

# Missouri End-of-Course (MO EOC) Assessments 2015 Standard Setting and Cutpoint Validation Plan

Presented by  
Questar Assessment, Inc.

October 15, 2014



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## 1. Introduction

### 1.1. Overview of the Document

This document presents the standard setting and cutpoint validation plan from Questar Assessment, Inc. (Questar) for the Missouri End-of-Course (MO EOC) Assessments. During the standard setting workshop, a group of Missouri educators and professionals will use the Modified Angoff method to establish recommended cut scores in a two-day meeting for Physical Science. During the cutpoint validation meeting, a group of Missouri educators and professionals will review the existing cut scores for English I, English II, Algebra I, Algebra II, and Geometry in a two-day meeting to determine if the cut scores are still appropriate.

Based on the Missouri Department of Elementary and Secondary Education's (DESE's) decision (through email communication on Oct. 9, 2014), standard setting will be performed for Physical Science, whereas cutpoint validation will be conducted for English I, English II, Algebra I, Algebra II, and Geometry. Subsequently, one standard setting panel and two cutpoint validation panels will be formed for the following content areas:

- Standard Setting Panel: Physical Science
- Cutpoint Validation Panel 1: English I, English II
- Cutpoint Validation Panel 2: Algebra I, Algebra II, Geometry

The standard setting and cutpoint validation workshops are scheduled for Feb. 17–18, 2015, using the Fall 2014 operational test forms and data. In addition, achievement level descriptors (ALDs) will be updated. Information about the ALDs is presented in this document as well.

### 1.2. Overview of the MO EOC Assessments

There are currently nine MO EOC Assessments: English I, English II, Algebra I, Algebra II, Geometry, Biology, Physical Science, Government, and American History. The MO EOC Assessments were first administered in 2008–2009 for English II, Algebra I, and Biology and in 2009–2010 for English I, Algebra II, Geometry, Government, and American History. The Physical Science Assessment was administered for the first time in Fall 2014.

Prior to 2014–2015, all MO EOC Assessments were required. However, beginning in Fall 2014, five MO EOC Assessments are required (English II, Algebra I, Algebra II<sup>1</sup>, Biology, and Government) and four MO EOC Assessments are optional (English I, Geometry, Physical Science, and American History).

The MO EOC Assessments are aligned to the Missouri Learning Standards, with CCSS standards included for English Language Arts and Mathematics (English I, English II, Algebra I, Algebra II, and Geometry). Course-level expectations (CLEs), which are aligned to the Show-Me Standards adopted in 1996, provide clear objectives for each course, or content area. Each MO EOC Assessment is tailored to a specific content area and is administered when a student has completed the content defined for that course. Districts can offer EOC course content in any

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<sup>1</sup> For students who complete the Algebra I EOC Assessment prior to high school, Algebra II is the required high school Mathematics assessment for accountability purposes. (<http://dese.mo.gov/college-career-readiness/assessment/end-course>)

grade and in a variety of configurations. Although many districts offer EOC course content within a course bearing the same name, EOC course content can also be embedded within a course or across several courses.

English I, English II, Algebra I, and Biology contain both selected-response (SR) items and performance events/writing prompts (PE/WPs), whereas Algebra II, Geometry, Government, American History, and Physical Science contain only SR items. These tests are administered in approximately one testing period and are not strictly timed. They are administered online with Paper/Pencil, Braille, or Large Print forms available for students requiring accommodations.

### *1.3. Reasons for the Standard Setting and Cutpoint Validation*

The Fall 2014 administration reflected various changes in English I, English II, Algebra I, Algebra II, Geometry, and Physical Science. These changes are reasons for the standard setting and cutpoint validation. Specifically, starting in Fall 2014, the following changes have occurred:

- Revised test blueprints for English I, English II, Algebra I, Algebra II, and Geometry
- New test forms for English I, English II, Algebra I, Algebra II, and Geometry
- A new test, Physical Science, developed by the University of Iowa
- Alignment of existing items to the Common Core State Standards (CCSS) for English Language Arts and Mathematics
- New scoring rubrics for PEs
- Change of test length and total score points
- Addition of PEs to English I
- Updated ALDs

In consultation with DESE, it was determined that these changes were not enough to conduct a full standard setting for all content areas. This is mainly because the adjustments are relatively minor and the forms still measure highly similar content to forms prior to Fall 2014. Therefore, cutpoint validation will be conducted for English I, English II, Algebra I, Algebra II, and Geometry while a full standard setting will be conducted for Physical Science.

## **2. Achievement Level Descriptors (ALDs)**

The MO EOC Assessments use the same achievement level labels used for the grade-level Missouri Assessment Program (MAP): Below Basic, Basic, Proficient, and Advanced. For each of these levels, the ALDs describe the specific knowledge and skills that a student at that level must be able to demonstrate.

DESE requested that Questar revise the previous ALDs (see Appendix A) to align to the CCSS. Questar's Assessment Design and Psychometrics team worked together to create draft ALDs for DESE to review. Questar then reviewed the ALDs with DESE and updated them based on DESE's feedback. These current versions of the draft ALDs are provided in Appendix B. ALDs are used as guidelines for evaluating student performance, and they will be beneficial to standard setting panelists as they define the borderline students and recommend cut scores.

### 3. Overview of the 2015 Standard Setting and Cutpoint Validation

Based on DESE’s recommendation, a standard setting workshop will convene from Feb. 17–18, 2015, for a two-day meeting to establish cut scores for Physical Science. At the same time on Feb. 17-18, two cutpoint validation panels will also convene to validate existing cut scores for English I, English II, Algebra I, Algebra II, and Geometry.

#### 3.1. Staffing

For both the standard setting and cutpoint validation workshops, Questar will provide staff members experienced in conducting standard setting and cutpoint validation to facilitate the panelist groups. Facilitators will all hold doctorates in educational measurement, and all panelists will be trained on the method prior to implementation with ample time for any questions to be addressed. Psychometricians and statistical analysts will also attend the workshops to enter panelist data, produce tables and reports, oversee data quality control, and observe the activities. A Questar program manager will also be present, along with Questar assessment specialists to serve as resources for content-related questions. DESE may be available for all or part of the standard setting and cutpoint validation as they see fit.

#### 3.2. Security

Data and other materials will be locked in a secure location when not in use during the workshop. This will include any student work and evaluation surveys. All computers containing assessment-related materials will also be locked in a secure location when not in use.

#### 3.3. Panels

As shown in Table 1, three panels with 8–12 members each will be created to form one standard setting and two cutpoint validation committees. Panelists will include classroom teachers, nonteacher educators and post-secondary teachers, and business professionals who have administered the MO EOC Assessments in their respective content area and are familiar with the applicable standards. The minimally acceptable number of panelists is eight per content area, and it is preferable not to have more than 12 panelists in any group.

