 0.52 | 0.01 | 0.46 | 0.53 | | | | | | 0.53 | 0.54 |
| 2012_G4Sc_FT | 509 | CR | 43 | 1 | 1,130 | 0.52 | 0.02 | 0.37 | 0.61 | | | | | | 0.61 | 0.42 |
| 2012_G4Sc_FT | 509 | CR | 44 | 1 | 1,130 | 0.52 | 0.02 | 0.20 | 0.78 | | | | | | 0.78 | 0.41 |
| 2012_G4Sc_FT | 510 | MC | 01 | 1 | 1,118 | 0.63 | 0.00 | | 0.06 | 0.57 | 0.32 | 0.05 | | | 0.57 | 0.28 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 510 | MC | 02 | 1 | 1,118 | 0.63 | 0.00 | | 0.76 | 0.18 | 0.06 | 0.00 | | | 0.76 | 0.40 |
| 2012_G4Sc_FT | 510 | MC | 03 | 1 | 1,118 | 0.63 | 0.00 | | 0.10 | 0.02 | 0.06 | 0.82 | | | 0.82 | 0.45 |
| 2012_G4Sc_FT | 510 | MC | 04 | 1 | 1,118 | 0.63 | 0.00 | | 0.07 | 0.13 | 0.68 | 0.11 | | | 0.68 | 0.60 |
| 2012_G4Sc_FT | 510 | MC | 05 | 1 | 1,118 | 0.63 | 0.00 | | 0.86 | 0.12 | 0.01 | 0.02 | | | 0.86 | 0.47 |
| 2012_G4Sc_FT | 510 | MC | 06 | 1 | 1,118 | 0.63 | 0.00 | | 0.05 | 0.92 | 0.02 | 0.01 | | | 0.92 | 0.47 |
| 2012_G4Sc_FT | 510 | MC | 07 | 1 | 1,118 | 0.63 | 0.00 | | 0.08 | 0.04 | 0.07 | 0.80 | | | 0.80 | 0.54 |
| 2012_G4Sc_FT | 510 | MC | 08 | 1 | 1,118 | 0.63 | 0.01 | | 0.90 | 0.03 | 0.02 | 0.05 | | | 0.90 | 0.51 |
| 2012_G4Sc_FT | 510 | CR | 41 | 1 | 1,118 | 0.63 | 0.01 | 0.30 | 0.69 | | | | | | 0.69 | 0.51 |
| 2012_G4Sc_FT | 510 | CR | 42 | 1 | 1,118 | 0.63 | 0.03 | 0.48 | 0.50 | | | | | | 0.50 | 0.51 |
| 2012_G4Sc_FT | 510 | CR | 43 | 1 | 1,118 | 0.63 | 0.01 | 0.12 | 0.87 | | | | | | 0.87 | 0.41 |
| 2012_G4Sc_FT | 511 | MC | 01 | 1 | 1,120 | 0.60 | 0.00 | | 0.03 | 0.06 | 0.73 | 0.18 | | | 0.73 | 0.52 |
| 2012_G4Sc_FT | 511 | MC | 02 | 1 | 1,120 | 0.60 | 0.00 | | 0.62 | 0.29 | 0.08 | 0.00 | | | 0.62 | 0.54 |
| 2012_G4Sc_FT | 511 | MC | 03 | 1 | 1,120 | 0.60 | 0.00 | | 0.02 | 0.02 | 0.46 | 0.50 | | | 0.46 | 0.52 |
| 2012_G4Sc_FT | 511 | MC | 04 | 1 | 1,120 | 0.60 | 0.01 | | 0.33 | 0.07 | 0.14 | 0.45 | | | 0.45 | 0.37 |
| 2012_G4Sc_FT | 511 | MC | 05 | 1 | 1,120 | 0.60 | 0.00 | | 0.04 | 0.93 | 0.01 | 0.01 | | | 0.93 | 0.37 |
| 2012_G4Sc_FT | 511 | MC | 06 | 1 | 1,120 | 0.60 | 0.01 | | 0.04 | 0.06 | 0.37 | 0.52 | | | 0.52 | 0.36 |
| 2012_G4Sc_FT | 511 | MC | 07 | 1 | 1,120 | 0.60 | 0.01 | | 0.07 | 0.63 | 0.25 | 0.04 | | | 0.63 | 0.34 |
| 2012_G4Sc_FT | 511 | MC | 08 | 1 | 1,120 | 0.60 | 0.03 | | 0.18 | 0.75 | 0.02 | 0.02 | | | 0.75 | 0.51 |
| 2012_G4Sc_FT | 511 | CR | 41 | 1 | 1,120 | 0.60 | 0.00 | 0.18 | 0.81 | | | | | | 0.81 | 0.46 |
| 2012_G4Sc_FT | 511 | CR | 42 | 1 | 1,120 | 0.60 | 0.01 | 0.12 | 0.87 | | | | | | 0.87 | 0.35 |
| 2012_G4Sc_FT | 511 | CR | 43 | 1 | 1,120 | 0.60 | 0.01 | 0.35 | 0.64 | | | | | | 0.64 | 0.44 |
| 2012_G4Sc_FT | 511 | CR | 44 | 1 | 1,120 | 0.60 | 0.02 | 0.11 | 0.87 | | | | | | 0.87 | 0.46 |
| 2012_G4Sc_FT | 511 | CR | 45 | | | | | | | | | | | | | |
| 2012_G4Sc_FT | 512 | MC | 01 | 1 | 1,115 | 0.60 | 0.00 | | 0.08 | 0.15 | 0.68 | 0.09 | | | 0.68 | 0.56 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 512 | MC | 02 | 1 | 1,115 | 0.60 | 0.00 | | 0.77 | 0.10 | 0.03 | 0.10 | | | 0.77 | 0.45 |
| 2012_G4Sc_FT | 512 | MC | 03 | 1 | 1,115 | 0.60 | 0.00 | | 0.82 | 0.02 | 0.04 | 0.12 | | | 0.82 | 0.45 |
| 2012_G4Sc_FT | 512 | MC | 04 | 1 | 1,115 | 0.60 | 0.00 | | 0.05 | 0.91 | 0.01 | 0.02 | | | 0.91 | 0.29 |
| 2012_G4Sc_FT | 512 | MC | 05 | 1 | 1,115 | 0.60 | 0.00 | | 0.03 | 0.05 | 0.90 | 0.02 | | | 0.90 | 0.39 |
| 2012_G4Sc_FT | 512 | MC | 06 | 1 | 1,115 | 0.60 | 0.00 | | 0.04 | 0.31 | 0.13 | 0.52 | | | 0.31 | 0.42 |
| 2012_G4Sc_FT | 512 | MC | 07 | 1 | 1,115 | 0.60 | 0.00 | | 0.52 | 0.21 | 0.15 | 0.12 | | | 0.52 | 0.36 |
| 2012_G4Sc_FT | 512 | MC | 08 | 1 | 1,115 | 0.60 | 0.02 | | 0.93 | 0.02 | 0.02 | 0.03 | | | 0.93 | 0.26 |
| 2012_G4Sc_FT | 512 | CR | 41 | 1 | 1,115 | 0.60 | 0.01 | 0.39 | 0.60 | | | | | | 0.60 | 0.51 |
| 2012_G4Sc_FT | 512 | CR | 42 | 1 | 1,115 | 0.60 | 0.01 | 0.37 | 0.62 | | | | | | 0.62 | 0.49 |
| 2012_G4Sc_FT | 512 | CR | 43 | 1 | 1,115 | 0.60 | 0.03 | 0.23 | 0.74 | | | | | | 0.74 | 0.54 |
| 2012_G4Sc_FT | 512 | CR | 44 | 1 | 1,115 | 0.60 | 0.03 | 0.33 | 0.64 | | | | | | 0.64 | 0.41 |
| 2012_G4Sc_FT | 513 | MC | 01 | 1 | 1,089 | 0.66 | 0.00 | | 0.70 | 0.10 | 0.03 | 0.16 | | | 0.70 | 0.50 |
| 2012_G4Sc_FT | 513 | MC | 02 | 1 | 1,089 | 0.66 | 0.00 | | 0.03 | 0.06 | 0.01 | 0.88 | | | 0.88 | 0.36 |
| 2012_G4Sc_FT | 513 | MC | 03 | 1 | 1,089 | 0.66 | 0.00 | | 0.02 | 0.68 | 0.11 | 0.18 | | | 0.68 | 0.47 |
| 2012_G4Sc_FT | 513 | MC | 04 | 1 | 1,089 | 0.66 | 0.00 | | 0.05 | 0.02 | 0.89 | 0.02 | | | 0.89 | 0.30 |
| 2012_G4Sc_FT | 513 | MC | 05 | 1 | 1,089 | 0.66 | 0.00 | | 0.72 | 0.16 | 0.11 | 0.00 | | | 0.72 | 0.48 |
| 2012_G4Sc_FT | 513 | MC | 06 | 1 | 1,089 | 0.66 | 0.00 | | 0.03 | 0.90 | 0.05 | 0.03 | | | 0.90 | 0.37 |
| 2012_G4Sc_FT | 513 | MC | 07 | 1 | 1,089 | 0.66 | 0.00 | | 0.22 | 0.04 | 0.08 | 0.66 | | | 0.66 | 0.59 |
| 2012_G4Sc_FT | 513 | MC | 08 | 1 | 1,089 | 0.66 | 0.01 | | 0.03 | 0.02 | 0.87 | 0.07 | | | 0.87 | 0.38 |
| 2012_G4Sc_FT | 513 | MC | 09 | 1 | 1,089 | 0.66 | 0.02 | | 0.60 | 0.10 | 0.10 | 0.18 | | | 0.60 | 0.51 |
| 2012_G4Sc_FT | 513 | CR | 41 | 1 | 1,089 | 0.66 | 0.05 | 0.72 | 0.23 | | | | | | 0.23 | 0.42 |
| 2012_G4Sc_FT | 513 | CR | 42 | 1 | 1,089 | 0.66 | 0.01 | 0.34 | 0.65 | | | | | | 0.65 | 0.54 |
| 2012_G4Sc_FT | 513 | CR | 43 | 1 | 1,089 | 0.66 | 0.05 | 0.33 | 0.62 | | | | | | 0.62 | 0.54 |
| 2012_G4Sc_FT | 514 | MC | 01 | 1 | 1,096 | 0.58 | 0.00 | | 0.20 | 0.49 | 0.13 | 0.18 | | | 0.49 | 0.44 |

