



*Listening. Learning. Leading.*

Multi-State Standard Setting Technical Report

**PRAXIS™ ELEMENTARY EDUCATION MULTIPLE SUBJECTS (5031)**

Educational and Credentialing Research

Educational Testing Service

Princeton, New Jersey

August 2011

Copyright © 2011 by Educational Testing Service. All rights reserved. ETS, the ETS logo and LISTENING. LEARNING. LEADING. are registered trademarks of Educational Testing Service (ETS) in the United States of America and other countries throughout the world.

## **Executive Summary**

To support the decision-making process for state departments of education with regards to establishing passing scores, or cut scores, for the Praxis™ Elementary Education Multiple Subjects (5031) test, research staff from Educational Testing Service (ETS) designed and conducted a multiple-panel, multi-state standard-setting study. The study also collected content-related validity evidence to confirm the importance of the content specifications for entry-level elementary school teachers.

The Praxis Elementary Education Multiple Subjects test is comprised of four, separately-timed subtests measuring core content areas.

- Reading and Language Arts (5032)
- Mathematics (5033)
- Social Studies (5034)
- Science (5035)

To “pass” the Praxis Elementary Education Multiple Subjects test, a candidate must meet or exceed the passing score established by a state department of education for each of the four subtests. Therefore, the standard-setting study conducted on behalf of the departments of education recommends passing scores for the Reading and Language Arts, Mathematics, Social Studies and Science subtests.

### **Participating States**

Panelists from 15 states and Washington, D.C. were recommended by state departments of education to participate on expert panels. The state departments of education recommended panelists with (a) education experience, either as elementary school (grades K through 6) teachers or college faculty who prepare elementary school teachers and (b) familiarity with the knowledge required of beginning elementary school teachers.

## Recommended Cut Scores

The recommended passing scores are provided to help state departments of education determine appropriate operational passing scores. For the Praxis Elementary Education Multiple Subjects subtests, the recommended passing scores<sup>1</sup> are:

- **Reading and Language Arts (5032):** The recommended passing score is 46 (on the raw score metric), which represents 71% of the total available 65 raw score points. The scaled score associated with a raw score of 46 is 165 (on a 100 - 200 scale).
- **Mathematics (5033):** The recommended passing score is 28 (on the raw score metric), which represents 70% of the total available 40 raw score points. The scaled score associated with a raw score of 28 is 164 (on a 100 - 200 scale).
- **Social Studies (5034):** The recommended passing score is 35 (on the raw score metric), which represents 64% of the total available 55 raw score points. The scaled score associated with a raw score of 35 is 155 (on a 100 - 200 scale).
- **Science (5035):** The recommended passing score is 33 (on the raw score metric), which represents 66% of the total available 50 raw score points. The scaled score associated with a raw score of 33 is 159 (on a 100 - 200 scale).

## Summary of Content Specification Judgments

Panelists judged the extent to which the knowledge reflected by the content specifications for each of the four subtests was important for entry-level elementary school teachers. The favorable judgments of the panelists provided evidence that the content covered by the subtests is important for beginning practice.

---

<sup>1</sup> Results from each of the panels participating in the study were averaged to produce the recommended passing scores.

To support the decision-making process for state departments of education with regards to establishing passing scores, or cut scores, for the Praxis™ Elementary Education Multiple Subjects (5031) test, research staff from Educational Testing Service (ETS) designed and conducted a multiple-panel, multi-state standard-setting study. The study also collected content-related validity evidence to confirm the importance of the content specifications for entry-level elementary school teachers. Panelists were recommended by state departments of education<sup>2</sup> to participate on the expert panels. The state departments of education recommended panelists with (a) education experience, either as elementary school (grades K through 6) teachers or college faculty who prepare elementary school teachers and (b) familiarity with the knowledge and skills required of beginning elementary school teachers.

The Praxis Elementary Education Multiple Subjects test is comprised of four, separately-timed subtests measuring core content areas.

- Reading and Language Arts (5032)
- Mathematics (5033)
- Social Studies (5034)
- Science (5035)

To “pass” the Praxis Elementary Education Multiple Subjects test, a candidate must meet or exceed the passing score established by a state department of education for each of the four subtests. Therefore, the standard-setting study conducted on behalf of the departments of education recommends passing scores for the Reading and Language Arts, Mathematics, Social Studies and Science subtests.

The four, non-overlapping panels (a) allow each participating state to be represented and (b) provide a replication of the judgment process to strengthen the technical quality of the recommended passing scores. Fifteen states and Washington, D.C. (see Table 1) were represented by 55 panelists across the panels. (See Appendix A for the names and affiliations of the panelists.)

---

<sup>2</sup> State departments of education that currently use one or more Praxis tests were invited to participate in the multi-state standard-setting study.

**Table 1**

**Participating States (and number of panelists) for Multi-State Panels**

---

Alabama (3 panelists)	New Jersey (3 panelists)
Connecticut (4 panelists)	South Carolina (4 panelists)
Hawaii (2 panelists)	Tennessee (4 panelists)
Idaho (2 panelists)	Utah (4 panelists)
Indiana (5 panelists)	Vermont (1 panelist)
Kentucky (5 panelists)	Washington, DC (4 panelists)
Missouri (4 panelists)	West Virginia (4 panelists)
New Hampshire (4 panelists)	Wisconsin (2 panelists)

---

The panels were convened in July 2011 in Princeton, New Jersey. Across panels, the same processes and methods were used to train panelists, gather panelists' judgments and to calculate the recommended passing scores.

The following technical report is divided into three sections. The first section describes the content and format of the subtests. The second section describes the standard-setting processes and methods. The third section presents the results of the standard-setting study.

The passing-score recommendations for the Praxis Elementary Education Multiple Subjects subtests are provided to each of the represented state departments of education. In each state, the department of education, the state board of education, or a designated educator licensure board is responsible for establishing the final passing scores in accordance with applicable state regulations. The study provides recommended passing scores, which represent the combined judgments of several groups of experienced educators. The full range of a state department of education's needs and expectations cannot likely be represented during the standard-setting study. Each state, therefore, may want to consider both the panels' recommended passing scores and other sources of information when setting the final Praxis Elementary Education Multiple Subjects passing scores (see Geisinger & McCormick, 2010). A state may accept the recommended passing scores, adjust one or more scores upward to reflect more stringent expectations, or adjust one or more scores downward to reflect more lenient expectations.

There are no *correct* decisions; the appropriateness of any adjustment may only be evaluated in terms of its meeting the state's needs.

Two sources of information to consider when setting the passing scores are the standard errors of measurement (SEM) and the standard errors of judgment (SEJ). The former addresses the reliability of Praxis Elementary Education Multiple Subjects subtest scores and the latter, the reliability of panelists' passing-score recommendations. The SEM allows a state to recognize that a Praxis Elementary Education Multiple Subjects subtest score—any test score on any test—is less than perfectly reliable. A subtest score only approximates what a candidate *truly* knows or *truly* can do on the subtest. The SEM, therefore, addresses the question: How close of an approximation is the subtest score to the *true* score? The SEJ allow a state to consider the likelihood that the recommended passing scores from the current panels would be similar to passing scores recommended by other panels of experts similar in composition and experience. The smaller the SEJ the more likely that another panel would recommend a passing score for a subtest consistent with the recommended passing score. The larger the SEJ, the less likely the recommended passing score would be reproduced by another panel.

In addition to measurement error metrics (e.g., SEM, SEJ), each state should consider the likelihood of classification error. That is, when adjusting a passing score, policymakers should consider whether it is more important to minimize a false positive decision or to minimize a false negative decision. A false positive decision occurs when a candidate's subtest scores suggest he should receive a license/certificate, but his actual level of knowledge indicates otherwise (i.e., the candidate does not possess the required knowledge). A false negative occurs when a candidate's subtest scores suggest that she should not receive a license/certificate, but she actually does possess the required knowledge. The state needs to consider which decision error may be more important to minimize.

## Overview of the Praxis Elementary Education Multiple Subjects Test

The Praxis Elementary Education Multiple Subjects *Test at a Glance* document (ETS, in press) describes the purpose and structure of the test. In brief, the test measures whether entry-level elementary school teachers have the knowledge in four core content areas believed necessary for competent professional practice. The four content areas, or subtests, are Reading and Language Arts, Mathematics, Social Studies, and Science. A National Advisory Committee of expert practitioners and preparation faculty defined the content of each subtest, and a national survey of the field confirmed the content.

The three and a half hour test contains four separately-timed subtests. Each subtest produces an overall score. To pass the Praxis Elementary Education Multiple Subjects (5031) test, a candidate must meet or exceed the passing score on each of the four subtests. A combined score across the four subtests is not reported.

- **Reading and Language Arts Subtest (5032)** contains 65 multiple-choice questions covering *Reading* (approximately 32 questions) and *Language, Writing, and Communication* (approximately 33 questions). The maximum total number of raw points that may be earned is 65.
- **Mathematics Subtest (5033)** contains 40 multiple-choice questions covering *Number Operations and Algebraic Thinking* (approximately 26 questions); and *Geometry, Measurement, Data, and Interpretation* (approximately 14 questions). The maximum total number of raw points that may be earned is 40.
- **Social Studies Subtest (5034)** contains 55 multiple-choice questions covering *United States History, Government, and Citizenship* (approximately 25 questions); *Geography, Anthropology, and Sociology* (approximately 16 questions); and *World History and Economics* (approximately 14 questions). The maximum total number of raw points that may be earned is 55.

- **Science Subtest (5035)** contains 50 multiple-choice questions covering *Earth Science* (approximately 16 questions); *Life Science* (approximately 17 questions); and *Physical Science* (approximately 17 questions). The maximum total number of raw points that may be earned is 50.

The reporting scale for all four of the Praxis Elementary Education Multiple Subjects subtests ranges from 100 to 200 scaled-score points.

The first national administration of the new Praxis Elementary Education Multiple Subjects test will occur in fall 2012.