**Table 1. Panel Composition**

| <b>Panel</b>          | <b>Content Area(s)</b>          | <b>Total # of Panelists*</b> |
|-----------------------|---------------------------------|------------------------------|
| Standard Setting      | Physical Science                | 8–12                         |
| Cutpoint Validation 1 | English I, English II           | 8–12                         |
| Cutpoint Validation 2 | Algebra I, Algebra II, Geometry | 8–12                         |
|                       | <b>Total</b>                    | <b>24–36</b>                 |

\*The number of panelists is tentative.

Consistent to the previous standard setting conducted for the MO EOC Assessments in 2009, the requirements for participation are as follows:

- For classroom teachers: The teacher must have taught the course for which he or she is being nominated to serve as a panelist for a minimum of five years. The teacher should be familiar with the Missouri Learning Standards and the applicable CLEs. Finally, the teacher should be recognized as “outstanding” in professional performance.

- For nonteacher educators and post-secondary educators: The educator may be a nonteacher educational staff member in a building or district central office, or an instructor or administrator at a post-secondary institution. The educator must have familiarity with the course content for which he or she is being nominated to serve as a panelist. He or she should be familiar with the Missouri Learning Standards and applicable CLEs. Finally, the educator must be recognized as “outstanding” in professional performance by the individual making the nomination.
- For business professionals: The business professional must have familiarity with the course content for which he or she is being nominated to serve as a panelist. The individual should either use high school course content for the applicable content area in his or her daily professional work *or* be familiar with the knowledge and skills that high school students completing the applicable courses must possess to have a firm foundation for further coursework or for the workplace. Finally, the business professional must not be a current or former employee of the public school system.

Effort will be made to ensure representation of the state’s urban, suburban, and rural schools and communities, as well as to include representation from the state’s nine Regional Professional Development Center (RPDC) regions.<sup>2</sup> Additionally, as much as possible given the nomination pool, an attempt will be made to include panelists with expertise in working with students with special needs and English language learners (ELLs). By design, panel slots will be heavily populated with classroom teachers.

#### **4. Standard Setting**

To establish recommended cut scores for Physical Science, a group of educators will convene from Feb. 17–18, 2015, for standard setting using the Modified Angoff method and the MO EOC Fall 2014 operational forms.

Modified Angoff, which was also used for the 2008 and 2009 standard settings for the MO EOC Assessments, is well recognized and heavily researched for establishing student performance standards for assessments. Unlike the item mapping method that requires ordering the items by difficulty, Modified Angoff requires panelists to determine the percentage of students meeting the borderline definition that will respond correctly to each item. Then, panelists must figure out that percentage for every borderline student definition (i.e., panelists must determine these percentages for each cut score recommendation).

Modified Angoff requires three rounds of panelist judgments. The cut score will be computed from the expected scores for individual items. Panelists will consider each item as a whole and make judgments of the probability that a borderline student would answer the question correctly.

Before the last round of judgments, Questar will provide the panelists with statewide impact data based on the Fall 2014 administration. These data will serve as an anchor for the panelists’ recommendations, but the facilitator will caution the panelists about relying too much on these impact data.

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<sup>2</sup> <http://dese.mo.gov/educator-quality/educator-development/regional-professional-development-centers>

Finally, the facilitator will clearly communicate to the panelists that the results of their standard setting activities will be purely advisory to DESE and that DESE will consider the recommendations and present them to the Missouri State Board of Education for final approval.

#### 4.1. *Cut Scores*

A cut score is the minimum score a student must get on an assessment in order to be placed in a certain achievement level, and they are determined between two adjacent achievement levels. Therefore, three recommended cut scores will be determined for the Physical Science Assessment:

- The cut score that differentiates Below Basic performance from Basic performance
- The cut score that differentiates Basic performance from Proficient performance
- The cut score that differentiates Proficient performance from Advanced performance

#### 4.2. *Materials*

The following materials will be used during standard setting:

- Previous ALDs (Appendix A)
- Draft ALDs (Appendix B)
- Fall 2014 operational test forms and data
- Standard setting agenda (Appendix C)
- Standard setting qualifying test (Appendix D)
- Standard setting readiness form (Appendix E)
- Standard setting evaluation survey (Appendix F)
- Standard setting PowerPoint presentation

#### 4.3. *Defining the Borderline Students*

Borderline student definitions will be used to consider the percentage of students obtaining a correct response or mean score for each achievement level. Therefore, before determining the cut score recommendations, panelists will first discuss and compare the ALDs for Physical Science to determine 3–5 distinguishing characteristics between each adjacent set of achievement levels. These characteristics will be used to describe the “borderline” students, or the students just at the cusp of two achievement levels. In other words, a borderline student has a test score close to the lower boundary of an achievement level (e.g., a “minimally Advanced” student).

Therefore, three borderline student definitions will be established to help panelists as they determine their cut score recommendations:

- The Basic borderline student: between Below Basic and Basic (i.e., the “minimally Basic” student)
  - What skills does a low Basic student possess that a high Below Basic student does not?
- The Proficient borderline student: between Basic and Proficient (i.e., the “minimally Proficient” student)
  - What skills does a low Proficient student possess that a high Basic student does not?

- The Advanced borderline student: between Proficient and Advanced (i.e., the “minimally Advanced” student)
  - What skills does a low Advanced student possess that a high Proficient student does not?

The Physical Science Assessment contains only SR items. Therefore, for all items, panelists will estimate the probability that a student performing at the borderline of each achievement level would respond correctly. Panelists will then think of this task as one of estimating the number of students who would give a correct response. They will think of a class of 100 students whose performance just met that of the ALDs for a particular level and will estimate the number of correct responses from 100 borderline students.

#### *4.4. Standard Setting Procedure*

##### *4.4.1. Day 1*

###### ***4.4.1.1. General Process Overview***

A draft standard setting agenda is located in Appendix C. The first part of the two-day session will serve as a high-level introduction and overview to the general standard setting processes. This introduction will include an overview of the MO EOC Assessments and the purpose and intended outcomes of the standard setting. It will also include an overview of the general standard setting process that will include an overview of standard setting, an overview of the Modified Angoff method, ground rules for panelist activities, and some key elements to focus on when setting cut scores.

Finally, panelists will be provided with a general overview of the Physical Science ALDs and their importance to the standard setting process. Since the panelists will be reviewing, editing, and expanding on draft versions of the ALDs provided by DESE and Questar, it will be important for panelists to understand the critical role of ALDs in the standard setting process.