| Test | Form | Type | Item, | Max | N-Count | Alpha | B | M0 | M1 | M2 | M3 | M4 | M5 | M6 | MEAN | Point-Biserial |
|--------------|------|------|-------|-----|---------|-------|------|------|------|------|------|------|----|----|------|----------------|
| 2012_G4Sc_FT | 514 | MC | 02 | 1 | 1,096 | 0.58 | 0.00 | | 0.10 | 0.03 | 0.74 | 0.13 | | | 0.74 | 0.46 |
| 2012_G4Sc_FT | 514 | MC | 03 | 1 | 1,096 | 0.58 | 0.00 | | 0.91 | 0.06 | 0.01 | 0.02 | | | 0.91 | 0.41 |
| 2012_G4Sc_FT | 514 | MC | 04 | 1 | 1,096 | 0.58 | 0.00 | | 0.07 | 0.03 | 0.88 | 0.02 | | | 0.88 | 0.30 |
| 2012_G4Sc_FT | 514 | MC | 05 | 1 | 1,096 | 0.58 | 0.00 | | 0.05 | 0.04 | 0.06 | 0.84 | | | 0.84 | 0.40 |
| 2012_G4Sc_FT | 514 | MC | 06 | 1 | 1,096 | 0.58 | 0.00 | | 0.10 | 0.03 | 0.82 | 0.04 | | | 0.82 | 0.45 |
| 2012_G4Sc_FT | 514 | MC | 07 | 1 | 1,096 | 0.58 | 0.00 | | 0.17 | 0.09 | 0.54 | 0.19 | | | 0.54 | 0.52 |
| 2012_G4Sc_FT | 514 | MC | 08 | 1 | 1,096 | 0.58 | 0.02 | | 0.01 | 0.02 | 0.04 | 0.91 | | | 0.91 | 0.27 |
| 2012_G4Sc_FT | 514 | CR | 41 | 1 | 1,096 | 0.58 | 0.00 | 0.22 | 0.77 | | | | | | 0.77 | 0.39 |
| 2012_G4Sc_FT | 514 | CR | 42 | 1 | 1,096 | 0.58 | 0.02 | 0.13 | 0.85 | | | | | | 0.85 | 0.29 |
| 2012_G4Sc_FT | 514 | CR | 43 | 1 | 1,096 | 0.58 | 0.03 | 0.19 | 0.78 | | | | | | 0.78 | 0.47 |
| 2012_G4Sc_FT | 514 | CR | 44 | 1 | 1,096 | 0.58 | 0.03 | 0.47 | 0.50 | | | | | | 0.50 | 0.40 |
| 2012_G4Sc_FT | 514 | CR | 45 | 1 | 1,096 | 0.58 | 0.04 | 0.56 | 0.40 | | | | | | 0.40 | 0.45 |