### **Processes and Methods**

For each of the expert panels, the same processes and methods were used to train panelists, gather panelists' judgments and to calculate the recommended passing scores. The following section describes the standard-setting processes and methods. (The agendas for the panel meetings are presented in Appendix B.)

The design of the standard-setting study included four non-overlapping expert panels. The training provided to panelists as well as the study materials were consistent across panels with the exception of (a) defining the Just Qualified Candidate (JQC) and (b) the number of subtests considered.

To assure that all panels were using the same frame of reference when making question-level standard-setting judgments, the JQC definition developed through a consensus process by one of the four panels was used as the definition for the remaining panels. The remaining panels did complete a thorough review of the definition to allow panelists to internalize the definition. The processes for developing the definition and reviewing/internalizing the definition are described later, and the Just Qualified Candidate definitions are presented in Appendix C.

Figure 1 illustrates the assignment of subtests to panels. For the first two panels, Panels 1A and 1B, the panelists considered each of the four subtests and determined passing score recommendations for each subtest. The scope of work for the remaining two panels, Panels 2A and 2B, was reduced; each panel considered two of the four subtests. Therefore, standard-setting judgments for each subtest were collected from three independent expert panels.

**Figure 1**

*Alignment of Subtests to Panels*

<b>Panel 1A</b> • Completed all 4 subtests	<b>Panel 1B</b>	<b>Panel 2A</b> • Completed 2 of the 4 subtests	<b>Panel 2B</b>
1st. RLA ○ “Took” the subtest ○ <b>Developed</b> the JQC definition ○ Made standard-setting judgments	1st. Social Studies ○ “Took” the subtest ○ <b>Developed</b> the JQC definition ○ Made standard-setting judgments	1st. Mathematics ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1A) ○ Made standard-setting judgments	RLA ○ Not applicable for Panel 2B
2nd. Mathematics ○ “Took” the subtest ○ <b>Developed</b> the JQC definition ○ Made standard-setting judgments	2nd. Science ○ “Took” the subtest ○ <b>Developed</b> the JQC definition ○ Made standard-setting judgments	2nd. RLA ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1A) ○ Made standard-setting judgments	Mathematics ○ Not applicable for Panel 2B
3rd. Social Studies ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1B) ○ Made standard-setting judgments	3rd. RLA ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1A) ○ Made standard-setting judgments	Social Studies ○ Not applicable for Panel 2A	1st. Science ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1B) ○ Made standard-setting judgments
4th. Science ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1B) ○ Made standard-setting judgments	4th. Mathematics ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1A) ○ Made standard-setting judgments	Science ○ Not applicable for Panel 2A	2nd. Social Studies ○ “Took” the subtest ○ <b>Reviewed</b> the JQC definition (from Panel 1B) ○ Made standard-setting judgments

RLA = Reading and Language Arts

The panelists were sent an e-mail explaining the purpose of the standard-setting study and requesting that they review the content specifications (included in the *Test at a Glance* document, which was attached to the e-mail). The purpose of the review was to familiarize the panelists with the general structure and content of the subtests.

The standard-setting study began with a welcome and introduction by the meeting facilitators, Drs. Clyde Reese and Wanda Swiggett from the Center for Validity Research. They explained how the subtests were developed, provided an overview of standard setting, and presented the agenda for the study. The following activities were completed for each of the four subtests.

### **Reviewing the Test**

For each of the subtests considered by a panel, the first activity was for the panelists to “take the test.” (Each panelist had signed a nondisclosure form.) Figure 1 illustrates the subtests assigned to each panel and the order in which the subtests were presented to the panel. For each subtest, the panelists were given approximately 30 to 40 minutes to respond to the multiple-choice questions. (Panelists were instructed not to refer to the answer key while taking the test.) The purpose of “taking the test” was for the panelists to become familiar with the format, content, and difficulty of the subtest. After “taking the test,” the panelists checked their responses against the answer key.

The panelists then engaged in a discussion of the major content areas being addressed by the subtest; they were also asked to remark on any content areas that they thought would be particularly challenging for entering teachers, and areas that addressed content that would be particularly important for entering teachers.

## Defining the Just Qualified Candidate

Following the review of the subtest, panelists internalized the definition of the Just Qualified Candidate (JQC). Separate JQC definitions were developed for each of the four subtests and were used by panelists to guide their standard-setting judgments. The JQC is the test taker who has the minimum level of knowledge believed necessary to be a qualified elementary school teacher. The JQC definition is the operational definition of the passing score. The goal of the standard-setting process is to identify the subtest score that aligns with this definition of the JQC.

Panel 1A developed the JQC definitions for the Reading and Language Arts and Mathematics subtests; Panel 1B developed the definitions for the Social Studies and Science subtests<sup>3</sup>. (Figure 1 illustrates, by subtest, whether a panel developed the JQC definition or used a definition developed by another panel.) For each assigned subtest, the panelists were split into smaller groups, and each group was asked to write down their definition of a JQC. Each group referred to the Praxis Elementary Education Multiple Subjects *Test at a Glance* to guide their definition. Each group posted its definition on chart paper, and a full-panel discussion occurred to reach a consensus on each definition (see Appendix C for the definitions).

For the panels that did not develop the definition for a particular subtest, the panelists began with the definition of the JQC developed by either Panel 1A or Panel 1B. Given that the multi-state standard-setting study was designed to replicate processes and procedures across the panels, it was important that all panels use consistent JQC definitions to frame their judgments. The panelists reviewed the JQC definition, and any ambiguities were discussed and clarified. The panelists then were split into smaller groups, and each group developed performance indicators or “can do” statements based on the definition. The purpose of the indicators was to provide clear examples of what might be observed to indicate that the teacher had the defined knowledge. The performance indicators were shared across the group, discussed, and added to the definition.

---

<sup>3</sup> The four expert panels were convened in pairs, Panels 1A and 1B met on July 18-19, 2011 and Panels 2A and 2B met on July 21-22.

## Panelists' Judgments

The standard-setting process for the Praxis Elementary Education Multiple Subjects test was conducted separately for the four subtests. For each subtest, a probability-based Angoff method (Brandon, 2004; Hambleton & Pitoniak, 2006) was used. In this approach, for each multiple-choice question, a panelist decides on the likelihood (probability or chance) that a JQC would answer the question correctly. Panelists made their judgments using the following rating scale: 0, .05, .10, .20, .30, .40, .50, .60, .70, .80, .90, .95, 1. The lower the value, the less likely it is that a JQC would answer the question correctly, because the question is difficult for the JQC. The higher the value, the more likely it is that a JQC would answer the question correctly.

The panelists were asked to approach the judgment process in two stages. First, they reviewed the definition of the JQC and the question and decided if, overall, the question was difficult for the JQC, easy for the JQC, or moderately difficult/easy. The facilitator encouraged the panelists to consider the following rule of thumb to guide their decision:

- Difficult questions for a JQC were in the 0 to .30 range.
- Moderately difficult/easy questions for a JQC were in the .40 to .60 range.
- Easy questions for a JQC were in the .70 to 1 range.

The second decision was for panelists to decide how they wanted to refine their judgment within the range. For example, if a panelist thought that a question was easy for a JQC, the initial decision located the question in the .70 to 1 range. The second decision was for the panelist to decide if the likelihood of answering it correctly was .70, .80, .90, .95, or 1. The two-stage decision-process was implemented to reduce the cognitive load placed on the panelists. The panelists practiced making their standard-setting judgments.

The panelists engaged in two rounds of judgments. Following Round 1, feedback was provided to the panel, including each panelist's recommended passing score and the panel's average recommended passing score, highest and lowest passing score, and standard deviation. Following discussion, question-level feedback was provided to the panel. The panelists' judgments were displayed for each question. The panelists' judgments were summarized by the three general difficulty levels (0 to .30, .40 to .60, and .70 to 1), and the panel's average question judgment was provided. Questions were

highlighted to show when panelists converged in their judgments (at least two-thirds of the panelists located a question in the same difficulty range) or diverged in their judgments. Panelists were asked to share their rationales for the judgments they made. Following this discussion, panelists were provided an opportunity to change their question-level standard-setting judgments (Round 2).

Standard-setting judgments were not shared across panels. Other than the JQC definitions, the four panels were independent.

The judgment process was conducted by subtest. The number of subtests and the order in which they were considered varied across panels (see Figure 1).

- Panel 1A first made Round 1 judgments for Reading and Language Arts then discussed the judgments and made Round 2 changes. The process was repeated for Mathematics, Social Studies and Science, in that order.
- Panel 1B first made Round 1 judgments for Social Studies then discussed the judgments and made Round 2 changes. The process was repeated for Science, Reading and Language Arts, and Mathematics, in that order.
- Panel 2A first made Round 1 judgments for Mathematics then discussed the judgments and made Round 2 changes. The process was repeated for Reading and Language Arts.
- Panel 2B first made Round 1 judgments for Science then discussed the judgments and made Round 2 changes. The process was repeated for Social Studies.

### **Judgment of Content Specifications**

In addition to the two-round standard-setting process, each panel judged the importance of the knowledge stated or implied in the content specifications for the job of an entry-level elementary school teacher. These judgments addressed the perceived content-based validity of the subtests. Judgments were made using a four-point scale — *Very Important*, *Important*, *Slightly Important*, and *Not Important*. Each panelist independently judged the knowledge categories and knowledge statements. Panels 1A and 1B judged the content specifications for all four subtest; Panels 2A and 2B judged the two subtests they considered.

## **Results**

The recommended passing scores presented are the average of the results from the separate panels. Results from the separate panels also are presented. More detailed results are presented in Appendix D.

### **Expert Panels**

The four panels that comprised the study included 55 educators representing 15 states and Washington, D.C. (See Appendix A for a listing of panelists.) In brief, 39 panelists were teachers, 15 were college faculty, and one was a reading coach. Fourteen of the panelists who were college faculty were currently involved in the training or preparation of teachers. Thirty-six panelists were White, 11 were Black or African American, four were Hispanic or Latino, two were Asian or Asian American, and two panelists indicated “other.” Forty-five panelists were female. Of the panelists who indicated they were currently teachers, approximately three-quarters of the panelists (31 of the 40 panelists or 77%) had 11 or fewer years of experience as a teacher.