###### ***4.4.1.2. Panelists Take the Operational Assessment***

Next, panelists will sign DESE-provided confidentiality forms and the facilitator will reiterate the high-level standard setting processes discussed during the opening session. Panelists will then take and score the Fall 2014 operational Physical Science Assessment. For this activity, panelists will have access to the test administration procedures, the actual test content, and all relevant scoring materials.

Field test items included in this operational test form will be removed from the test books seen by the panelists. Because these will be “live” materials, the facilitator will stress the confidentiality of all of the items. The primary purpose of this activity will be to familiarize panelists with the assessment content prior to beginning the standard setting judgments. Panelists will then discuss the assessment content such as difficulty, sources of challenges, scoring issues, and general and specific reactions. This exercise will provide the panelists, especially those not familiar with the MO EOC Assessments, with a context concerning the definition of Proficient as conveyed by the assessment.

#### ***4.4.1.3. Panelists Discuss and Fine-Tune the ALDs***

Panelists will fine-tune the draft ALDs for Physical Science. The facilitator will provide panelists with draft copies of the appropriate ALDs, copies of the Physical Science Assessment blueprint, and the appropriate CLEs. Using these materials as references and drawing on the expertise of the panelists, the facilitator will lead the panel in an extended discussion and exercise to refine and elaborate each of the ALDs. Once this activity is complete, panelists will rely on the resulting ALDs as a reference during the actual standard setting. Panelists will also be allowed to make appropriate, though generally minor, revisions and refinements to the ALDs during and after the standard setting activities.

Panelists will begin this activity with a review of the draft ALDs. This review will be highly interactive, with panelists suggesting changes and other refinements, both substantive and editorial. The ultimate task will be to operationalize specific behaviors indicating performance at the Advanced, Proficient, Basic, and Below Basic levels. Panelist suggestions will be discussed until consensus is reached and will then be recorded on the draft ALDs, a copy of which will be given to the panelists. Panelists can refer to these pages, along with the original drafts, during the actual judgment activities. The thoroughness of the ALD refinement activities and the extent to which the panelists, individually and as a group, internalize the ALDs will significantly impact the soundness of the subsequent standard setting activities.

At the conclusion of the standard setting sessions, DESE will collect the panelist recommendations for ALD revisions for consideration in the wording of the final ALDs.

#### ***4.4.1.4. Introduction to the Modified Angoff Method***

After the ALD activity, the facilitator will orient the panel to the specific tasks involved with the Modified Angoff standard setting process. Modified Angoff will require panelists to read and make judgments about each successive item in the test book. When reading an item, panelists will consider the item's importance in the context of the underlying CLE, the task(s) required of the student, and the item's difficulty. They will decide what percentage of minimally Proficient students (i.e., the Proficient borderline students) should be able to answer the item correctly. Panelists will then decide what percentage of minimally Advanced students would answer the item correctly. Finally, they will decide what percentage of minimally Basic students would answer the item correctly.

The panelists will consider their judgments in this order—Proficient, Advanced, and Basic—as it anchors the item judgments on the most important cut, Proficient. Once panelists make their judgment for the Proficient students, they will have a clearer, more defined range of values to consider for the other two cuts.

The facilitator will include the following points in their presentations:

- Panelists should focus on the threshold of performance in each category (i.e., the borderline students).
- Panelists should review and recall what each ALD means.
- Panelists should focus on MO EOC students statewide, not just in the school or district in which they work.

The facilitator will explain that the panelists' judgments should be made independently and anonymously and that security of the testing materials should be maintained at all times.

#### **4.4.1.5. Practice Exercise**

Next, the facilitator will lead panelists in a practice exercise using the Modified Angoff rating procedures. The practice test will contain five SR items. During this exercise, panelists will practice the mechanical aspects of Modified Angoff for recording their recommendations before beginning work on the real assessment. The practice test will also allow the facilitator to check the panelists' understanding of the mechanics of the technique and corresponding recording of judgments.

The practice judgments will be reviewed on a group basis by discussing the range of judgments made about each item. Following completion of the practice exercise, panelists will complete and sign a readiness form indicating that they understand the information they have received and discussed and that they feel prepared to make their Round 1 judgments (see Appendix E).

#### **4.4.1.6. Round 1**

In Round 1, panelists will think about the borderline definition for the Proficient achievement level and review each item. Panelists will determine the percentage of these students who would respond correctly to each item. Panelists will then consider the borderline definition for the next achievement level and determine the percentage of borderline students that would respond correctly.

Round 1 will be completed anonymously and independently (via identification numbers known only to the individual panelist and Questar staff). Panelists will indicate their judgments using Questar's item bank system. Using the item bank system, panelists can review the items and provide ratings for each item and achievement level. The facilitator can also use the item bank system to monitor the rating process. Details of the item bank system will be provided once the interface is finalized.

### **4.4.2. Day 2**

#### **4.4.2.1. Discussion of Round 1 Judgments**

Day 2 of standard setting will begin with an overview of two reports of the Round 1 judgment results, which will have been prepared by Questar's psychometricians during the evening of Day 1.

1. The first report will be a table displaying all three raw score cuts as determined individually by each panelist's judgments. This table will also contain the entire panel's average, median, highest, and lowest raw score cuts, as well as the standard deviation of all the panelists' judgments for each of the three raw score cuts. An example of this psychometric report is provided in Appendix G. Standard setting literature typically considers the median recommendation to be the best indicator of a panel's judgment, as the median would not be impacted by the judgments of a few outlying panelists.
2. The second report will contain a frequency display of all three cut scores (Basic, Proficient, and Advanced) recommended by each panelist. This bar graph (Appendix G) will display all the panelists' judgments on a single graph so that areas of dispersion or overlap in the raw cut scores will be apparent.

The facilitator will review these reports with the panelists to ensure that everyone understands how to interpret the information contained in them. Using the Round 1 results, the facilitator will then lead an extended discussion of the Round 1 judgments. This discussion will focus primarily on the panelists' judgments of individual items. The facilitator will actively engage all the panelists in the discussion to gauge whether they have indicated the item percentage values that they intended, that the reasoning processes they followed in making their judgments are consistent with good practice, and that the panelists clearly understand the mechanics of making item judgments.

Throughout these discussions, the facilitator will focus on the key elements of the standard setting process: establishing the threshold of each cut, projecting the cuts for a statewide population of these students, and focusing on the particular course and achievement level of the target populations. Much like a jury deliberation, these discussions will also allow the panelists to hear their peers' comments and rationales for their judgments. The facilitator will permit discussion to continue until they perceive that all panelists are prepared to make their second round of judgments.