Appendix B: Partial-Credit Model Item Analysis

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 501 | MC | 01 | 1 | 1,116 | -0.3239 | | | | | | | 1.08 |
| 2012_G4Sc_FT | 501 | MC | 02 | 1 | 1,116 | -0.7400 | | | | | | | 1.09 |
| 2012_G4Sc_FT | 501 | MC | 03 | 1 | 1,116 | 0.9800 | | | | | | | 1.06 |
| 2012_G4Sc_FT | 501 | MC | 04 | 1 | 1,116 | 0.9632 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 501 | MC | 05 | 1 | 1,116 | 1.0300 | | | | | | | 1.18 |
| 2012_G4Sc_FT | 501 | MC | 06 | 1 | 1,116 | -0.7700 | | | | | | | 1.16 |
| 2012_G4Sc_FT | 501 | MC | 07 | 1 | 1,116 | 2.0900 | | | | | | | 1.12 |
| 2012_G4Sc_FT | 501 | MC | 08 | 1 | 1,116 | 0.5600 | | | | | | | 1.15 |
| 2012_G4Sc_FT | 501 | MC | 09 | 1 | 1,116 | -0.7500 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 501 | MC | 10 | 1 | 1,116 | -0.9100 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 501 | MC | 11 | 1 | 1,116 | 0.4100 | | | | | | | 0.90 |
| 2012_G4Sc_FT | 501 | MC | 12 | 1 | 1,116 | -0.4506 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 501 | MC | 13 | 1 | 1,116 | 0.8600 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 501 | MC | 14 | 1 | 1,116 | 1.1400 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 501 | MC | 15 | 1 | 1,116 | -0.9000 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 501 | MC | 16 | 1 | 1,116 | -0.0600 | | | | | | | 0.80 |
| 2012_G4Sc_FT | 501 | MC | 17 | 1 | 1,116 | -1.0600 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 501 | MC | 18 | 1 | 1,116 | -0.2000 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 501 | MC | 19 | 1 | 1,116 | 0.0900 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 501 | MC | 20 | 1 | 1,116 | 0.1310 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 501 | MC | 21 | 1 | 1,116 | 0.2700 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 501 | MC | 22 | 1 | 1,116 | -1.3091 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 501 | MC | 23 | 1 | 1,116 | -0.5600 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 501 | MC | 24 | 1 | 1,116 | 0.9300 | | | | | | | 1.04 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 501 | MC | 25 | 1 | 1,116 | -0.3300 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 502 | MC | 01 | 1 | 1,138 | 0.1226 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 502 | MC | 02 | 1 | 1,138 | 0.4523 | | | | | | | 0.92 |
| 2012_G4Sc_FT | 502 | MC | 03 | 1 | 1,138 | 0.1455 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 502 | MC | 04 | 1 | 1,138 | 1.1073 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 502 | MC | 05 | 1 | 1,138 | -0.5652 | | | | | | | 1.01 |
| 2012_G4Sc_FT | 502 | MC | 06 | 1 | 1,138 | -0.2975 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 502 | MC | 07 | 1 | 1,138 | 0.4829 | | | | | | | 1.12 |
| 2012_G4Sc_FT | 502 | MC | 08 | 1 | 1,138 | 1.1253 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 502 | MC | 09 | 1 | 1,138 | 0.4317 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 502 | CR | 41 | 1 | 1,138 | 1.6270 | | | | | | | 1.08 |
| 2012_G4Sc_FT | 502 | CR | 42 | 1 | 1,138 | -0.4488 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 502 | CR | 43 | 1 | 1,138 | 0.9896 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 502 | CR | 44 | 1 | 1,138 | -0.6056 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 503 | MC | 01 | 1 | 1,118 | 0.9531 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 503 | MC | 02 | 1 | 1,118 | -0.0118 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 503 | MC | 03 | 1 | 1,118 | 1.1330 | | | | | | | 1.16 |
| 2012_G4Sc_FT | 503 | MC | 04 | 1 | 1,118 | 0.7200 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 503 | MC | 05 | 1 | 1,118 | 0.2723 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 503 | MC | 06 | 1 | 1,118 | -0.6179 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 503 | MC | 07 | 1 | 1,118 | 0.8068 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 503 | MC | 08 | 1 | 1,118 | -0.0552 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 503 | CR | 41 | | | | | | | | | | |
| 2012_G4Sc_FT | 503 | CR | 42 | 1 | 1,118 | -0.2646 | | | | | | | 0.94 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 503 | CR | 43 | 1 | 1,118 | 2.2622 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 503 | CR | 44 | 1 | 1,118 | 1.5129 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 504 | MC | 01 | 1 | 1,127 | -0.3395 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 504 | MC | 02 | 1 | 1,127 | 0.4598 | | | | | | | 1.12 |
| 2012_G4Sc_FT | 504 | MC | 03 | 1 | 1,127 | -0.0697 | | | | | | | 1.01 |
| 2012_G4Sc_FT | 504 | MC | 04 | 1 | 1,127 | 1.0645 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 504 | MC | 05 | 1 | 1,127 | -0.2311 | | | | | | | 0.88 |
| 2012_G4Sc_FT | 504 | MC | 06 | 1 | 1,127 | 0.8126 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 504 | MC | 07 | 1 | 1,127 | 0.6327 | | | | | | | 0.85 |
| 2012_G4Sc_FT | 504 | MC | 08 | 1 | 1,127 | 0.5013 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 504 | MC | 09 | 1 | 1,127 | -0.4470 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 504 | MC | 10 | 1 | 1,127 | 1.2146 | | | | | | | 1.10 |
| 2012_G4Sc_FT | 504 | CR | 41 | 1 | 1,127 | 0.0980 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 504 | CR | 42 | 1 | 1,127 | 0.6526 | | | | | | | 1.05 |
| 2012_G4Sc_FT | 504 | CR | 43 | | | | | | | | | | |
| 2012_G4Sc_FT | 505 | MC | 01 | 1 | 1,147 | 0.9109 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 505 | MC | 02 | 1 | 1,147 | 1.8256 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 505 | MC | 03 | 1 | 1,147 | -0.7399 | | | | | | | 0.92 |
| 2012_G4Sc_FT | 505 | MC | 04 | 1 | 1,147 | 0.4266 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 505 | MC | 05 | | | | | | | | | | |
| 2012_G4Sc_FT | 505 | MC | 06 | 1 | 1,147 | -0.8007 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 505 | MC | 07 | 1 | 1,147 | -1.1049 | | | | | | | 0.86 |
| 2012_G4Sc_FT | 505 | MC | 08 | 1 | 1,147 | 1.3875 | | | | | | | 1.06 |
| 2012_G4Sc_FT | 505 | CR | 41 | 1 | 1,147 | 1.9192 | | | | | | | 1.00 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 505 | CR | 42 | 1 | 1,147 | 0.8767 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 505 | CR | 43 | 1 | 1,147 | 0.2385 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 505 | CR | 44 | 1 | 1,147 | -0.2497 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 506 | MC | 01 | 1 | 1,113 | -0.3179 | | | | | | | 0.86 |
| 2012_G4Sc_FT | 506 | MC | 02 | 1 | 1,113 | -0.8117 | | | | | | | 0.83 |
| 2012_G4Sc_FT | 506 | MC | 03 | 1 | 1,113 | 0.3653 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 506 | MC | 04 | 1 | 1,113 | 1.1619 | | | | | | | 1.18 |
| 2012_G4Sc_FT | 506 | MC | 05 | 1 | 1,113 | -0.7790 | | | | | | | 1.11 |