The number of experts by panel and their demographic information is presented in Appendix D (see Table D1).

### **Initial Evaluation Forms**

The panelists completed an initial evaluation after receiving training on how to make standard-setting judgments. The primary information collected from this form was the panelists indicating if they had received adequate training to make their standard-setting judgments and were ready to proceed. Across the panels, all panelists indicated that they were prepared to make their judgments.

**Table 2*****Panel Member Demographics (Across Panels)***

	<i>N</i>	<i>%</i>
<b>Current Position</b>		
Teacher	39	71%
College Faculty	15	27%
Reading Coach	1	2%
<b>Race</b>		
White	36	65%
Black or African American	11	20%
Hispanic or Latino	4	7%
Asian or Asian American	2	4%
Other	2	4%
<b>Gender</b>		
Female	45	82%
Male	10	18%
<b>If you are working in a K-12 setting, are you currently supervising or mentoring other elementary school teachers?</b>		
Yes	11	20%
No	29	53%
Not currently working at the K-12 level	15	27%
<b>How many years of experience do you have as an elementary school teacher?</b>		
7 years or less	19	35%
8 - 11 years	12	22%
12 - 15 years	3	5%
16 years or more	6	11%
Not currently working at the K-12 level	15	27%
<b>Which best describes the location of your K-12 school?</b>		
Urban	12	22%
Suburban	15	27%
Rural	13	24%
Not currently working at the K-12 level	15	27%
<b>If you are college faculty, are you currently involved in the training/preparation of elementary-school teachers?</b>		
Yes	14	25%
No	1	2%
Not college faculty	40	73%

## Summary of Standard-setting Judgments

Summaries of the standard-setting judgments are presented in Tables 3-6. The numbers in the tables summarize the recommended passing scores—the number of raw points needed to pass each subtest. The panel’s average recommended passing score and highest and lowest passing scores are reported, as are the standard deviations (SD) of panelists’ passing scores and the standard errors of judgment (SEJ). The SEJ is one way of estimating the reliability of the judgments<sup>4</sup>. It indicates how likely it would be for other panels of educators similar in makeup, experience, and standard-setting training to the current panel to recommend the same passing score on the same form of the subtest. A comparable panel’s passing score would be within 1 SEJ of the current average passing score 68 percent of the time.

- Reading and Language Arts.** The panels’ passing score recommendations for the Reading and Language Arts subtest ranged from 42.98 to 48.57 (see Table 3). The recommended passing scores for the three panels were averaged (45.74) and the value was rounded to 46, the next highest whole number, to determine the recommended operational passing score. The value of 46 represents 71% of the total available 65 raw-score points that could be earned on the subtest. The scaled score associated with 46 raw points is 165 (on a 100 - 200 scale).

**Table 3**  
*Summary of Standard-setting Judgments – Reading and Language Arts*

	Panel 1A	Panel 1B	Panel 2A	Panel 2B
<b>Average</b>	42.98	45.68	48.57	--
<b>SD</b>	4.75	3.50	4.32	--
<b>SEJ</b>	1.32	0.94	1.11	--
<b>Highest</b>	49.55	51.55	59.30	--
<b>Lowest</b>	35.50	39.40	42.40	--

<sup>4</sup> An SEJ assumes that panelists are randomly selected and that standard-setting judgments are independent. It is seldom the case that panelists are randomly sampled, and only the first round of judgments may be considered independent. The SEJ, therefore, likely underestimates the uncertainty of passing scores (Tannenbaum & Katz, in press).

- Mathematics.** The panels' passing score recommendations for the Mathematics subtest ranged from 26.49 to 28.18 (see Table 4). The recommended passing scores for the three panels were averaged (27.39) and the value was rounded to 28, the next highest whole number, to determine the recommended operational passing score. The value of 28 represents 70% of the total available 40 raw-score points that could be earned on the subtest. The scaled score associated with 28 raw points is 164 (on a 100 - 200 scale).

**Table 4**

*Summary of Standard-setting Judgments – Mathematics*

	Panel 1A	Panel 1B	Panel 2A	Panel 2B
<b>Average</b>	26.49	27.49	28.18	--
<b>SD</b>	2.83	2.57	2.66	--
<b>SEJ</b>	0.79	0.69	0.69	--
<b>Highest</b>	31.40	30.90	34.30	--
<b>Lowest</b>	22.00	22.40	24.60	--

- Social Studies.** The panels' passing score recommendations for the Social Studies subtest ranged from 32.68 to 36.92 (see Table 5). The recommended passing scores for the three panels were averaged (34.37) and the value was rounded to 35, the next highest whole number, to determine the recommended operational passing score. The value of 35 represents 64% of the total available 55 raw-score points that could be earned on the subtest. The scaled score associated with 35 raw points is 155 (on a 100 - 200 scale).

**Table 5**

*Summary of Standard-setting Judgments – Social Studies*

	Panel 1A	Panel 1B	Panel 2A	Panel 2B
<b>Average</b>	36.92	33.51	--	32.68
<b>SD</b>	3.86	3.03	--	4.60
<b>SEJ</b>	1.07	0.81	--	1.27
<b>Highest</b>	43.85	39.85	--	42.85
<b>Lowest</b>	30.10	27.20	--	24.90

- **Science.** The panels’ passing score recommendations for the Science subtest ranged from 30.61 to 34.30 (see Table 6). The recommended passing scores for the three panels were averaged (32.70) and the value was rounded to 33, the next highest whole number, to determine the recommended operational passing score. The value of 33 represents 66% of the total available 50 raw-score points that could be earned on the subtest. The scaled score associated with 33 raw points is 159 (on a 100 - 200 scale).

**Table 6**

*Summary of Standard-setting Judgments – Science*

	Panel 1A	Panel 1B	Panel 2A	Panel 2B
<b>Average</b>	34.30	33.19	--	30.61
<b>SD</b>	3.93	2.33	--	3.74
<b>SEJ</b>	1.09	0.62	--	1.04
<b>Highest</b>	42.00	38.20	--	35.30
<b>Lowest</b>	29.70	29.10	--	22.10

Panelist-level results, for Rounds 1 and 2, are presented in Appendix D (see Tables D2-D5).

Tables 7-10 present the estimated conditional standard error of measurement (CSEM) around the recommended passing scores. A standard error represents the uncertainty associated with a subtest score. The scaled scores associated with 1 and 2 CSEMs above and below the recommended passing score are provided. The conditional standard errors of measurement provided are estimates, given that the Praxis Elementary Education Multiple Subjects test has not yet been administered operationally.

**Table 7**

*Passing Scores Within 1 and 2 CSEMs of the Recommended Passing Score<sup>5</sup> – Reading and Language Arts*

<b>Recommended passing score (CSEM)</b>		<b>Scale score equivalent</b>
	46 (3.70)	165
- 2 CSEMs	39	150
-1 CSEM	43	159
+1 CSEM	50	174
+ 2 CSEMs	54	183

<sup>5</sup> The unrounded CSEM value is added to or subtracted from the rounded passing score recommendation. The resulting values are rounded up to the next highest whole number and the rounded values are converted to scaled scores.

**Table 8*****Passing Scores Within 1 and 2 CSEMs of the Recommended Passing Score<sup>6</sup> – Mathematics***

<b>Recommended passing score (CSEM)</b>		<b>Scale score equivalent</b>
	28 (2.94)	164
- 2 CSEMs	23	146
-1 CSEM	26	157
+1 CSEM	31	175
+ 2 CSEMs	34	186

**Table 9*****Passing Scores Within 1 and 2 CSEMs of the Recommended Passing Score<sup>6</sup> – Social Studies***

<b>Recommended passing score (CSEM)</b>		<b>Scale score equivalent</b>
	35 (3.85)	155
- 2 CSEMs	28	137
-1 CSEM	32	147
+1 CSEM	39	166
+ 2 CSEMs	43	176

**Table 10*****Passing Scores Within 1 and 2 CSEMs of the Recommended Passing Score<sup>6</sup> – Science***

<b>Recommended passing score (CSEM)</b>		<b>Scale score equivalent</b>
	33 (3.67)	159
- 2 CSEMs	26	139
-1 CSEM	30	150
+1 CSEM	37	170
+ 2 CSEMs	41	181

<sup>6</sup> The unrounded CSEM value is added to or subtracted from the rounded passing score recommendation. The resulting values are rounded up to the next highest whole number and the rounded values are converted to scaled scores.

## Summary of Content-specification Judgments

Panelists judged the extent to which the knowledge reflected by the content specifications was important for entry-level elementary school teachers. Panelists rated the knowledge statements on a four-point scale ranging from *Very Important* to *Not Important*. The panelists' ratings are summarized in Appendix D (see Tables D6-D9).

- **Reading and Language Arts.** The five major content areas were judged to be *Very Important* or *Important* by all of the panelists who responded. All but one of the knowledge statements were judged to be *Very Important* or *Important* by at least 95% of the panelists.
- **Mathematics.** Both of the major content areas were judged to be *Very Important* or *Important* by all of the panelists who responded. All but two of the knowledge statements were judged to be *Very Important* or *Important* by at least 85% of the panelists.
- **Social Studies.** Two of the three major content areas were judged to be *Very Important* or *Important* by all of the panelists; the third (World History and Economics) was judged to be *Very Important* or *Important* by all but three of the panelists. All but three of the knowledge statements were judged to be *Very Important* or *Important* by at least 85% of the panelists.
- **Science.** Two of the three major content areas were judged to be *Very Important* or *Important* by all of the panelists who responded; the third (Physical Science) was judged to be *Very Important* or *Important* by all but one of the panelists who responded. All of the knowledge statements were judged to be *Very Important* or *Important* by at least 80% of the panelists.

## Summary of Final Evaluations

The panelists completed an evaluation form at the conclusion of their standard-setting study. The evaluation form asked the panelists to provide feedback about the quality of the standard-setting implementation and the factors that influenced their decisions. Results of the final evaluations, by panel, are presented in Appendix D.