Following this discussion, the facilitator will provide panelists with estimated statewide impact data (i.e., the percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced if the panels' Round 1 judgments are adopted). The panels' median Round 1 judgments will be used to determine cut scores for this report. The facilitator will also advise the panelists that the impact data will be relevant to, but not essential for, setting cut scores. Before Round 2, panelists will again sign a readiness form indicating that they understand the procedures and are prepared to make Round 2 recommendations (see Appendix E).

#### ***4.4.2.2. Round 2***

During Round 2, panelists will again work independently to make judgments about the percentage of students at the threshold of each achievement level (borderline students) who would answer each item correctly. The facilitator will explain to the panelists that they are free to maintain their Round 1 judgments or to revise them as they deem appropriate.

Before beginning Round 2, panelists will once again be reminded of the key elements of the process and will focus specifically on the ALDs. Round 2 will require significantly less time than did Round 1 because the panelists will more clearly understand the judgment process. They will also be increasingly familiar with the specific items for which they will make the judgments. Furthermore, many panelists will have begun to formulate some or all of their Round 2 item judgments during the discussion of the Round 1 results.

After panelists complete their Round 2 judgments and record their recommendations in the item bank system, they will be excused for lunch. Questar's psychometricians will then prepare the reports of the Round 2 judgments.

#### ***4.4.2.3. Discussion of Round 2 Judgments***

When the panels convene after the break, the facilitator will present the results of Round 2. The reports showing the Round 2 results will be used to guide another discussion of specific items.

The presentation and discussion at this stage will be similar to, although more focused than, those following Round 1.

Following this discussion, the facilitator will provide panelists with estimated statewide impact data (i.e., the percentages of students statewide whose performance would likely be labeled Below Basic, Basic, Proficient, or Advanced if the panels' Round 2 judgments are adopted). The panels' median Round 2 judgments will be used to determine cut scores for this report. Again, the facilitator will advise the panelists that the impact data will be relevant to, but not essential for, setting cut scores. When the facilitator is comfortable that all panelists are prepared to make their final recommendations, the panel will proceed to Round 3.

#### **4.4.2.4. Round 3, Meeting Evaluation, and Final Review of ALDs**

For Round 3, the panelists' judgments will consist of one recommended cut score for each achievement level; panelists will not be required to make item-level judgments. Panelists will be given unlimited time to complete their Round 3 (final) recommendations. All panelists will clearly understand that only the Round 3 judgments count as their recommendations and that the three rounds are not combined in any way to form the proposed cuts.

After completing their final round of judgments, individual panelists will complete a standard setting evaluation survey (see example in Appendix F). This survey will cover the panelists' opinions of the adequacy of the training provided and their comfort with and confidence in their judgments on a round-by-round basis. The form will also contain spaces for the panelists to write other comments concerning the workshop.

After the facilitator collects the panelist evaluation surveys, the panels will perform a final review of the ALDs. During this time, panelists can discuss and, if necessary, fine-tune or revise the ALDs. Finally, panelists will be thanked for their participation and dismissed.

#### **4.5. Vertical Articulation**

The articulation panel will meet following the standard setting workshop to review the placement of cut points and impact data and to check for consistency, as well as to review the results in the context of the MO EOC program goals.

This panel will review the results and discuss the reasoning for establishing the cut points. The standard error of measurement (SEM) equation suggested by Huynh Huynh (personal communication, 2009) will be used in the smoothing calculation and is presented as Equation 1:

$$SEM = \sqrt{SEP^2 + CSEM^2} \quad (\text{Equation 1})$$

where *SEP* is the standard error of the panelists and *CSEM* is the conditional standard error of the cut.

Prior to the articulation meeting, Questar will apply this SEM to the data to illustrate how changes in the cut points would affect the proportions of students in each achievement level. The articulation panel can suggest changes to cut scores before reviewing the results. The final suggestions from this panel will be provided to DESE to take under advisement when establishing the final cut scores.

## **5. Cutpoint Validation**

With the changes discussed in Section 1.3, it is important to evaluate if existing cut scores continue to represent a student's performance on the new Fall 2014 MO EOC Assessment forms for English I, English II, Algebra I, Algebra II, and Geometry. Therefore, to verify the existing cut scores, a group of educators will convene Feb. 17-18, 2015, for cutpoint validation using the MO EOC Fall 2014 operational forms. A draft cutpoint validation agenda is provided in Appendix H.

During cutpoint validation, Questar facilitators will explain the changes in the MO EOC Assessments. Panelists will then review the previous and updated draft ALDs (see Appendix A and Appendix B, respectively) so that they can evaluate whether changes and adjustments to the MO EOC fall 2014 forms are considered significant enough to have caused changes in the existing cut scores. Impact data using existing cut scores for each content area (English I, English II, Algebra I, Algebra II, and Geometry) based on the Fall 2014 administration will also be presented to the panelists.

A PowerPoint presentation will be used to guide the panelists through the impact data based on the Fall 2014 administration. During this presentation, panelists can ask any clarifying questions about the process and decisions from the meeting that they deem important. Panelists will indicate whether they agree with the existing cut scores, and they will be able to recommend new cut scores by using Questar's item bank system (similar to the standard setting workshop).

This meeting will serve to validate the existing cut scores using Fall 2014 data. Thus, it will not be necessary to achieve consensus. Instead, the purpose of this verification will be to ensure that the changes in the MO EOC Assessments (discussed in Section 1.3) do not affect student performance on the MO EOC Assessments. Similar to standard setting, the cutpoint validation suggestions from panelists will be provided to DESE to take under advisement to validate the existing cut scores.

### *5.1. Materials*

The following materials will be used during cutpoint validation:

- Previous ALDs (Appendix A)
- Draft ALDs (Appendix B)
- Fall 2014 operational test forms and data
- Cutpoint validation PowerPoint presentation
- Cutpoint validation agenda (Appendix H)

## **6. Impact Data**

Impact data based on the Fall 2014 operational administration will be presented following completion of Round 1 and after Round 2 for standard setting, as well as for cutpoint validation. It will consist of graphical and tabular information on the percentages of students assigned to each of the achievement levels for the overall population and disaggregated by gender for each grade within the grade band. These data will be presented for informational purposes and will give the panelists an opportunity for any discussions and adjustments to their cut score recommendations during Round 2 and Round 3 for standard setting and during cut score recommendation for cutpoint validation.

Using the cut scores established during standard setting for Physical Science and the existing cut scores established during cutpoint validation for English I, English II, Algebra I, Algebra II, and Geometry, students from the Fall 2014 administration will be classified into different achievement levels. Percentages of students in each achievement level will be presented graphically for panelists' review.