| 2012_G4Sc_FT | 506 | MC | 06 | 1 | 1,113 | 0.1479 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 506 | CR | 41 | 1 | 1,113 | -1.4325 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 506 | CR | 42 | 1 | 1,113 | 0.6748 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 506 | CR | 43 | 1 | 1,113 | 1.2378 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 506 | CR | 44 | 1 | 1,113 | 0.9713 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 506 | CR | 45 | 1 | 1,113 | 0.2137 | | | | | | | 1.13 |
| 2012_G4Sc_FT | 507 | MC | 01 | 1 | 1,135 | 0.8787 | | | | | | | 1.08 |
| 2012_G4Sc_FT | 507 | MC | 02 | 1 | 1,135 | -0.4452 | | | | | | | 0.88 |
| 2012_G4Sc_FT | 507 | MC | 03 | 1 | 1,135 | -0.3555 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 507 | MC | 04 | 1 | 1,135 | 1.2513 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 507 | MC | 05 | 1 | 1,135 | -0.0339 | | | | | | | 1.11 |
| 2012_G4Sc_FT | 507 | MC | 06 | 1 | 1,135 | -1.0390 | | | | | | | 0.89 |
| 2012_G4Sc_FT | 507 | MC | 07 | 1 | 1,135 | 1.1895 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 507 | CR | 41 | 1 | 1,135 | 1.9248 | | | | | | | 1.11 |
| 2012_G4Sc_FT | 507 | CR | 42 | 1 | 1,135 | 0.4326 | | | | | | | 0.90 |
| 2012_G4Sc_FT | 507 | CR | 43 | 1 | 1,135 | 0.0273 | | | | | | | 1.05 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 507 | CR | 44 | | | | | | | | | | |
| 2012_G4Sc_FT | 508 | MC | 01 | 1 | 1,128 | -0.1612 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 508 | MC | 02 | 1 | 1,128 | 1.4351 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 508 | MC | 03 | 1 | 1,128 | 1.5905 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 508 | MC | 04 | 1 | 1,128 | -0.5770 | | | | | | | 1.15 |
| 2012_G4Sc_FT | 508 | MC | 05 | 1 | 1,128 | -1.5772 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 508 | MC | 06 | 1 | 1,128 | 0.2401 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 508 | MC | 07 | 1 | 1,128 | 0.6049 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 508 | CR | 41 | 1 | 1,128 | 0.0302 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 508 | CR | 42 | 1 | 1,128 | -0.0727 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 508 | CR | 43 | 1 | 1,128 | 2.6446 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 508 | CR | 44 | 1 | 1,128 | 0.4506 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 509 | MC | 01 | 1 | 1,130 | 0.7678 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 509 | MC | 02 | 1 | 1,130 | 0.4968 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 509 | MC | 03 | 1 | 1,130 | 0.4063 | | | | | | | 0.90 |
| 2012_G4Sc_FT | 509 | MC | 04 | 1 | 1,130 | 1.2976 | | | | | | | 1.14 |
| 2012_G4Sc_FT | 509 | MC | 05 | 1 | 1,130 | 0.0772 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 509 | MC | 06 | 1 | 1,130 | 1.4871 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 509 | CR | 41 | 1 | 1,130 | -0.4889 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 509 | CR | 42 | 1 | 1,130 | 1.3387 | | | | | | | 0.92 |
| 2012_G4Sc_FT | 509 | CR | 43 | 1 | 1,130 | 0.9483 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 509 | CR | 44 | 1 | 1,130 | 0.0383 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 510 | MC | 01 | 1 | 1,118 | 1.3194 | | | | | | | 1.35 |
| 2012_G4Sc_FT | 510 | MC | 02 | 1 | 1,118 | 0.2784 | | | | | | | 1.11 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 510 | MC | 03 | 1 | 1,118 | -0.1793 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 510 | MC | 04 | 1 | 1,118 | 0.7353 | | | | | | | 0.85 |
| 2012_G4Sc_FT | 510 | MC | 05 | 1 | 1,118 | -0.5011 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 510 | MC | 06 | 1 | 1,118 | -1.2559 | | | | | | | 0.86 |
| 2012_G4Sc_FT | 510 | MC | 07 | 1 | 1,118 | -0.0427 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 510 | MC | 08 | 1 | 1,118 | -0.9279 | | | | | | | 0.85 |
| 2012_G4Sc_FT | 510 | CR | 41 | 1 | 1,118 | 0.6641 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 510 | CR | 42 | 1 | 1,118 | 1.7166 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 510 | CR | 43 | 1 | 1,118 | -0.5957 | | | | | | | 1.01 |
| 2012_G4Sc_FT | 511 | MC | 01 | 1 | 1,120 | 0.2940 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 511 | MC | 02 | 1 | 1,120 | 0.9054 | | | | | | | 0.91 |
| 2012_G4Sc_FT | 511 | MC | 03 | 1 | 1,120 | 1.6954 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 511 | MC | 04 | 1 | 1,120 | 1.7301 | | | | | | | 1.14 |
| 2012_G4Sc_FT | 511 | MC | 05 | 1 | 1,120 | -1.4493 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 511 | MC | 06 | 1 | 1,120 | 1.3780 | | | | | | | 1.13 |
| 2012_G4Sc_FT | 511 | MC | 07 | 1 | 1,120 | 0.8652 | | | | | | | 1.15 |
| 2012_G4Sc_FT | 511 | MC | 08 | 1 | 1,120 | 0.1818 | | | | | | | 0.92 |
| 2012_G4Sc_FT | 511 | CR | 41 | 1 | 1,120 | -0.2102 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 511 | CR | 42 | 1 | 1,120 | -0.6582 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 511 | CR | 43 | 1 | 1,120 | 0.8111 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 511 | CR | 44 | 1 | 1,120 | -0.7093 | | | | | | | 0.89 |
| 2012_G4Sc_FT | 511 | CR | 45 | | | | | | | | | | |
| 2012_G4Sc_FT | 512 | MC | 01 | 1 | 1,115 | 0.6027 | | | | | | | 0.88 |
| 2012_G4Sc_FT | 512 | MC | 02 | 1 | 1,115 | 0.0793 | | | | | | | 0.97 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 512 | MC | 03 | 1 | 1,115 | -0.3021 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 512 | MC | 04 | 1 | 1,115 | -1.1915 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 512 | MC | 05 | 1 | 1,115 | -1.0225 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 512 | MC | 06 | 1 | 1,115 | 2.5155 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 512 | MC | 07 | 1 | 1,115 | 1.4043 | | | | | | | 1.16 |
| 2012_G4Sc_FT | 512 | MC | 08 | 1 | 1,115 | -1.3568 | | | | | | | 1.05 |
| 2012_G4Sc_FT | 512 | CR | 41 | 1 | 1,115 | 1.0065 | | | | | | | 0.97 |
| 2012_G4Sc_FT | 512 | CR | 42 | 1 | 1,115 | 0.9116 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 512 | CR | 43 | 1 | 1,115 | 0.2463 | | | | | | | 0.89 |
| 2012_G4Sc_FT | 512 | CR | 44 | 1 | 1,115 | 0.7921 | | | | | | | 1.08 |
| 2012_G4Sc_FT | 513 | MC | 01 | 1 | 1,089 | 0.4671 | | | | | | | 0.99 |
| 2012_G4Sc_FT | 513 | MC | 02 | 1 | 1,089 | -0.8855 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 513 | MC | 03 | 1 | 1,089 | 0.5720 | | | | | | | 1.03 |
| 2012_G4Sc_FT | 513 | MC | 04 | 1 | 1,089 | -0.9967 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 513 | MC | 05 | 1 | 1,089 | 0.3374 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 513 | MC | 06 | 1 | 1,089 | -1.0072 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 513 | MC | 07 | 1 | 1,089 | 0.7097 | | | | | | | 0.88 |
| 2012_G4Sc_FT | 513 | MC | 08 | 1 | 1,089 | -0.7633 | | | | | | | 1.01 |
| 2012_G4Sc_FT | 513 | MC | 09 | 1 | 1,089 | 1.0433 | | | | | | | 1.00 |
| 2012_G4Sc_FT | 513 | CR | 41 | 1 | 1,089 | 3.2260 | | | | | | | 1.06 |
| 2012_G4Sc_FT | 513 | CR | 42 | 1 | 1,089 | 0.7648 | | | | | | | 0.95 |
| 2012_G4Sc_FT | 513 | CR | 43 | 1 | 1,089 | 0.9175 | | | | | | | 0.96 |
| 2012_G4Sc_FT | 514 | MC | 01 | 1 | 1,096 | 1.5604 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 514 | MC | 02 | 1 | 1,096 | 0.2570 | | | | | | | 0.96 |