All panelists *agreed* or *strongly agreed* that they understood the purpose of the study and that the facilitator's instructions and explanations were clear. All panelists *agreed* or *strongly agreed* that they were prepared to make their standard-setting judgments. Across the panels, all but two of the panelists *strongly agreed* or *agreed* that the standard-setting process was easy to follow.

All panelists reported that the definition of the JQC was at least *somewhat influential* in guiding their standard-setting judgments; 80% of panelists indicated the definition was *very influential*. All but one of the panelists reported that between-round discussions were at least *somewhat influential* in guiding their judgments. More than three-quarters of the panelists (45 of the 55 panelists) indicated that the knowledge/skills required to answer each question was *very influential* in guiding their judgments.

Across panels<sup>7</sup>, the majority of panelists indicated they were comfortable with the passing scores they recommended and that the passing scores were about right. A summary of the final evaluation results are presented in Appendix D (see Tables D10-D13).

---

<sup>7</sup> Panel 1B was asked to respond to their level of comfort for each of the four subtests; similar judgments were collected for the two subtests considered by Panel 2A. (Due to a data-collection error, similar information was not collected for Panel 2B.) Panel 1A responded to their comfort level overall across the four subtests.

## Summary

To support the decision-making process for state departments of education with regards to establishing passing scores, or cut scores, for the Praxis Elementary Education Multiple Subjects (5031) test, research staff from Educational Testing Service (ETS) designed and conducted a multiple-panel, multi-state standard-setting study. The study also collected content-related validity evidence to confirm the importance of the content specifications for entry-level elementary school teachers.

The recommended passing scores are provided to help state departments of education determine appropriate operational passing scores. For the Praxis Elementary Education Multiple Subjects subtests, the recommended passing scores<sup>8</sup> are:

- **Reading and Language Arts (5032):** The recommended passing score is 46 (on the raw score metric), which represents 71% of the total available 65 raw score points. The scaled score associated with a raw score of 46 is 165 (on a 100 - 200 scale).
- **Mathematics (5033):** The recommended passing score is 28 (on the raw score metric), which represents 70% of the total available 40 raw score points. The scaled score associated with a raw score of 28 is 164 (on a 100 - 200 scale).
- **Social Studies (5034):** The recommended passing score is 35 (on the raw score metric), which represents 64% of the total available 55 raw score points. The scaled score associated with a raw score of 35 is 155 (on a 100 - 200 scale).
- **Science (5035):** The recommended passing score is 33 (on the raw score metric), which represents 66% of the total available 50 raw score points. The scaled score associated with a raw score of 33 is 159 (on a 100 - 200 scale).

Panelists judged the extent to which the knowledge reflected by the content specifications for each of the four subtests were important for entry-level elementary school teachers. The favorable judgments of the panelists provided evidence that the content of the subtests is important for beginning practice.

---

<sup>8</sup> Results from each of the panels participating in the study were averaged to produce the recommended passing scores.

## References

- Brandon, P.R. (2004). Conclusions about frequently studied modified Angoff standard-setting topics. *Applied Measurement in Education, 17*, 59-88.
- ETS. (in press). *Elementary Education Multiple Subjects Test at a Glance*. Princeton, NJ.
- Geisinger, K. F. & McCormick, C. M. (2010), Adopting Cut Scores: Post-Standard-Setting Panel Considerations for Decision Makers. *Educational Measurement: Issues and Practice, 29*: 38–44.
- Hambleton, R. K., & Pitoniak, M.J. (2006). Setting performance standards. In R. L. Brennan (Ed.), *Educational Measurement* (4th ed., pp. 433-470). Westport, CT: American Council on Education/Praeger.
- Tannenbaum, R.J., & Katz, I.R. (in press). Standard setting. In K.F. Geisinger (Ed.), *APA Handbook of Testing and Assessment in Psychology*. Washington, DC: American Psychological Association.

**Appendix A**  
**Panelists' Names & Affiliations**

## **Praxis Elementary Education Multiple Subjects**

---

### **Panelist**

John P. Acampora  
Graciela Aparicio  
Rosela Balinbin  
Amy L. Bassett  
LaVada Brandon  
Gresham Brown  
Ramona Claridy  
Lana Clauss  
Cassandra Coles  
Becky Cox  
Kezia Curry  
Michelle Dudley-Jones  
Brigette Golmen  
Doug Greek  
Kristal S. Harne  
Pam Hedgpeth  
Patricia Higgins  
Sarah B. Hill  
Andria Hodge  
Stacey Jensen  
Sara Kaminski  
Jennifer Kelemen  
Shannon Lamb  
Sharon Lancaster  
Timothy Leonard  
Lauren Lochel  
Jill Maniakas  
Cathy Meredith

### **Affiliation**

Slackwood Elementary School (NJ)  
Ogden School District (UT)  
University of Hawaii at Manoa (HI)  
Mountainside Elementary (UT)  
Purdue University Calumet (IN)  
Stone Academy of Communication Arts (SC)  
Smiths Station Elementary School (AL)  
Tennessee Tech University (TN)  
Nora Elementary School (IN)  
The University of TN at Martin (TN)  
University of Hawaii at Manoa (HI)  
The Queen City Academy Charter School (NJ)  
Nixa R-II School District-Helen Mathews Elementary (MO)  
Schofield Elementary School, Republic R3 (MO)  
Liberty Elementary School\Casey County School District (KY)  
Southwest Baptist University (MO)  
Kentucky State University (KY)  
Canaan Elementary School (NH)  
Camdenton R-III School District Dogwood Elementary (MO)  
Edahow Elementary (ID)  
Live Oaks Elementary School (CT)  
Columbus School (CT)  
Kindle Farm School (VT)  
Indian Hills Elementary (KY)  
Shepherd Elementary School (DC)  
Fort Mill School District (SC)  
Nora Elementary (IN)  
University of Memphis (TN)

---

## **Praxis Elementary Education Multiple Subjects (continued)**

---

### **Panelist**

Nicolasa Moreau  
Jennifer Mueller  
Joanna Mulligan  
Lori Neurohr  
Jamil Odom  
Raquel Ortiz  
Sharon Owens  
Bob Pooler  
Betsy Potts  
Amanda Preece  
Gabrielle Rhodes  
Kristal Salyer  
Prajakta Sane  
Stacey Spears  
Judy Stechly  
Kelly Taylor  
Raschelle Theoharis  
Mary Thomas  
Sam Thomas  
Tara M. Watts  
James Weidenborner  
Angela R. Williams  
Holly Williamson  
Kaleb Yates  
Janet Young

### **Affiliation**

Hollis Upper Elementary School (NH)  
Univeristy of Wisconsin - Milwaukee (WI)  
Teacher (WV)  
Kohler Elementary School (WI)  
Mary Bryan Elementary School (IN)  
Cardinal Valley Elementary (KY)  
Loachapoka Elementary School (AL)  
Hollis Upper Elementary School (NH)  
Goodlettsville Elementary (MNPS) (TN)  
Genoa Elementary School (WV)  
Union Elementary School (WV)  
Clinton Elementary (SC)  
Branchville Elementary School (CT)  
Argillite Elementary School (KY)  
West Liberty University (WV)  
Burr Elementary School (CT)  
Gallaudet University (DC)  
District of Columbia Public Schools (DC)  
Richmond Community Schools (IN)  
DCPS\Bancroft Elementary School (DC)  
Gregory Elementary School/Montclair State University (NJ)  
Alabama A&M University (AL)  
Williamsburg County School District (SC)  
Foothills Elementary (UT)  
Brigham Young University (UT)

---

\*Two panelists did not wish to be listed in the final report.

**Appendix B**  
**Study Agendas**

**Praxis Elementary Education: Multiple Subjects (5031)  
Standard Setting Study – Panel 1A<sup>9</sup>**

**Day 1**

<b>8:00 – 8:15</b>	<b>Welcome and Introduction</b>
<b>8:15 – 8:30</b>	<b>Overview of Standard Setting &amp; the Praxis Elementary Education Test</b>
<b>8:30 – 9:00</b>	<b>“Take” the Praxis Elementary Education Assessment: Reading and Language Arts Subtest</b>
<b>9:00 – 9:45</b>	<b>Define the Knowledge of a JQC: Reading and Language Arts Subtest</b>
<b>9:45 – 9:50</b>	<b>Break</b>
<b>9:50 – 10:15</b>	<b>Standard Setting Training</b>
<b>10:15 – 11:15</b>	<b>Round 1 Standard Setting Judgments: Reading and Language Arts Subtest</b>
<b>11:15 – 11:30</b>	<b>Break</b>
<b>11:30 – 12:15</b>	<b>Round 1 Feedback &amp; Round 2 Judgments: Reading and Language Arts Subtest</b>
<b>12:15 – 1:00</b>	<b>Lunch</b>
<b>1:00 – 1:30</b>	<b>“Take” the Praxis Elementary Education Assessment: Mathematics Subtest</b>
<b>1:30 – 2:15</b>	<b>Define the Knowledge/Skills of a JQC: Mathematics Subtest</b>
<b>2:15 – 2:20</b>	<b>Break</b>
<b>2:20 – 3:15</b>	<b>Round 1 Standard Setting Judgments: Mathematics Subtest</b>
<b>3:15 – 3:30</b>	<b>Break</b>
<b>3:30 – 4:15</b>	<b>Round 1 Feedback &amp; Round 2 Judgments: Mathematics Subtest</b>
<b>4:15 – 4:30</b>	<b>Collect Materials; End of Day 1</b>

---

<sup>9</sup> Similar agenda followed for Panel 1B.