Sample size for the Fall administration is typically much smaller than those for the Spring administrations. Given that both item statistics and impact data will be based on the Fall 2014 administration, it is possible that large random error will be associated with the item statistics and impact data due to the small sample sizes associated with the Fall student population. Again, facilitators will let the panelists know that the statistical information based on the Fall 2014 administration will be relevant to, but not essential for, setting new cut scores or verifying existing cut scores.

## **7. References**

Loomis, S. C., & Bourque, M. L. (2001). From tradition to innovation: Standard setting on the National Assessment of Educational Progress. In G. J. Cizek (Ed.), *Setting performance standards: Concepts, methods, and perspectives* (pp. 175–217). Mahwah, NJ: Lawrence Erlbaum Associates.

## Appendix A: Previous MO EOC ALDs

### English I Achievement Descriptors

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#### Advanced Scale Score: 225–250

**Reading** — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Analyze the main idea and evaluate supporting details
- ✓ Make sophisticated connections — compare, contrast, evaluate
- ✓ Evaluate text features
- ✓ Analyze complex figurative language and literary techniques
- ✓ Draw insightful conclusions
- ✓ Summarize and paraphrase complex ideas and information
- ✓ Analyze literary elements
- ✓ Analyze reasoning, inferences, and sources
- ✓ Analyze proposed solutions
- ✓ Analyze accuracy and adequacy of evidence
- ✓ Analyze organizational patterns
- ✓ Analyze the author’s point of view, viewpoint/perspective, and purpose
- ✓ Analyze the author’s style and word choice

#### Proficient Scale Score: 200–224

**Reading** — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and supporting details
- ✓ Make connections — compare, contrast, analyze
- ✓ Analyze text features
- ✓ Analyze figurative language and literary techniques
- ✓ Draw accurate conclusions
- ✓ Summarize and paraphrase ideas and information
- ✓ Explain literary elements
- ✓ Explain reasoning, inferences, and sources
- ✓ Explain proposed solutions
- ✓ Explain evidence and use of information
- ✓ Explain organizational patterns
- ✓ Explain the author’s point of view, viewpoint/perspective, and purpose
- ✓ Explain the author’s style and word choice

#### Basic Scale Score: To Be Determined

**Reading** — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and major details
- ✓ Make simple connections — compare, contrast
- ✓ Identify text features
- ✓ Identify figurative language and literary techniques
- ✓ Draw conclusions
- ✓ Summarize and paraphrase basic ideas and information

- ✓ Identify basic literary elements
- ✓ Make simple inferences
- ✓ Identify proposed solutions
- ✓ Determine reliability of information
- ✓ Identify organizational patterns
- ✓ Identify author's purpose and point of view
- ✓ Identify the author's style and word choice

**Below Basic Scale Score: To Be Determined**

**Reading** — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and some details
- ✓ Make simple connections
- ✓ Identify simple text features
- ✓ Identify figurative language
- ✓ Identify characters, plot, and setting
- ✓ Determine literal meaning
- ✓ Identify point of view

**English II Achievement Descriptors**

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**Advanced Scale Score Cut: 225–250**

**Reading** — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Analyze the main idea and evaluate supporting details
- ✓ Make sophisticated connections — compare, contrast, evaluate
- ✓ Evaluate text features
- ✓ Analyze complex figurative language and literary techniques
- ✓ Draw insightful conclusions
- ✓ Summarize and paraphrase complex ideas and information
- ✓ Analyze literary elements
- ✓ Evaluate reasoning, inferences, and sources
- ✓ Evaluate proposed solutions
- ✓ Evaluate accuracy and adequacy of evidence
- ✓ Evaluate organizational patterns
- ✓ Evaluate the author's point of view, viewpoint/perspective, and purpose
- ✓ Evaluate the author's tone

**Writing** — A student is able to write across genres a paper that

- ✓ Contains a strong controlling idea, along with an effective beginning, middle, and end
- ✓ Uses paragraphing effectively
- ✓ Progresses in a logical order and uses cohesive devices effectively
- ✓ Addresses the topic clearly and provides specific and relevant details, reasons, and examples
- ✓ Uses precise, vivid language in sentences that are clear and varied in structure
- ✓ Effectively uses writing techniques
- ✓ Shows complexity, freshness of thought, and individual perspective
- ✓ Shows a clear awareness of audience and purpose
- ✓ Contains few errors in Standard English and spelling

A student is able to consistently and correctly apply the conventions of capitalization, punctuation, and standard usage.

**Proficient Scale Score Cut: 200–224**

**Reading** — In both fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and supporting details
- ✓ Make connections — compare, contrast, analyze
- ✓ Analyze text features
- ✓ Analyze figurative language and literary techniques
- ✓ Draw accurate conclusions
- ✓ Summarize and paraphrase ideas and information
- ✓ Analyze literary elements
- ✓ Analyze reasoning, inferences, and sources
- ✓ Analyze proposed solutions
- ✓ Analyze evidence and use of information
- ✓ Analyze organizational patterns
- ✓ Analyze the author’s point of view, viewpoint/perspective, and purpose
- ✓ Analyze the author’s tone

**Writing** — A student is able to write across genres a paper that

- ✓ Contains a controlling idea, along with a clear beginning, middle, and end
- ✓ Uses paragraphing appropriately
- ✓ Progresses in a generally logical order and uses cohesive devices
- ✓ Addresses the topic and provides details, reasons, and examples
- ✓ Uses precise language in sentences that are clear and show some variety in structure
- ✓ Uses writing techniques
- ✓ Shows some complexity, freshness of thought, and/or individual perspective
- ✓ Shows awareness of audience and purpose
- ✓ Contains some errors in Standard English and spelling

A student is able to apply the conventions of capitalization, punctuation, and standard usage correctly.

**Basic Scale Score Cut: 180–199**

**Reading** — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and major details
- ✓ Make simple connections — compare, contrast
- ✓ Identify text features
- ✓ Identify figurative language and literary techniques
- ✓ Draw basic/simple conclusions
- ✓ Summarize and paraphrase basic ideas and information
- ✓ Identify basic literary elements
- ✓ Make simple inferences
- ✓ Identify proposed solutions
- ✓ Determine reliability of information

- ✓ Identify organizational patterns
- ✓ Identify author's purpose and point of view
- ✓ Identify author's tone

**Writing** — A student is able to write across genres a paper that

- ✓ Contains an idea, though it may lack focus, along with a beginning, middle, and end
- ✓ Shows evidence of paragraphing
- ✓ Progresses generally in a somewhat logical order and may use cohesive devices
- ✓ Addresses the topic but relies on generalities rather than specifics
- ✓ May use imprecise language in sentences that are generally clear in structure
- ✓ May lack writing techniques
- ✓ May lack complexity, freshness of thought, and individual perspective
- ✓ Shows some awareness of audience and purpose
- ✓ Contains errors in Standard English and spelling that may be distracting

A student inconsistently applies the conventions of capitalization, punctuation, and standard usage.