| Test | Form | Type | Item | Max | N-Count | RID | S1 | S2 | S3 | S4 | S5 | S6 | INFIT |
|--------------|------|------|------|-----|---------|---------|----|----|----|----|----|----|-------|
| 2012_G4Sc_FT | 514 | MC | 03 | 1 | 1,096 | -1.0821 | | | | | | | 0.90 |
| 2012_G4Sc_FT | 514 | MC | 04 | 1 | 1,096 | -0.7285 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 514 | MC | 05 | 1 | 1,096 | -0.3744 | | | | | | | 0.98 |
| 2012_G4Sc_FT | 514 | MC | 06 | 1 | 1,096 | -0.2617 | | | | | | | 0.94 |
| 2012_G4Sc_FT | 514 | MC | 07 | 1 | 1,096 | 1.3099 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 514 | MC | 08 | 1 | 1,096 | -1.1052 | | | | | | | 1.04 |
| 2012_G4Sc_FT | 514 | CR | 41 | 1 | 1,096 | 0.0776 | | | | | | | 1.02 |
| 2012_G4Sc_FT | 514 | CR | 42 | 1 | 1,096 | -0.5103 | | | | | | | 1.07 |
| 2012_G4Sc_FT | 514 | CR | 43 | 1 | 1,096 | 0.0007 | | | | | | | 0.93 |
| 2012_G4Sc_FT | 514 | CR | 44 | 1 | 1,096 | 1.4811 | | | | | | | 1.08 |
| 2012_G4Sc_FT | 514 | CR | 45 | 1 | 1,096 | 2.0081 | | | | | | | 1.02 |