**Praxis Elementary Education: Multiple Subjects (5031)  
Standard Setting Study – Panel 1A**

**Day 2**

<b>8:00 – 8:15</b>	<b>Overview of Day 2</b>
<b>8:15 – 8:45</b>	<b>“Take” the Praxis Elementary Education Assessment: Social Studies Subtest</b>
<b>8:45 – 9:30</b>	<b>Review the Knowledge/Skills of a JQC: Social Studies Subtest</b>
<b>9:30 – 9:35</b>	<b>Break</b>
<b>9:35 – 9:45</b>	<b>Standard Setting Review</b>
<b>9:45 – 10:45</b>	<b>Round 1 Standard Setting Judgments: Social Studies Subtest</b>
<b>10:45 – 11:00</b>	<b>Break</b>
<b>11:00 – 11:45</b>	<b>Round 1 Feedback &amp; Round 2 Judgments: Social Studies Subtest</b>
<b>11:45 – 12:30</b>	<b>Lunch</b>
<b>12:30 – 1:00</b>	<b>“Take” the Praxis Elementary Education Assessment: Science Subtest</b>
<b>1:00 – 1:45</b>	<b>Review the Knowledge/Skills of a JQC: Science Subtest</b>
<b>1:45 – 1:50</b>	<b>Break</b>
<b>1:50 – 2:45</b>	<b>Round 1 Standard Setting Judgments: Science Subtest</b>
<b>2:45 – 3:00</b>	<b>Break</b>
<b>3:00 – 3:45</b>	<b>Round 1 Feedback &amp; Round 2 Judgments: Science Subtest</b>
<b>3:45 – 3:50</b>	<b>Break</b>
<b>3:50 – 4:15</b>	<b>Specification Judgments</b>
<b>4:15 – 4:30</b>	<b>Feedback on Round 2 Recommended Cut Scores &amp; Complete Final Evaluation</b>
<b>4:30 – 4:45</b>	<b>Collect Materials; End of Study</b>

**Praxis Elementary Education: Multiple Subjects (5031)  
Standard Setting Study – Panel 2A<sup>10</sup>**

**Day 1**

<b>8:00 – 8:15</b>	<b>Welcome and Introduction</b> <ul style="list-style-type: none"><li>• <b>Overview of Workshop Events</b></li></ul>
<b>8:15 – 8:30</b>	<b>Overview of Standard Setting</b>
<b>8:30 – 8:45</b>	<b>Overview of the Praxis Elementary Education Assessment</b>
<b>8:45 – 9:30</b>	<b>“Take” the Praxis Elementary Education Assessment</b> <ul style="list-style-type: none"><li>• <b>Mathematics Subtest</b></li></ul>
<b>9:30 – 9:35</b>	<b>Break</b>
<b>9:35 – 10:45</b>	<b>Review the Knowledge/Skills of a JQC</b> <ul style="list-style-type: none"><li>• <b>Mathematics Subtest</b></li></ul>
<b>10:45 – 11:15</b>	<b>Standard Setting Training &amp; Practice</b>
<b>11:15 – 12:15</b>	<b>Round 1 Standard Setting Judgments:</b> <ul style="list-style-type: none"><li>• <b>Mathematics Subtest</b></li></ul>
<b>12:15 – 1:15</b>	<b>Lunch</b>
<b>1:00 – 2:30</b>	<b>Round 1 Feedback &amp; Round 2 Judgments:</b> <ul style="list-style-type: none"><li>• <b>Mathematics Subtest</b></li></ul>
<b>2:30 – 2:45</b>	<b>Break</b>
<b>2:45 – 3:00</b>	<b>Specification Judgments</b> <ul style="list-style-type: none"><li>• <b>Mathematics Subtest</b></li></ul>
<b>3:00 – 3:15</b>	<b>Collect Materials; End of Day 1</b>

---

<sup>10</sup> Similar agenda followed for Panel 2B.

**Praxis Elementary Education: Multiple Subjects (5031)  
Standard Setting Study – Panel 2A**

**Day 2**

<b>9:00 – 9:05</b>	<b>Overview of Day 2</b>
<b>9:05 – 10:00</b>	<b>“Take” the Praxis Elementary Education Assessment</b> <ul style="list-style-type: none"><li>• <b>Reading Language Arts Subtest</b></li></ul>
<b>10:00 – 11:15</b>	<b>Review the Knowledge/Skills of a JQC</b> <ul style="list-style-type: none"><li>• <b>Reading Language Arts Subtest</b></li></ul>
<b>11:15 – 12:15</b>	<b>Round 1 Standard Setting Judgments:</b> <ul style="list-style-type: none"><li>• <b>Reading Language Arts Subtest</b></li></ul>
<b>12:15 – 1:15</b>	<b>Lunch</b>
<b>1:00 – 2:30</b>	<b>Round 1 Feedback &amp; Round 2 Judgments:</b> <ul style="list-style-type: none"><li>• <b>Reading Language Arts Subtest</b></li></ul>
<b>2:30 – 2:45</b>	<b>Break</b>
<b>2:45 – 3:00</b>	<b>Specification Judgments</b> <ul style="list-style-type: none"><li>• <b>Reading Language Arts Subtest</b></li></ul>
<b>3:00 – 3:30</b>	<b>Feedback on Round 2 Recommended Passing Scores &amp; Complete Final Evaluation</b>
<b>3:30 – 3:45</b>	<b>Collect Materials; End of Study</b>

## **Appendix C**

### **Just Qualified Candidate (JQC) Definitions**

**Description of a Just Qualified Candidate<sup>11</sup>**  
**Reading and Language Arts**

**A JQC ...**

1. Knows key ideas relevant to the foundations of literacy and reading development (e.g., concepts of print, language acquisition) as it relates to each individual learner (e.g., second-language learners), including phonological awareness (e.g., rhyming); phonics (e.g., basic letter sounds, syllabication); fluency (e.g., rate, accuracy, prosody); comprehension (meaning, prior knowledge, vocabulary, predicting, figurative language etc.); and orthography (relationship between various types of written, printed and oral development)
  - a. Can explain the difference between similes and metaphors
  - b. Can explain the importance of high-frequency word in relation to fluency
2. Understands the basic components of written language, sentence type, sentence structure and vocabulary
  - a. Can recognize types of sentences (e.g., simple, complex)
  - b. Can distinguish parts of speech
3. Understands the types, traits, and structures of writing
  - a. Can describe the structures of various types or genres of writing
  - b. Can describe the purposes of different types of writing
4. Understands the stages of writing process and how to use resource materials
  - a. Can create a web for brainstorming
  - b. Can use a dictionary and thesaurus to improve word choice
5. Understands the different aspects and role of speaking, listening, viewing and language acquisition for all learners. (NOTE: listening and viewing would include media literacy)
  - a. Can discern a writer's message
  - b. Can ask and answer questions appropriately
6. Understands the basic elements of a variety of genres (e.g., informational, poetry, drama)
  - a. Can identify the basic elements of a narrative
  - b. Can identify the purpose(s) of various genres

---

<sup>11</sup> Examples of the “can do” statements developed by the panels provided.

**Description of a Just Qualified Candidate<sup>12</sup>**  
**Mathematics**

**A JQC ...**

1. Understands foundations of mathematics, including prenumeration concepts (e.g., patterns), basic number systems (e.g., whole numbers), basic four operations and their properties (e.g., order of operations)
  - a. Can expand a pattern to identify a particular element
  - b. Can solve two-step arithmetic problems
2. Understands basic concepts of number theory
  - a. Can explain place values
  - b. Can explain decimals, fractions, and ratios
3. Knows mathematical problem solving (e.g., word problems), investigation, estimation, and application of formulas
  - a. Can use multiple strategies to solve multi-step problems
  - b. Can identify relevant variables and operations in a complex problem
4. Knows basic algebraic methods
  - a. Can apply the order of operations to expand algebraic expressions
  - b. Can solve one-variable equations
5. Understands basic algebraic representations (variables, equations, inequalities, x-y graphs)
  - a. Can identify correct equations to represent a written relationship
  - b. Can interpret a line graph
6. Understands basic arithmetic and algebraic properties (associative, commutative, etc) and special properties of 0 and 1
  - a. Can use appropriate mathematics vocabulary
  - b. Can explain the associative property
7. Understands tables, graphs, and visual displays
  - a. Can draw conclusions from bar graphs
  - b. Can construct a pie chart
8. Understands properties and attributes of 2- and 3-dimensional figures
  - a. Can explain lines of symmetry
  - b. Can calculate perimeter and area of geometric figures (e.g., triangle, rectangle, square)
9. Understands measurement systems and units of measure
  - a. Can convert measurements within a measurement system (e.g., inches to feet)
  - b. Can identify the appropriate unit of measure
10. Understands basic concepts of probability (permutations, chance) and statistics (mean, median, mode, range)
  - a. Can interpret a set of data
  - b. Can calculate the mean, median and mode

---

<sup>12</sup> Examples of the “can do” statements developed by the panels provided.

**Description of a Just Qualified Candidate<sup>13</sup>**  
**Social Studies**

**A JQC ...**

1. Knows the purposes and functions of the U.S. government (federal, state, and local) and the rights and responsibilities of its citizens.
  - a. Can identify key features and key responsibilities of the three branches of government
  - b. can identify important local or national issues that are addressed through government and the responsibilities of active citizenship
2. Knows the basic important people, events, and artifacts in U.S. History from Colonization to present time.
  - a. Can identify key concepts (e.g., colonization, migration, California Gold Rush) of the growth and expansion of the United States
  - b. given an amendment, can recognize if it is associated with the Bill of Rights
3. Knows world and regional geography (commonly used terms, places, regions across time) and how people of different cultures interact with their environment
  - a. Can describe the geographic regions of the U.S. and their natural resources
  - b. Can describe the basic vocabulary of geography and maps (e.g., continents, interpret time zone differences, cardinal directions)
4. Knows and is able to apply the basics of geography (including the usage of maps, charts, and grids) in relation to past, present, and future events.
  - a. Can interpret maps, charts and grids from historical to current times
  - b. Can create a basic map of their community including key map elements (e.g., direction, legend, symbols)
5. Knows major contributions and developments of world civilizations from ancient to modern times.
  - a. Can attribute major contributions to the civilization of origin
  - b. Can describe how multiple cultures influence society
6. Knows key terms and basic concepts of economics and its effects on society.
  - a. Can describe the impact of natural disasters and conflicts on an economy
  - b. Can describe import and export between countries

---

<sup>13</sup> Examples of the “can do” statements developed by the panels provided.