**Below Basic Scale Score Cut: 100–179**

**Reading** — In fiction and nonfiction, a student can

- ✓ Determine vocabulary meaning
- ✓ Identify the main idea and some details
- ✓ Make simple connections
- ✓ Identify simple text features
- ✓ Identify figurative language
- ✓ Identify characters, plot, and setting
- ✓ Determine literal meaning
- ✓ Identify point of view

**Writing** — A student is able to write across genres a paper that

- ✓ May contain an unfocused idea and may lack a beginning, middle, and/or end
- ✓ May lack evidence of paragraphing
- ✓ Does not progress in a logical order and lacks cohesion
- ✓ May address the topic but lacks details
- ✓ May use imprecise language in sentences that may be unclear in structure
- ✓ Shows little evidence of writing techniques
- ✓ Lacks complexity, freshness of thought, and individual perspective
- ✓ Shows little or no awareness of audience or purpose
- ✓ Contains repeated errors in Standard English and spelling that are distracting

A student incorrectly applies the conventions of capitalization, punctuation, and standard usage.

## Algebra I Achievement Descriptors

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### Advanced Scale Score Cut: 225–250

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined functions
- ✓ Describe the effects of parameter changes on exponential growth/decay and quadratic functions, including intercepts
- ✓ Use symbolic algebra to represent and solve problems that involve quadratic relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including factoring, and apply properties of exponents to simplify expressions
- ✓ Use and solve equivalent forms of quadratic and absolute value equations
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including quadratic and exponential growth/decay
- ✓ Use and solve systems of linear inequalities with two variables
- ✓ Analyze quadratic functions by investigating rates of change, intercepts, and zeros

### Proficient Scale Score Cut: 200–224

**Number and Operations** — Using numbers and operations, a student can

- ✓ Compare and order rational and irrational numbers, including finding their approximate locations on a number line
- ✓ Use real numbers and various models, drawings, etc. to solve problems

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined linear functions
- ✓ Compare and contrast various forms of representations of patterns
- ✓ Compare and contrast the properties of linear and nonlinear functions
- ✓ Describe the effects of parameter changes on linear functions, including intercepts
- ✓ Use symbolic algebra to represent problems that involve linear relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including rules of integer exponents, to simplify expressions
- ✓ Use and solve equivalent forms of absolute value and linear equations
- ✓ Use and solve systems of linear equations with two variables
- ✓ Identify quantitative relationships that can be modeled by linear functions to solve a problem
- ✓ Analyze linear functions by investigating rates of change, intercepts, and zeros

**Data and Probability** — Using data and probability, a student can

- ✓ Use appropriate graphical representations of data
- ✓ Given one-variable quantitative data, display the distribution and describe its shape
- ✓ Apply statistical methods to measures of center to solve problems
- ✓ Given a scatter plot, determine an equation for a line of best fit
- ✓ Make conjectures about possible relationships between two characteristics of a sample on the basis of scatter plots of the data

**Basic Scale Score Cut: 177–199****Number and Operations** — Using numbers and operations, a student can

- ✓ Compare and order rational numbers, including finding their approximate locations on a number line

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using recursively defined single-operation functions
- ✓ Compare the properties of linear functions
- ✓ Use symbolic algebra to solve problems that involve linear relationships, including equations and inequalities
- ✓ Describe and use algebraic manipulations, including order of operations, to simplify expressions
- ✓ Use equivalent forms of linear equations

**Data and Probability** — Using data and probability, a student can

- ✓ Determine the sample space of an experiment
- ✓ Formulate questions about a characteristic which include sample spaces and distributions

**Below Basic Scale Score Cut: 100–176****Number and Operations** — Using numbers and operations, a student can

- ✓ Compare and order rational numbers

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Identify a function as linear or nonlinear
- ✓ Use symbolic algebra to solve problems that involve two-step linear equations

**Data and Probability** — Using data and probability, a student can

- ✓ Identify the sample space of an experiment
- ✓ Select appropriate graphical representations of data
- ✓ Determine measures of center

**Algebra II Achievement Descriptors**

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**Advanced Scale Score: 225–250****Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Describe the effect of parameter changes on logarithmic and rational functions
- ✓ Compare and contrast properties of rational functions
- ✓ Use symbolic algebra to represent and solve problems that involve logarithmic relationships
- ✓ Describe and use algebraic manipulations, inverse, or composition of functions
- ✓ Use and solve equivalent forms of logarithmic, radical, and rational equations
- ✓ Use and solve systems of quadratic equations or inequalities with 2 variables
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including logarithmic and rational functions
- ✓ Analyze logarithmic functions by investigating intercepts, domain and range, and asymptotes

**Data and Probability** — Using data and probability, a student can

- ✓ Describe the concept of probability distribution
- ✓ Compute the probability of compound events

**Proficient Scale Score: 200–224****Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Compare and contrast various forms of representations of patterns
- ✓ Describe the effect of parameter changes on quadratic, cubic, absolute value, and square root functions
- ✓ Compare and contrast the properties of exponential and logarithmic functions
- ✓ Use symbolic algebra to represent and solve problems that involve exponential or quadratic relationships
- ✓ Describe and use algebraic manipulations, including factoring or imaginary numbers, to simplify expressions
- ✓ Use and solve equivalent forms of quadratic and exponential equations
- ✓ Use and solve systems of linear inequalities with two variables
- ✓ Identify quantitative relationships and determine type(s) of functions that might model the situation to solve a problem, including quadratic and exponential growth/decay
- ✓ Analyze exponential functions by investigating rates of change, intercepts, domain and range, and asymptotes

**Data and Probability** — Using data and probability, a student can

- ✓ Given a scatterplot, determine a type of function that models the data
- ✓ Given one-variable quantitative data, calculate summary statistics
- ✓ Use and describe the concepts of conditional probability

**Basic Scale Score: 182–199****Numbers and Operations** — Using numbers and operations, a student can

- ✓ Compare and order irrational numbers, including finding their approximate location on a number line
- ✓ Use real numbers and various models, drawings, etc. to solve problems