Appendix C: DIF Statistics

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 501 | 01 | MC | 0.15 | 0.14 | 0.03 | | |
| 501 | 02 | MC | -0.38 | 0.66 | -0.05 | | |
| 501 | 03 | MC | -0.55 | 2.61 | -0.08 | | |
| 501 | 04 | MC | -0.22 | 0.42 | -0.03 | | |
| 501 | 05 | MC | 0.37 | 1.36 | 0.06 | | |
| 501 | 06 | MC | -0.64 | 2.00 | -0.07 | | |
| 501 | 07 | MC | -0.82 | 6.27 | -0.14 | | |
| 501 | 08 | MC | -0.13 | 0.15 | -0.01 | | |
| 501 | 09 | MC | -0.12 | 0.07 | -0.02 | | |
| 501 | 10 | MC | -0.09 | 0.03 | 0.00 | | |
| 501 | 11 | MC | -0.72 | 3.39 | -0.11 | | |
| 501 | 12 | MC | 0.61 | 1.99 | 0.09 | | |
| 501 | 13 | MC | -0.06 | 0.03 | 0.00 | | |
| 501 | 14 | MC | 0.19 | 0.27 | 0.03 | | |
| 501 | 15 | MC | 0.35 | 0.45 | 0.04 | | |
| 501 | 16 | MC | 0.14 | 0.10 | 0.03 | | |
| 501 | 17 | MC | 1.03 | 3.08 | 0.09 | | |
| 501 | 18 | MC | 1.00 | 5.75 | 0.11 | | |
| 501 | 19 | MC | 0.86 | 5.00 | 0.13 | | |
| 501 | 20 | MC | 0.18 | 0.23 | 0.04 | | |
| 501 | 21 | MC | -0.59 | 2.34 | -0.10 | | |
| 501 | 22 | MC | -0.60 | 0.90 | -0.05 | | |
| 501 | 23 | MC | 0.37 | 0.62 | 0.03 | | |
| 501 | 24 | MC | 0.38 | 1.28 | 0.05 | | |
| 501 | 25 | MC | -0.05 | 0.01 | -0.03 | | |
| 502 | 01 | MC | 0.91 | 5.61 | 0.13 | | |
| 502 | 02 | MC | -0.36 | 0.93 | -0.05 | | |
| 502 | 03 | MC | 0.04 | 0.01 | 0.01 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 502 | 04 | MC | -0.78 | 5.53 | -0.13 | | |
| 502 | 05 | MC | 0.13 | 0.08 | 0.02 | | |
| 502 | 06 | MC | -0.15 | 0.13 | -0.02 | | |
| 502 | 07 | MC | 0.42 | 1.56 | 0.06 | | |
| 502 | 08 | MC | -0.30 | 0.70 | -0.04 | | |
| 502 | 09 | MC | -0.36 | 1.02 | -0.06 | | |
| 502 | 41 | OE | | 0.11 | 0.02 | | |
| 502 | 42 | OE | | 0.58 | 0.04 | | |
| 502 | 43 | OE | | 1.82 | 0.07 | | |
| 502 | 44 | OE | | 0.57 | -0.05 | | |
| 503 | 01 | MC | 1.15 | 11.25 | 0.17 | B | Female |
| 503 | 02 | MC | -0.56 | 2.08 | -0.09 | | |
| 503 | 03 | MC | -0.65 | 4.21 | -0.12 | | |
| 503 | 04 | MC | 0.24 | 0.46 | 0.04 | | |
| 503 | 05 | MC | -1.53 | 16.16 | -0.22 | C | Male |
| 503 | 06 | MC | 0.51 | 1.18 | 0.06 | | |
| 503 | 07 | MC | -1.14 | 11.17 | -0.18 | B | Male |
| 503 | 08 | MC | 0.94 | 5.32 | 0.12 | | |
| 503 | 41 | OE | | | | | |
| 503 | 42 | OE | | 11.33 | 0.19 | BB | Female |
| 503 | 43 | OE | | 0.03 | 0.01 | | |
| 503 | 44 | OE | | 0.92 | 0.06 | | |
| 504 | 01 | MC | -0.13 | 0.09 | -0.02 | | |
| 504 | 02 | MC | -0.97 | 7.89 | -0.16 | | |
| 504 | 03 | MC | 0.38 | 0.90 | 0.05 | | |
| 504 | 04 | MC | -0.35 | 1.06 | -0.06 | | |
| 504 | 05 | MC | 0.69 | 2.36 | 0.08 | | |
| 504 | 06 | MC | 0.38 | 1.23 | 0.06 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 504 | 07 | MC | -0.39 | 1.06 | -0.05 | | |
| 504 | 08 | MC | -0.47 | 1.61 | -0.07 | | |
| 504 | 09 | MC | 0.24 | 0.30 | 0.03 | | |
| 504 | 10 | MC | -0.03 | 0.01 | 0.00 | | |
| 504 | 41 | OE | | 1.61 | 0.07 | | |
| 504 | 42 | OE | | 0.09 | 0.02 | | |
| 504 | 43 | OE | | | | | |
| 505 | 01 | MC | -0.35 | 1.17 | -0.06 | | |
| 505 | 02 | MC | 0.74 | 5.47 | 0.13 | | |
| 505 | 03 | MC | 1.11 | 4.94 | 0.12 | B | Female |
| 505 | 04 | MC | -0.19 | 0.31 | -0.03 | | |
| 505 | 05 | MC | | | | | |
| 505 | 06 | MC | -0.69 | 2.09 | -0.08 | | |
| 505 | 07 | MC | -0.47 | 0.62 | -0.04 | | |
| 505 | 08 | MC | -0.57 | 3.40 | -0.09 | | |
| 505 | 41 | OE | | 5.39 | -0.12 | | |
| 505 | 42 | OE | | 4.45 | 0.11 | | |
| 505 | 43 | OE | | 1.77 | 0.07 | | |
| 505 | 44 | OE | | 0.01 | 0.00 | | |
| 506 | 01 | MC | 1.41 | 7.52 | 0.15 | B | Female |
| 506 | 02 | MC | 1.43 | 5.29 | 0.12 | B | Female |
| 506 | 03 | MC | -0.26 | 0.43 | -0.04 | | |
| 506 | 04 | MC | -0.22 | 0.42 | -0.03 | | |
| 506 | 05 | MC | -0.59 | 1.35 | -0.08 | | |
| 506 | 06 | MC | 0.52 | 1.53 | 0.08 | | |
| 506 | 41 | OE | | 0.14 | 0.03 | | |
| 506 | 42 | OE | | 0.07 | -0.02 | | |