## **Description of a Just Qualified Candidate<sup>14</sup> Science**

### **A JQC ...**

1. Understands various processes, technologies, and methods (research) used in scientific inquiry in Earth, life and physical sciences
  - a. Can select appropriate tools and resources to support scientific inquiry (e.g., basic microscope, graduated cylinder)
  - b. Can identify and apply the principles of scientific inquiry
2. Recognizes science as a human endeavor, process, and career within Earth, life, & physical sciences
  - a. Can identify given roles of various scientists (e.g., paleontologist, anthropologist, chemist)
  - b. Can identify some major scientific discoveries of major pioneers in science
3. Knows basic cycles, patterns, and change in Earth, life, and physical science
  - a. Can identify the developmental stages in a life cycle of a given organism
  - b. Can describe the cause and effect of weather patterns
4. Knows the core processes, structures, and history of Earth, it's systems, & our solar system within the universe
  - a. Can identify the interrelationships between the Earth, the moon and the sun
  - b. Can describe and identify how the structures (layers/plates) of Earth are formed and changed
5. Knows the structures, functions, and interrelationships of living things from single-cell to complex organisms within their environments
  - a. Can identify the characteristics of an ecosystem
  - b. Can describe the difference between plant & animal cells
6. Knows the basics of heredity, adaptation, and mutation
  - a. Can identify and interpret a Punnett square, but not necessarily know the term
  - b. Can give an example of environmental adaptation and its importance for a species' survival
7. Awareness of personal health issues
  - a. Can identify common illnesses and diseases
  - b. Can identify at least 5 elements of a healthy lifestyle and explain the effects on communities
8. Knows the basic structures of matter and how matter interacts with various forms of energy
  - a. Can identify the properties of matter and the process to change states
  - b. Can recognize ways that matter interacts with energy (electricity, magnetism, and sound)
9. Knows relationships between forces and motions
  - a. Can identify laws of motion
  - b. Can describe the effects of potential & kinetic energy but not necessarily the terms
10. Knows key terms used in Earth, life, and physical sciences
  - a. Can distinguish between Earth, life and physical sciences based on terminology
  - b. Can define at least 5 terms that relate to each of the sciences

---

<sup>14</sup> Examples of the “can do” statements developed by the panels provided.

## **Appendix D**

### **Results for Praxis Elementary Education Multiple Subjects Standard Setting Study**

**Table D1*****Panel Member Demographics (By Panels)***

	Panel 1A		Panel 1B		Panel 2A		Panel 2B	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<b>Current Position</b>								
Teacher	9	69%	11	79%	10	67%	9	69%
College Faculty	3	23%	3	21%	5	33%	4	31%
Reading Coach	1	8%	0	0%	0	0%	0	0%
<b>Race</b>								
White	8	62%	9	64%	10	67%	9	69%
Black or African American	3	23%	3	21%	2	13%	3	23%
Hispanic or Latino	1	8%	1	7%	1	7%	1	8%
Asian or Asian American	0	0%	1	7%	1	7%	0	0%
Other	1	8%	0	0%	1	7%	0	0%
<b>Gender</b>								
Female	11	85%	11	79%	13	87%	10	77%
Male	2	15%	3	21%	2	13%	3	23%
<b>If you are working in a K-12 setting, are you currently supervising or mentoring other elementary school teachers?</b>								
Yes	6	46%	3	21%	2	13%	0	0%
No	4	31%	8	57%	8	53%	9	69%
Not currently working at the K-12 level	3	23%	3	21%	5	33%	4	31%

**Table D1 (continued)**

***Panel Member Demographics***

	Panel 1A		Panel 1B		Panel 2A		Panel 2B	
	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%	<i>N</i>	%
<b>How many years of experience do you have as an elementary school teacher?</b>								
7 years or less	4	31%	4	29%	7	47%	4	31%
8 - 11 years	3	23%	3	21%	2	13%	4	31%
12 - 15 years	0	0%	2	14%	1	7%	0	0%
16 years or more	3	23%	2	14%	0	0%	1	8%
<b>Which best describes the location of your K-12 school?</b>								
Urban	4	31%	2	14%	3	20%	3	23%
Suburban	4	31%	6	43%	2	13%	3	23%
Rural	2	15%	3	21%	5	33%	3	23%
Not currently teaching at the K-12 level	3	23%	3	21%	5	33%	4	31%
<b>If you are college faculty, are you currently involved in the training/preparation of elementary-school teachers?</b>								
Yes	3	23%	3	21%	4	27%	4	31%
No	0	0%	0	0%	1	7%	0	0%
Not college faculty	10	77%	11	79%	10	66%	9	69%

**Table D2****Passing Score Summary by Round of Judgments — Panel 1A**

<b>Panelist</b>	<b>Reading Lang. Arts</b>		<b>Mathematics</b>		<b>Social Studies</b>		<b>Science</b>	
	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>
1	41.00	40.90	25.10	25.20	34.75	34.75	30.30	30.50
2	33.80	35.50	26.20	26.10	34.45	34.45	30.20	30.70
3	41.85	42.45	26.20	26.20	37.35	37.95	35.70	35.70
4	44.35	44.35	27.50	28.15	39.30	39.30	36.95	36.95
5	46.75	46.55	27.40	27.60	39.05	38.85	35.45	35.55
6	41.30	41.30	24.30	24.10	34.30	34.60	33.00	33.50
7	36.20	35.90	20.90	22.00	29.70	30.10	29.80	30.20
8	46.50	46.20	23.30	24.40	35.25	35.45	31.90	32.30
9	50.15	49.45	29.25	29.95	41.15	41.75	39.75	40.05
10	47.50	47.50	28.95	28.75	43.85	43.85	42.00	42.00
11	49.05	49.55	31.70	31.40	41.45	40.55	37.10	36.80
12	41.00	41.00	28.10	28.10	35.60	35.60	31.80	31.90
13	38.55	38.15	22.45	22.45	32.25	32.75	29.30	29.70
<b>Average</b>	42.92	42.98	26.26	26.49	36.80	36.92	34.10	34.30
<b>SD</b>	4.99	4.75	3.02	2.83	4.01	3.86	4.07	3.93
<b>SEJ</b>	1.38	1.32	0.84	0.79	1.11	1.07	1.13	1.09
<b>Highest</b>	50.15	49.55	31.70	31.40	43.85	43.85	42.00	42.00
<b>Lowest</b>	33.80	35.50	20.90	22.00	29.70	30.10	29.30	29.70

**Table D3****Passing Score Summary by Round of Judgments — Panel 1B**

<b>Panelist</b>	<b>Reading Lang. Arts</b>		<b>Mathematics</b>		<b>Social Studies</b>		<b>Science</b>	
	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>
1	45.70	47.90	28.70	28.70	29.40	31.45	35.20	34.30
2	51.75	51.55	30.90	30.90	36.80	36.90	38.20	38.20
3	43.20	42.90	26.05	26.05	24.70	27.20	33.20	33.05
4	39.40	39.40	24.70	24.20	31.50	31.20	28.60	29.10
5	44.10	45.30	27.65	27.65	35.80	34.65	29.80	35.00
6	39.30	41.70	24.15	25.35	31.65	31.65	30.35	30.85
7	41.00	41.40	22.20	22.40	33.45	33.35	29.35	29.55
8	42.75	43.35	25.65	26.05	33.85	33.85	34.15	34.55
9	50.55	49.65	25.80	26.20	31.70	32.10	34.45	33.85
10	49.05	48.75	29.70	29.40	28.00	31.65	33.25	33.45
11	46.35	46.65	30.40	30.40	35.20	35.50	33.10	32.90
12	47.40	47.20	31.05	30.85	41.50	39.85	32.65	32.65
13	48.40	47.80	28.95	29.05	36.30	35.20	34.65	34.70
14	44.30	45.90	28.60	27.70	35.15	34.55	32.55	32.55
<b>Average</b>	45.23	45.68	27.46	27.49	33.21	33.51	32.82	33.19
<b>SD</b>	3.93	3.50	2.74	2.57	4.19	3.03	2.60	2.33
<b>SEJ</b>	1.05	0.94	0.73	0.69	1.12	0.81	0.70	0.62
<b>Highest</b>	51.75	51.55	31.05	30.90	41.50	39.85	38.20	38.20
<b>Lowest</b>	39.30	39.40	22.20	22.40	24.70	27.20	28.60	29.10

**Table D4****Passing Score Summary by Round of Judgments — Panel 2A**

<b>Panelist</b>	<b>Reading Lang. Arts</b>		<b>Mathematics</b>	
	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>
1	59.30	59.30	34.30	34.30
2	50.40	50.90	29.90	29.75
3	50.20	49.65	27.10	28.60
4	49.20	50.50	28.00	29.70
5	44.45	44.85	28.90	28.90
6	48.90	50.50	25.10	25.40
7	42.60	42.60	23.25	25.15
8	47.05	47.05	27.25	27.65
9	38.50	42.40	28.05	28.55
10	44.05	44.25	27.05	26.65
11	51.10	50.80	24.10	24.60
12	49.85	49.95	30.50	29.60
13	51.30	50.90	32.15	31.70
14	43.90	45.40	24.55	26.05
15	44.95	49.55	23.80	26.05
<b>Average</b>	47.72	48.57	27.60	28.18
<b>SD</b>	4.91	4.32	3.20	2.66
<b>SEJ</b>	1.27	1.11	0.83	0.69
<b>Highest</b>	59.30	59.30	34.30	34.30
<b>Lowest</b>	38.50	42.40	23.25	24.60