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined linear or exponential functions
- ✓ Describe the effect of parameter changes on exponential functions
- ✓ Compare and contrast the properties of linear and exponential functions
- ✓ Use symbolic algebra to represent and solve problems that involve linear relationships
- ✓ Describe and use algebraic manipulations, including rules of exponents, to simplify expressions
- ✓ Use and solve equivalent forms of absolute value and linear equations
- ✓ Use and solve systems of linear equations with two variables
- ✓ Identify quantitative relationships that can be modeled by linear functions to solve a problem

**Data and Probability** — Using data and probability, a student can

- ✓ Given a scatterplot, determine an equation for a line of best fit
- ✓ Given one-variable quantitative data, display the distribution and describe its shape
- ✓ Apply statistical measures of center to solve problems

**Below Basic Scale Score: 100–181****Numbers and Operations** — Using numbers and operations, a student can

- ✓ Compare and order rational numbers, including finding approximate locations on a number line

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined single operation functions
- ✓ Describe the effects of parameter changes on linear functions
- ✓ Compare the properties of linear functions
- ✓ Describe and use algebraic manipulations, including order of operations, to simplify expressions
- ✓ Use and solve equivalent forms of linear equations

**Data and Probability** — Using data and probability, a student can

- ✓ Use appropriate graphical representations of data
- ✓ Describe the concept of sample space
- ✓ Determine the probability of two independent events

**Geometry Achievement Descriptors**

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**Advanced Scale Score: 225–250****Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Compare and contrast various forms of representations of patterns (exponential)

**Geometric and Spatial Relationships** — Using geometric and spatial relationships, a student can

- ✓ Use inductive and deductive reasoning to prove theorems and critique arguments made by others
- ✓ Make conjectures involving 2-dimensional objects represented with Cartesian coordinates
- ✓ Apply constructions and the coordinate plane to represent translations, reflections, rotations, and dilations of objects
- ✓ Draw vertex-edge graphs or networks to find optimal solutions
- ✓ Draw representations of 3-dimensional geometric objects from different perspectives

**Measurement** — Using measurement relationships, a student can

- ✓ Solve problems of angle measure involving polygons

**Proficient Scale Score: 200–224****Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (exponential)
- ✓ Analyze linear functions by investigating rates of change and intercepts
- ✓ Apply appropriate properties of exponents to solve equations
- ✓ Compare and contrast various forms of representations of patterns (quadratic)

**Geometric and Spatial Relationships** — Using geometric and spatial relationships, a student can

- ✓ Use inductive and deductive reasoning to establish the validity of geometric conjectures
- ✓ Solve problems involving 2-dimensional objects represented with Cartesian coordinates
- ✓ Use constructions and the coordinate plane to represent translations, reflections, rotations, and dilations of objects

- ✓ Identify types of symmetries of 3-dimensional figures
- ✓ Use vertex-edge graphs or networks to find optimal solutions

**Measurement** — Using measurement relationships, a student can

- ✓ Solve problems of angle measure involving parallel lines cut by a transversal
- ✓ Determine the surface area of geometric figures, including cylinders, cones, and spheres

**Basic Scale Score: 182–199**

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Generalize patterns using explicitly or recursively defined functions
- ✓ Apply appropriate properties of exponents to simplify expressions
- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (absolute value and quadratic)
- ✓ Compare and contrast various forms of representations of patterns (linear)

**Geometric and Spatial Relationships** — Using geometric and spatial relationships, a student can

- ✓ Identify types of symmetries of 2-dimensional figures (rotational)

**Measurement** — Using measurement relationships, a student can

- ✓ Solve problems of angle measure involving triangles
- ✓ Determine the volume of geometric figures, including cylinders, cones, and spheres

**Below Basic Scale Score: 100–181**

**Algebraic Relationships** — Using algebraic relationships, a student can

- ✓ Identify quantitative relationships and determine the type(s) of function that might model the situation to solve the problem (linear)

**Geometric and Spatial Relationships** — Using geometric and spatial relationships, a student can

- ✓ Identify types of symmetries of 2-dimensional figures (line)

**Measurement** — Using measurement relationships, a student can

- ✓ Determine the volume of geometric figures (prism and pyramids)

**Appendix B: Draft MO EOC ALDs**

**Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)**

**English I**

| <b>Below Basic</b>   | <b>Basic</b>   | <b>Proficient</b>   | <b>Advanced</b>  |
|--|--|---|--|
| <p>Students performing at the Below Basic level on the Missouri English I End-of-Course Assessment demonstrate a minimal command of the skills and processes identified in the Course Level Reading Expectations for English I. They demonstrate these skills inconsistently and/or incorrectly in reading processes and in responding to both narrative and informational texts. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information.</p> | <p>Students performing at the Basic level on the Missouri English I End-of-Course Assessment demonstrate a partial command of the skills and processes identified in the Course Level Reading Expectations for English I. They demonstrate these skills inconsistently in reading processes and in responding to both narrative and informational texts. In addition to understanding and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information.</p> | <p>Students performing at the Proficient level on the Missouri English I End-of-Course Assessment demonstrate solid command of the skills and processes identified in the Course Level Reading Expectations for English I. They understand the organization and structure of various texts, determine main ideas, summarize information, and understand key literary elements such as characterization, plot, and theme. In addition to understanding and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information.</p> | <p>Students performing at the Advanced level on the Missouri English I End-of-Course Assessment consistently demonstrate a thorough command of the skills and processes identified in the Course Level Reading Expectations for English I. They comprehend complex narrative and informational text by referring to what is explicitly stated and use reasoning skills to draw inferences, analyze, synthesize, and evaluate text consistent with high school expectations. In addition to understanding and applying the skills at the Proficient level, students performing at the Advanced level use a range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information.</p> |
| <b>Reading</b>   |  |   |  |
| <p><b>Students at this level:</b></p>  | <p><b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Basic level, students at this level:</b></p>  | <p><b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b></p>  |
| <ul style="list-style-type: none"> <li>• May use context clues to recognize the meaning of words</li> <li>• May understand the organization and purpose of informational materials</li> <li>• May identify explicitly stated main ideas</li> <li>• May identify the main events of the plot</li> <li>• May recognize character traits</li> </ul>   | <ul style="list-style-type: none"> <li>• May use limited context clues and pattern of word changes to determine the origin and meaning of unknown words</li> <li>• Inconsistently identify the structure and format of various informational documents</li> <li>• Paraphrase ideas from a single source to demonstrate comprehension</li> </ul>  | <ul style="list-style-type: none"> <li>• Use clues and pattern of word changes to analyze the origin and meaning of unknown words</li> <li>• Analyze the structure and format of various informational documents</li> <li>• Synthesize the content from several sources on a single issue</li> <li>• Identify the thesis, evidence, and argument in</li> </ul>  | <ul style="list-style-type: none"> <li>• Consistently use context clues and pattern of word changes to analyze the origin and meaning of unfamiliar words</li> <li>• Consistently synthesize the content from several sources on a single issue</li> <li>• Consistently identify the thesis, evidence, and argument in informational texts</li> </ul>  |