| 506 | 43 | OE | | 0.69 | -0.04 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 506 | 44 | OE | | 1.59 | -0.08 | | |
| 506 | 45 | OE | | 0.02 | -0.02 | | |
| 507 | 01 | MC | -1.01 | 9.23 | -0.17 | B | Male |
| 507 | 02 | MC | 0.21 | 0.20 | 0.02 | | |
| 507 | 03 | MC | 0.19 | 0.19 | 0.02 | | |
| 507 | 04 | MC | -0.29 | 0.72 | -0.05 | | |
| 507 | 05 | MC | 0.76 | 3.88 | 0.12 | | |
| 507 | 06 | MC | -0.80 | 1.93 | -0.08 | | |
| 507 | 07 | MC | 0.07 | 0.04 | 0.02 | | |
| 507 | 41 | OE | | 1.12 | 0.05 | | |
| 507 | 42 | OE | | 0.18 | 0.02 | | |
| 507 | 43 | OE | | 1.29 | 0.07 | | |
| 507 | 44 | OE | | | | | |
| 508 | 01 | MC | 0.29 | 0.53 | 0.05 | | |
| 508 | 02 | MC | -0.71 | 4.80 | -0.11 | | |
| 508 | 03 | MC | -0.68 | 4.28 | -0.11 | | |
| 508 | 04 | MC | 0.10 | 0.05 | 0.00 | | |
| 508 | 05 | MC | 1.43 | 4.42 | 0.13 | B | Female |
| 508 | 06 | MC | -0.11 | 0.09 | -0.02 | | |
| 508 | 07 | MC | 0.00 | 0.00 | 0.01 | | |
| 508 | 41 | OE | | 0.03 | 0.00 | | |
| 508 | 42 | OE | | 0.03 | 0.01 | | |
| 508 | 43 | OE | | 0.20 | 0.02 | | |
| 508 | 44 | OE | | 5.14 | 0.12 | | |
| 509 | 01 | MC | -0.16 | 0.23 | -0.03 | | |
| 509 | 02 | MC | -0.05 | 0.03 | -0.02 | | |
| 509 | 03 | MC | 0.52 | 1.95 | 0.08 | | |
| 509 | 04 | MC | 0.25 | 0.68 | 0.04 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 509 | 05 | MC | -0.51 | 1.88 | -0.08 | | |
| 509 | 06 | MC | 0.09 | 0.08 | 0.02 | | |
| 509 | 41 | OE | | 0.83 | 0.06 | | |
| 509 | 42 | OE | | 9.60 | 0.16 | | |
| 509 | 43 | OE | | 0.03 | 0.01 | | |
| 509 | 44 | OE | | 26.56 | -0.29 | CC | Male |
| 510 | 01 | MC | 0.03 | 0.01 | 0.01 | | |
| 510 | 02 | MC | -0.50 | 1.81 | -0.07 | | |
| 510 | 03 | MC | 0.21 | 0.24 | 0.02 | | |
| 510 | 04 | MC | 0.55 | 2.04 | 0.07 | | |
| 510 | 05 | MC | -0.09 | 0.04 | -0.02 | | |
| 510 | 06 | MC | -0.25 | 0.15 | -0.02 | | |
| 510 | 07 | MC | -0.18 | 0.17 | -0.02 | | |
| 510 | 08 | MC | -1.01 | 3.01 | -0.08 | | |
| 510 | 41 | OE | | 0.44 | -0.04 | | |
| 510 | 42 | OE | | 1.57 | 0.06 | | |
| 510 | 43 | OE | | 0.58 | 0.04 | | |
| 511 | 01 | MC | 0.12 | 0.10 | 0.02 | | |
| 511 | 02 | MC | -0.54 | 2.35 | -0.08 | | |
| 511 | 03 | MC | -0.14 | 0.17 | -0.02 | | |
| 511 | 04 | MC | -0.34 | 1.24 | -0.06 | | |
| 511 | 05 | MC | -0.19 | 0.09 | -0.02 | | |
| 511 | 06 | MC | 0.09 | 0.09 | 0.02 | | |
| 511 | 07 | MC | -0.09 | 0.08 | -0.01 | | |
| 511 | 08 | MC | -0.16 | 0.17 | -0.03 | | |
| 511 | 41 | OE | | 2.09 | 0.08 | | |
| 511 | 42 | OE | | 1.51 | 0.06 | | |
| 511 | 43 | OE | | 0.00 | 0.00 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 511 | 44 | OE | | 3.85 | 0.11 | | |
| 511 | 45 | OE | | | | | |
| 512 | 01 | MC | -0.45 | 1.44 | -0.06 | | |
| 512 | 02 | MC | 0.17 | 0.20 | 0.02 | | |
| 512 | 03 | MC | 0.46 | 1.23 | 0.06 | | |
| 512 | 04 | MC | -0.33 | 0.38 | -0.03 | | |
| 512 | 05 | MC | -0.84 | 2.48 | -0.09 | | |
| 512 | 06 | MC | -0.60 | 2.84 | -0.09 | | |
| 512 | 07 | MC | 0.99 | 10.27 | 0.19 | | |
| 512 | 08 | MC | 0.49 | 0.79 | 0.05 | | |
| 512 | 41 | OE | | 1.15 | 0.06 | | |
| 512 | 42 | OE | | 0.08 | 0.02 | | |
| 512 | 43 | OE | | 6.71 | -0.13 | | |
| 512 | 44 | OE | | 0.12 | -0.03 | | |
| 513 | 01 | MC | 0.16 | 0.19 | 0.04 | | |
| 513 | 02 | MC | 1.43 | 7.83 | 0.17 | B | Female |
| 513 | 03 | MC | -0.36 | 1.00 | -0.06 | | |
| 513 | 04 | MC | 1.00 | 3.95 | 0.12 | | |
| 513 | 05 | MC | -0.42 | 1.26 | -0.06 | | |
| 513 | 06 | MC | 0.05 | 0.01 | 0.02 | | |
| 513 | 07 | MC | -0.44 | 1.35 | -0.07 | | |
| 513 | 08 | MC | -0.82 | 2.89 | -0.09 | | |
| 513 | 09 | MC | 0.21 | 0.35 | 0.03 | | |
| 513 | 41 | OE | | 1.65 | -0.07 | | |
| 513 | 42 | OE | | 0.20 | 0.02 | | |
| 513 | 43 | OE | | 0.35 | 0.02 | | |
| 514 | 01 | MC | -0.42 | 1.67 | -0.07 | | |
| 514 | 02 | MC | 0.30 | 0.64 | 0.05 | | |