**Table D5****Passing Score Summary by Round of Judgments — Panel 2B**

<b>Panelist</b>	<b>Social Studies</b>		<b>Science</b>	
	<b>Rd 1</b>	<b>Rd 2</b>	<b>Rd 1</b>	<b>Rd 2</b>
1	33.55	33.75	32.50	32.50
2	31.15	32.65	30.55	30.75
3	33.90	33.80	35.40	35.30
4	26.70	28.65	26.30	27.20
5	29.40	29.30	33.25	33.10
6	35.70	36.20	32.60	31.80
7	24.90	24.90	25.60	25.80
8	28.90	29.70	30.40	30.40
9	32.15	32.95	33.40	32.90
10	31.45	30.95	28.70	29.30
11	44.15	42.85	31.70	31.70
12	39.00	38.30	35.75	35.05
13	31.10	30.80	21.70	22.10
<b>Average</b>	32.47	32.68	30.60	30.61
<b>SD</b>	5.08	4.60	4.08	3.74
<b>SEJ</b>	1.41	1.27	1.13	1.04
<b>Highest</b>	44.15	42.85	35.75	35.30
<b>Lowest</b>	24.90	24.90	21.70	22.10

**Table D6**

**Specification Judgments — Reading and Language Arts (5032)**

	Very Important		Important		Slightly Important		Not Important	
	N	%	N	%	N	%	N	%
<b>I. Reading</b>								
<b>A. Foundational Skills</b>	<b>41</b>	<b>98%</b>	<b>1</b>	<b>2%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands key ideas relevant to the foundations of literacy and reading development	40	95%	2	5%	0	0%	0	0%
• Understands the role of phonological awareness, and phonics and word analysis skills in literacy development	39	93%	3	7%	0	0%	0	0%
• Understands the role of fluency in supporting comprehension	31	74%	11	26%	0	0%	0	0%
• Knows the stages of early orthographic development	19	45%	22	52%	1	2%	0	0%
<b>B. Literature and Informational Texts</b>	<b>29</b>	<b>69%</b>	<b>13</b>	<b>31%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands the role of comprehension	38	90%	4	10%	0	0%	0	0%
• Understands the basic elements of literature and informational texts	30	71%	11	26%	1	2%	0	0%
• Understands the basic elements of poetry and drama	8	19%	26	62%	8	19%	0	0%
• Understands how to determine the meanings of words and phrases as used in texts, including figurative language	29	69%	13	31%	0	0%	0	0%

Table D6

## Specification Judgments — Reading and Language Arts (5032)

	Very Important		Important		Slightly Important		Not Important	
	N	%	N	%	N	%	N	%
<b>II. Language, Writing, and Communication</b>								
<b>A. Language</b>	<b>31</b>	<b>74%</b>	<b>11</b>	<b>26%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Knows the components of written language	34	81%	8	19%	0	0%	0	0%
• Knows sentence types and sentence structure	25	60%	15	36%	2	5%	0	0%
• Understands the basic components of vocabulary	30	71%	11	26%	1	2%	0	0%
<b>B. Writing<sup>15</sup></b>	<b>32</b>	<b>76%</b>	<b>7</b>	<b>17%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Knows types and traits of writing	28	67%	14	33%	0	0%	0	0%
• Knows the stages of the writing process	35	83%	7	17%	0	0%	0	0%
• Knows structures and organization of writing	30	71%	12	29%	0	0%	0	0%
• Understands how to use resource material in reading and language arts	19	45%	22	52%	1	2%	0	0%
<b>C. Communication</b>	<b>27</b>	<b>64%</b>	<b>15</b>	<b>36%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands different aspects of speaking	23	55%	18	43%	1	2%	0	0%
• Understands different aspects of listening	28	67%	14	33%	0	0%	0	0%
• Understands different aspects of viewing	16	38%	25	60%	1	2%	0	0%
• Understands the role that speaking, listening, and viewing play in language acquisition for second-language learners	30	71%	12	29%	0	0%	0	0%

<sup>15</sup> Three panelists did not respond to this question.

**Table D7**

**Specification Judgments — Mathematics (5033)**

	Very Important		Important		Slightly Important		Not Important	
	N	%	N	%	N	%	N	%
<b>I. Number Operations and Algebraic Thinking<sup>16</sup></b>	<b>32</b>	<b>76%</b>	<b>9</b>	<b>21%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands prenumeration concepts	31	74%	10	24%	1	2%	0	0%
• Understands basic number systems	38	90%	4	10%	0	0%	0	0%
• Understands basic four operations and their properties	38	90%	4	10%	0	0%	0	0%
• Understands basic concepts of number theory	31	74%	11	26%	0	0%	0	0%
• Understands how to solve problems, including word problems, using multiple strategies and assess the reasonableness of results	33	79%	9	21%	0	0%	0	0%
• Understands how to generate, describe, and explore numerical patterns and engage in mathematical investigations	23	55%	19	45%	0	0%	0	0%
• Understands basic algebraic methods and representations	24	57%	15	36%	3	7%	0	0%
• Understands the associative, commutative, and distributive properties	13	31%	23	55%	6	14%	0	0%
• Understands additive and multiplicative inverses	8	19%	21	50%	11	26%	2	5%
• Understands the special properties of zero and one	18	43%	19	45%	5	12%	0	0%
• Understands equations and inequalities	22	52%	18	43%	2	5%	0	0%
• Understands the appropriate application of formulas	21	50%	18	43%	3	7%	0	0%

<sup>16</sup> One panelist did not respond to this question.

**Table D7**

**Specification Judgments — Mathematics (5033)**

		Very Important		Important		Slightly Important		Not Important	
		N	%	N	%	N	%	N	%
<b>II.</b>	<b>Geometry, Measurement, Data, and Interpretation</b>	<b>22</b>	<b>52%</b>	<b>20</b>	<b>48%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
	• Understands properties and attributes of two- or three-dimensional figures and their hierarchy of classification	22	52%	20	48%	0	0%	0	0%
	• Understands transformations, geometric models, and net	11	26%	23	55%	7	17%	1	2%
	• Understands nonstandard, customary, and metric units of measurement	27	64%	13	31%	2	5%	0	0%
	• Understands visual displays of quantitative data	28	67%	13	31%	1	2%	0	0%
	• Understands simple probability and intuitive concepts of chance	10	24%	30	71%	2	5%	0	0%
	• Understands fundamental counting techniques	28	67%	11	26%	3	7%	0	0%
	• Understands basic descriptive statistics	18	43%	20	48%	4	10%	0	0%

**Table D8**

**Specification Judgments — Social Studies (5034)**

		Very Important		Important		Slightly Important		Not Important	
		N	%	N	%	N	%	N	%
<b>I.</b>	<b>United States History, Government, and Citizenship</b>	<b>23</b>	<b>58%</b>	<b>17</b>	<b>43%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
	● Knows European exploration and colonization in United States history and growth and expansion of the United States	16	40%	22	55%	2	5%	0	0%
	● Knows about the American Revolution and the founding of the nation in United States history	21	53%	18	45%	1	3%	0	0%
	● Knows the major events and developments in United States history from founding to present	23	58%	17	43%	0	0%	0	0%
	● Knows about twentieth-century developments and transformations in the United States	17	43%	20	50%	3	8%	0	0%
	● Understands connections between causes and effects of events	25	63%	14	35%	1	3%	0	0%
	● Understands the nature, purpose, and forms of government	26	65%	14	35%	0	0%	0	0%
	● Knows key documents and speeches in the history of the United States	8	20%	23	58%	9	23%	0	0%
	● Knows the rights and responsibilities of citizenship in a democracy	29	73%	11	28%	0	0%	0	0%
<b>II.</b>	<b>Geography, Anthropology, and Sociology</b>	<b>13</b>	<b>33%</b>	<b>27</b>	<b>68%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
	● Knows world and regional geography	21	53%	17	43%	2	5%	0	0%
	● Understands the interaction of physical and human systems	6	15%	31	78%	3	8%	0	0%
	● Knows the uses of geography	20	50%	20	50%	0	0%	0	0%
	● Knows how people of different cultural backgrounds interact with their environment, family, neighborhoods, and communities	23	58%	16	40%	1	3%	0	0%

**Table D8**

**Specification Judgments — Social Studies (5034)**

		<b>Very Important</b>		<b>Important</b>		<b>Slightly Important</b>		<b>Not Important</b>	
		<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>	<b>N</b>	<b>%</b>
<b>III.</b>	<b>World History and Economics</b>	<b>9</b>	<b>23%</b>	<b>28</b>	<b>70%</b>	<b>3</b>	<b>8%</b>	<b>0</b>	<b>0%</b>
	• Knows the major contributions of classical civilizations	5	13%	25	63%	10	25%	0	0%
	• Understands twentieth-century developments and transformations in World history	8	20%	27	68%	5	13%	0	0%
	• Understands the role of cross-cultural comparisons in World history instruction	4	10%	26	65%	10	25%	0	0%
	• Knows key terms and basic concepts of economics	19	48%	17	43%	4	10%	0	0%
	• Understands how economics effects population, resources, and technology	11	28%	25	63%	4	10%	0	0%
	• Understands the government’s role in economics and impact of economics on government	14	35%	20	50%	6	15%	0	0%

**Table D9**

**Specification Judgments — Science (5035)**

	Very Important		Important		Slightly Important		Not Important	
	N	%	N	%	N	%	N	%
<b>I. Earth Science</b>	<b>20</b>	<b>50%</b>	<b>20</b>	<b>50%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands the structure of the Earth system	20	50%	20	50%	0	0%	0	0%
• Understands processes of the Earth system	15	38%	24	60%	1	3%	0	0%
• Understands Earth history	8	20%	26	65%	6	15%	0	0%
• Understands Earth and the universe <sup>17</sup>	20	50%	19	48%	0	0%	0	0%
• Understands Earth patterns, cycles, and change	26	65%	14	35%	0	0%	0	0%
• Understands science as a human endeavor, process, and career	18	45%	18	45%	4	10%	0	0%
• Understands science as inquiry	37	93%	3	8%	0	0%	0	0%
• Understands how to use resource and research material in science	26	65%	12	30%	2	5%	0	0%
• Understands the unifying processes of science	10	25%	27	68%	3	8%	0	0%
<b>II. Life Science</b>	<b>24</b>	<b>60%</b>	<b>16</b>	<b>40%</b>	<b>0</b>	<b>0%</b>	<b>0</b>	<b>0%</b>
• Understands the structure and function of living systems	28	70%	12	30%	0	0%	0	0%
• Understands reproduction and heredity	14	35%	19	48%	7	18%	0	0%
• Understands change over time in living things	18	45%	22	55%	0	0%	0	0%
• Understands regulation and behavior	14	35%	24	60%	2	5%	0	0%
• Understands unity/diversity of life, adaptation, & classification	16	40%	19	48%	5	13%	0	0%
• Understands the interdependence of organisms	23	58%	14	35%	3	8%	0	0%
• Knows about personal health	29	73%	9	23%	2	5%	0	0%
• Understands science as a human endeavor, process, and career	14	35%	19	48%	7	18%	0	0%
• Understands science as inquiry	35	88%	4	10%	1	3%	0	0%
• Understands how to use resource and research material in science	25	63%	13	33%	2	5%	0	0%
• Understands the unifying processes of science	13	33%	23	58%	4	10%	0	0%

<sup>17</sup> One panelist did not respond to this question.