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 514 | 03 | MC | -1.23 | 4.58 | -0.12 | B | Male |
| 514 | 04 | MC | 1.22 | 6.66 | 0.14 | B | Female |
| 514 | 05 | MC | -0.08 | 0.03 | -0.02 | | |
| 514 | 06 | MC | -1.54 | 13.24 | -0.18 | C | Male |
| 514 | 07 | MC | -0.57 | 2.71 | -0.08 | | |
| 514 | 08 | MC | 0.96 | 3.23 | 0.12 | | |

*DIF Category meanings: A/AA = negligible, B/BB = moderate, C/CC = large

| Form | Item | Item Type | MH Delta | MH Chi-Sq | Effect Size | DIF Category | Favored Group |
|------|------|-----------|----------|-----------|-------------|--------------|---------------|
| 514 | 41 | OE | | 7.68 | 0.14 | | |
| 514 | 42 | OE | | 0.77 | 0.05 | | |
| 514 | 43 | OE | | 0.42 | -0.02 | | |
| 514 | 44 | OE | | 2.57 | 0.09 | | |
| 514 | 45 | OE | | 0.73 | -0.05 | | |

Appendix D: Operational Test Map

June 2012

| Position | Item Type | Max Points | Weight | Strand | Mean | Point-Biserial | Rasch | S1 | S2 | S3 | S4 | S5 | S6 |
|----------|-----------|------------|--------|--------|------|----------------|-------|----|----|----|----|----|----|
| 1 | MC | 1 | 1 | 4 | 0.85 | 0.42 | -0.51 | | | | | | |
| 2 | MC | 1 | 1 | 4 | 0.41 | 0.53 | 2.07 | | | | | | |
| 3 | MC | 1 | 1 | 4 | 0.81 | 0.41 | -0.15 | | | | | | |
| 4 | MC | 1 | 1 | 4 | 0.80 | 0.53 | -0.07 | | | | | | |
| 5 | MC | 1 | 1 | 4 | 0.79 | 0.32 | -0.09 | | | | | | |
| 6 | MC | 1 | 1 | 4 | 0.77 | 0.47 | -0.09 | | | | | | |
| 7 | MC | 1 | 1 | 4 | 0.89 | 0.42 | -1.23 | | | | | | |
| 8 | MC | 1 | 1 | 4 | 0.84 | 0.27 | -0.50 | | | | | | |
| 9 | MC | 1 | 1 | 4 | 0.54 | 0.45 | 1.15 | | | | | | |
| 10 | MC | 1 | 1 | 4 | 0.61 | 0.53 | 1.02 | | | | | | |
| 11 | MC | 1 | 1 | 4 | 0.66 | 0.50 | 0.61 | | | | | | |
| 12 | MC | 1 | 1 | 4 | 0.49 | 0.47 | 1.62 | | | | | | |
| 13 | MC | 1 | 1 | 4 | 0.68 | 0.43 | 0.70 | | | | | | |
| 14 | MC | 1 | 1 | 4 | 0.93 | 0.42 | -1.40 | | | | | | |
| 15 | MC | 1 | 1 | 4 | 0.89 | 0.36 | -0.94 | | | | | | |
| 16 | MC | 1 | 1 | 4 | 0.59 | 0.48 | 0.95 | | | | | | |
| 17 | MC | 1 | 1 | 4 | 0.90 | 0.46 | -1.25 | | | | | | |
| 18 | MC | 1 | 1 | 4 | 0.76 | 0.31 | 0.13 | | | | | | |
| 19 | MC | 1 | 1 | 4 | 0.79 | 0.51 | -0.27 | | | | | | |
| 20 | MC | 1 | 1 | 4 | 0.78 | 0.44 | 0.04 | | | | | | |
| 21 | MC | 1 | 1 | 4 | 0.89 | 0.40 | -0.93 | | | | | | |
| 22 | MC | 1 | 1 | 4 | 0.76 | 0.49 | 0.08 | | | | | | |
| 23 | MC | 1 | 1 | 4 | 0.78 | 0.23 | -0.28 | | | | | | |

| Position | Item Type | Max Points | Weight | Strand | Mean | Point-Biserial | Rasch | S1 | S2 | S3 | S4 | S5 | S6 |
|----------|-----------|------------|--------|--------|------|----------------|-------|-------|-------|----|----|----|----|
| 24 | MC | 1 | 1 | 4 | 0.74 | 0.47 | 0.34 | | | | | | |
| 25 | MC | 1 | 1 | 4 | 0.65 | 0.62 | 0.80 | | | | | | |
| 26 | MC | 1 | 1 | 4 | 0.94 | 0.27 | -2.17 | | | | | | |
| 27 | MC | 1 | 1 | 6 | 0.53 | 0.31 | 1.09 | | | | | | |
| 28 | MC | 1 | 1 | 6 | 0.86 | 0.42 | -0.55 | | | | | | |
| 29 | MC | 1 | 1 | 1 | 0.72 | 0.55 | 0.32 | | | | | | |
| 30 | MC | 1 | 1 | 1 | 0.54 | 0.50 | 1.05 | | | | | | |
| 31 | CR | 1 | 1 | 1 | 0.79 | 0.24 | -0.28 | | | | | | |
| 32 | CR | 1 | 1 | 1 | 0.90 | 0.24 | -1.24 | | | | | | |
| 33 | CR | 1 | 1 | 4 | 0.62 | 0.44 | 0.52 | | | | | | |
| 34 | CR | 1 | 1 | 4 | 0.59 | 0.45 | 1.16 | | | | | | |
| 35 | CR | 1 | 1 | 4 | 0.54 | 0.49 | 1.39 | | | | | | |
| 36 | CR | 2 | 1 | 4 | 1.72 | 0.67 | -0.44 | 0.49 | -0.49 | | | | |
| 37 | CR | 1 | 1 | 4 | 0.85 | 0.42 | -0.52 | | | | | | |
| 38 | CR | 2 | 1 | 4 | 1.12 | 0.61 | 1.21 | -0.71 | 0.71 | | | | |
| 39 | CR | 2 | 1 | 4 | 1.61 | 0.60 | -0.65 | -1.39 | 1.39 | | | | |
| 40 | CR | 1 | 1 | 4 | 0.81 | 0.44 | -0.49 | | | | | | |
| 41 | CR | 1 | 1 | 4 | 0.81 | 0.45 | -0.28 | | | | | | |
| 42 | CR | 1 | 1 | 4 | 0.50 | 0.50 | 1.41 | | | | | | |

Appendix E: Scoring Table

June 2012

| Raw Score | Ability | Scale Score |
|-----------|---------|-------------|
| 0 | -5.359 | 0.000 |
| 1 | -4.118 | 1.683 |
| 2 | -3.374 | 3.787 |
| 3 | -2.919 | 5.757 |
| 4 | -2.582 | 7.820 |
| 5 | -2.310 | 9.970 |
| 6 | -2.080 | 12.185 |
| 7 | -1.879 | 14.466 |
| 8 | -1.698 | 16.797 |
| 9 | -1.534 | 19.175 |
| 10 | -1.382 | 21.598 |
| 11 | -1.240 | 24.067 |
| 12 | -1.106 | 26.551 |
| 13 | -0.979 | 29.061 |
| 14 | -0.857 | 31.611 |
| 15 | -0.739 | 34.171 |

| Raw Score | Ability | Scale Score |
|-----------|---------|-------------|
| 16 | -0.625 | 36.748 |
| 17 | -0.514 | 39.327 |
| 18 | -0.405 | 41.927 |
| 19 | -0.297 | 44.526 |
| 20 | -0.191 | 47.137 |
| 21 | -0.086 | 49.735 |
| 22 | 0.019 | 52.313 |
| 23 | 0.124 | 54.900 |
| 24 | 0.230 | 57.462 |
| 25 | 0.337 | 59.996 |
| 26 | 0.444 | 62.485 |
| 27 | 0.553 | 64.958 |
| 28 | 0.664 | 67.374 |
| 29 | 0.778 | 69.761 |
| 30 | 0.894 | 72.089 |
| 31 | 1.014 | 74.364 |

| Raw Score | Ability | Scale Score |
|-----------|---------|-------------|
| 32 | 1.138 | 76.584 |
| 33 | 1.268 | 78.742 |
| 34 | 1.403 | 80.840 |
| 35 | 1.546 | 82.870 |
| 36 | 1.699 | 84.842 |
| 37 | 1.863 | 86.741 |
| 38 | 2.042 | 88.584 |
| 39 | 2.242 | 90.356 |
| 40 | 2.469 | 92.073 |
| 41 | 2.736 | 93.727 |
| 42 | 3.068 | 95.327 |
| 43 | 3.517 | 96.877 |
| 44 | 4.253 | 98.397 |
| 45 | 5.487 | 100.000 |