**Table D9**

**Specification Judgments — Science (5035)**

	Very Important		Important		Slightly Important		Not Important	
	N	%	N	%	N	%	N	%
<b>III. Physical Science<sup>18</sup></b>	<b>17</b>	<b>43%</b>	<b>21</b>	<b>53%</b>	<b>1</b>	<b>3%</b>	<b>0</b>	<b>0%</b>
• Understands the physical and chemical properties and structure of matter	20	50%	18	45%	2	5%	0	0%
• Understands forces and motions	11	28%	24	60%	5	13%	0	0%
• Understands energy	13	33%	24	60%	3	8%	0	0%
• Understands interactions of energy and matter	11	28%	25	63%	4	10%	0	0%
• Understands science as a human endeavor, process, and career	17	43%	16	40%	7	18%	0	0%
• Understands science as inquiry	36	90%	3	8%	1	3%	0	0%
• Understands how to use resource and research material in science	26	65%	12	30%	2	5%	0	0%
• Understands the unifying processes of science	15	38%	22	55%	3	8%	0	0%

<sup>18</sup> One panelist did not respond to this question.

**Table D10****Final Evaluation — Panel 1A**

	<b>Strongly Agree</b>		<b>Agree</b>		<b>Disagree</b>		<b>Strongly Disagree</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• I understood the purpose of this study.	11	85%	2	15%	0	0%	0	0%
• The instructions and explanations provided by the facilitators were clear.	8	62%	5	38%	0	0%	0	0%
• The training in the standard setting method was adequate to give me the information I needed to complete my assignment.	10	77%	3	23%	0	0%	0	0%
• The explanation of how the recommended cut score is computed was clear.	10	77%	1	8%	2	15%	0	0%
• The opportunity for feedback and discussion between rounds was helpful.	10	77%	3	23%	0	0%	0	0%
• The process of making the standard setting judgments was easy to follow. <sup>19</sup>	7	64%	3	27%	1	9%	0	0%

---

<sup>19</sup> Two panelists did not respond to this question.

**Table D10 (continued)**

**Final Evaluation — Panel 1A**

<b>How influential was each of the following factors in guiding your standard setting judgments?</b>	<b>Very Influential</b>		<b>Somewhat Influential</b>		<b>Not Influential</b>			
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>		
• The definition of the JQC	11	85%	2	15%	0	0%		
• The between-round discussions	5	38%	8	62%	0	0%		
• The knowledge/skills required to answer each test question	10	77%	2	15%	1	8%		
• The cut scores of other panel members	1	8%	11	85%	1	8%		
• My own professional experience	11	85%	2	15%	0	0%		
	<b>Very Comfortable</b>		<b>Somewhat Comfortable</b>		<b>Somewhat Uncomfortable</b>		<b>Very Uncomfortable</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• Overall, how comfortable are you with the panel's recommended cut scores? <sup>20</sup>	7	64%	4	36%	0	0%	0	0%
	<b>Too Low</b>		<b>About Right</b>		<b>Too High</b>			
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>		
• Overall, the recommended cut score is: <sup>21</sup>	0	0%	12	100%	0	0%		

<sup>20</sup> Two panelists did not respond to this question.

<sup>21</sup> One panelist did not respond to this question.

**Table D11****Final Evaluation — Panel 1B**

	Strongly Agree		Agree		Disagree		Strongly Disagree	
	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent	<i>N</i>	Percent
• I understood the purpose of this study.	11	79%	3	21%	0	0%	0	0%
• The instructions and explanations provided by the facilitators were clear.	11	79%	3	21%	0	0%	0	0%
• The training in the standard setting method was adequate to give me the information I needed to complete my assignment.	9	64%	5	36%	0	0%	0	0%
• The explanation of how the recommended cut score is computed was clear. <sup>22</sup>	11	85%	2	15%	0	0%	0	0%
• The opportunity for feedback and discussion between rounds was helpful.	11	79%	3	21%	0	0%	0	0%
• The process of making the standard setting judgments was easy to follow. <sup>16</sup>	7	54%	6	46%	0	0%	0	0%

---

<sup>22</sup> One panelist did not respond to this question.

**Table D11 (continued)**

**Final Evaluation — Panel 1B**

<b>How influential was each of the following factors in guiding your standard setting judgments?</b>	<b>Very Influential</b>		<b>Somewhat Influential</b>		<b>Not Influential</b>			
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>		
• The definition of the JQC	12	86%	2	14%	0	0%		
• The between-round discussions	9	64%	5	36%	0	0%		
• The knowledge/skills required to answer each test question	13	93%	0	0%	1	7%		
• The cut scores of other panel members	3	21%	5	36%	6	43%		
• My own professional experience	11	79%	3	21%	0	0%		

  

<b>Overall, how comfortable are you with the panel's recommended cut scores?</b>	<b>Very Comfortable</b>		<b>Somewhat Comfortable</b>		<b>Somewhat Uncomfortable</b>		<b>Very Uncomfortable</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• Reading and Language Arts	8	57%	6	43%	0	0%	0	0%
• Mathematics	13	93%	0	0%	1	7%	0	0%
• Social Studies	8	57%	5	36%	1	7%	0	0%
• Science	10	71%	4	29%	0	0%	0	0%

  

<b>Overall, the recommended cut score is:</b>	<b>Too Low</b>		<b>About Right</b>		<b>Too High</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• Reading and Language Arts	4	29%	9	64%	1	7%
• Mathematics <sup>23</sup>	0	0%	13	100%	0	0%
• Social Studies	4	29%	9	64%	1	7%
• Science	1	7%	12	86%	1	7%

<sup>23</sup> One panelist did not respond to this question.

**Table D12****Final Evaluation — Panel 2A**

	<b>Strongly Agree</b>		<b>Agree</b>		<b>Disagree</b>		<b>Strongly Disagree</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• I understood the purpose of this study.	10	67%	5	33%	0	0%	0	0%
• The instructions and explanations provided by the facilitators were clear.	8	53%	7	47%	0	0%	0	0%
• The training in the standard setting method was adequate to give me the information I needed to complete my assignment.	7	47%	8	53%	0	0%	0	0%
• The explanation of how the recommended cut score is computed was clear.	10	67%	5	33%	0	0%	0	0%
• The opportunity for feedback and discussion between rounds was helpful.	9	60%	5	33%	1	7%	0	0%
• The process of making the standard setting judgments was easy to follow.	9	60%	5	33%	1	7%	0	0%

**Table D12 (continued)**

**Final Evaluation — Panel 2A**

<b>How influential was each of the following factors in guiding your standard setting judgments?</b>	<b>Very Influential</b>		<b>Somewhat Influential</b>		<b>Not Influential</b>			
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>		
• The definition of the JQC	10	67%	5	33%	0	0%		
• The between-round discussions	12	80%	2	13%	1	7%		
• The knowledge/skills required to answer each test question	13	87%	1	7%	1	7%		
• The cut scores of other panel members	7	47%	6	40%	2	13%		
• My own professional experience	12	80%	2	13%	1	7%		

  

<b>Overall, how comfortable are you with the panel's recommended passing scores?</b>	<b>Very Comfortable</b>		<b>Somewhat Comfortable</b>		<b>Somewhat Uncomfortable</b>		<b>Very Uncomfortable</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• Reading and Language Arts	10	67%	4	27%	1	7%	0	0%
• Mathematics	9	60%	4	27%	2	13%	0	0%

  

<b>Overall, the recommended passing score is:</b>	<b>Too Low</b>		<b>About Right</b>		<b>Too High</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• Reading and Language Arts	0	0%	15	100%	0	0%
• Mathematics	4	27%	10	67%	1	7%

**Table D13****Final Evaluation — Panel 2B**

	<b>Strongly Agree</b>		<b>Agree</b>		<b>Disagree</b>		<b>Strongly Disagree</b>	
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>
• I understood the purpose of this study.	10	77%	3	23%	0	0%	0	0%
• The instructions and explanations provided by the facilitators were clear.	13	100%	0	0%	0	0%	0	0%
• The training in the standard setting method was adequate to give me the information I needed to complete my assignment.	12	92%	1	8%	0	0%	0	0%
• The explanation of how the recommended cut score is computed was clear.	10	77%	3	23%	0	0%	0	0%
• The opportunity for feedback and discussion between rounds was helpful.	11	85%	2	15%	0	0%	0	0%
• The process of making the standard setting judgments was easy to follow.	12	92%	1	8%	0	0%	0	0%
<b>How influential was each of the following factors in guiding your standard setting judgments?</b>	<b>Very Influential</b>		<b>Somewhat Influential</b>		<b>Not Influential</b>			
	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>	<i>N</i>	<b>Percent</b>		
• The definition of the JQC	11	85%	2	15%	0	0%		
• The between-round discussions	10	77%	3	23%	0	0%		
• The knowledge/skills required to answer each test question	9	69%	4	31%	0	0%		
• The cut scores of other panel members	2	15%	10	77%	1	8%		
• My own professional experience	8	62%	5	38%	0	0%		
• The definition of the JQC	11	85%	2	15%	0	0%		