Appendix B: Draft MO EOC ALDs

| Below Basic  | Basic   | Proficient  | Advanced   |
|--|---|---|--|
| <ul style="list-style-type: none"> <li>• May identify literary devices</li> </ul>  | <ul style="list-style-type: none"> <li>• May identify main idea or thesis, with limited evidence, in informational and narrative texts</li> <li>• Inconsistently identify purpose and/or audience of a variety of texts</li> <li>• Identify some aspects of an author’s argument</li> <li>• May determine characters’ traits by what the characters say about themselves</li> <li>• May compare and/or contrast simple themes across works of prose, poetry, and drama</li> <li>• May identify some literary devices</li> </ul> | <p>informational texts</p> <ul style="list-style-type: none"> <li>• Explain an author’s argument or defense of a claim</li> <li>• Define the purpose and audience of a variety of communication formats</li> <li>• Determine characters’ traits by what the characters say about themselves</li> <li>• Explain the importance of the setting to the mood and meaning of the text</li> <li>• Explain the author’s point of view and interpret how it influences the text</li> <li>• Compare and contrast themes across works of prose, poetry, and drama</li> <li>• Explain significant literary devices, including irony and symbolism</li> </ul> | <ul style="list-style-type: none"> <li>• Consistently define the purpose and audience of a variety of texts</li> <li>• Consistently evaluate the author’s argument or defense of a claim</li> <li>• Consistently evaluate the importance of the setting to the mood and meaning of the text</li> <li>• Consistently explain the author’s point of view and interpret how it influences the text</li> </ul>   |
| Writing  |   |   |  |
| Students at this level:  | In addition to understanding and applying the skills at the Below Basic level, students at this level:  | In addition to understanding and applying the skills at the Basic level, students at this level:  | In addition to understanding and applying the skills at the Proficient level, students at this level:  |
| <ul style="list-style-type: none"> <li>• May identify a thesis</li> <li>• May lack evidence of paragraphing and order</li> <li>• May develop topic sentence(s)</li> <li>• May identify an appropriate word choice</li> <li>• May link ideas within sentences and between paragraphs</li> <li>• Show little evidence of writing techniques</li> </ul> | <ul style="list-style-type: none"> <li>• Develop a thesis</li> <li>• Identify a position or argument with supporting evidence</li> <li>• Show evidence of paragraphing, but progresses in a somewhat logical order</li> <li>• May use sentence structure and word choice to create clear content</li> <li>• May lack writing techniques</li> </ul>  | <ul style="list-style-type: none"> <li>• Develop and support a logical thesis with examples</li> <li>• Defend a position or argument with relevant evidence</li> <li>• Use paragraphing appropriately and progresses in a logical order</li> <li>• Use varied sentence structure and word choices to elaborate ideas clearly, concisely and accurately to express a logical progression of ideas</li> <li>• Use writing techniques</li> </ul>   | <ul style="list-style-type: none"> <li>• Develop and support an original, logical thesis</li> <li>• Construct a position or argument with precise and relevant evidence</li> <li>• Use paragraphing appropriately and progresses in a logical order</li> <li>• Use varied and complex sentences, including verbal phrases, vivid and specific vocabulary, and depth of ideas and information</li> <li>• Effectively uses writing techniques</li> </ul> |

**Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)**

**English II**

| Below Basic   | Basic  | Proficient   | Advanced  |
|---|--|--|---|
| <p>Students performing at the Below Basic level on the Missouri English II End-of-Course Assessment demonstrate a minimal command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills inconsistently and/or incorrectly in reading processes, in responding to both narrative and informational texts, and in writing. Students performing at the Below Basic level use few strategies to comprehend and interpret texts, demonstrate little understanding of literary forms, and apply few strategies for accessing information. They may not follow a writing process to compose papers and/or incorrectly apply the rules and conventions of Standard English.</p> | <p>Students performing at the Basic level on the Missouri English II End-of-Course Assessment demonstrate a partial command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills inconsistently in reading processes, in responding to both narrative and informational texts, and in writing. They may identify the support an author provides for the main argument. In addition to understanding and applying the skills at the Below Basic level, students performing at the Basic level use some strategies to comprehend and interpret a variety of texts, demonstrate a partial understanding of literary forms, and inconsistently apply few strategies for accessing and summarizing information. They may follow a writing process to compose papers while inconsistently applying the rules and conventions of Standard English.</p> | <p>Students performing at the Proficient level on the Missouri English II End-of-Course Assessment demonstrate a solid command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate these skills in reading processes, in responding to both narrative and informational texts, and in writing effectively. They understand the organization, structure, and purpose of informational text. In addition to understanding and applying the skills at the Basic level, students performing at the Proficient level use a range of strategies to comprehend and interpret a variety of texts, demonstrate an understanding of literary forms, and apply strategies for accessing and summarizing information. They follow a writing process to compose well-developed and organized papers for a variety of audiences and purposes, while correctly applying the rules and conventions of Standard English.</p> | <p>Students performing at the Advanced level on the Missouri English II End-of-Course Assessment consistently demonstrate a thorough command of the skills and processes identified in the Course Level Expectations for English II. They demonstrate higher-level skills in reading processes, in responding to both narrative and informational texts, and in writing effectively. In addition to understanding and applying the skills at the Proficient level, students performing at the Advanced level use a wide range of strategies to comprehend and interpret a variety of texts, demonstrate a thorough understanding of literary forms, and consistently apply different strategies for accessing and summarizing information. They follow a writing process to compose well-developed and organized papers for a variety of audiences and purposes, while consistently and correctly applying the rules and conventions of Standard English.</p> |
| <b>Reading</b>  |  |  |   |
| <b>Students at this level:</b>  | <b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b>  | <b>In addition to understanding and applying the skills at the Basic level, students at this level:</b>  | <b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b>  |
| <ul style="list-style-type: none"> <li>• Identify the literal and figurative meaning of words in context</li> <li>• Identify the main idea and some details</li> <li>• Make simple connections</li> <li>• Identify simple text features</li> <li>• May understand the features and purpose of informational materials</li> </ul>  | <ul style="list-style-type: none"> <li>• Identify word meanings using context clues and word parts</li> <li>• Identify and explain details in support of a conclusion</li> <li>• Identify or explain main ideas</li> <li>• Attempt to summarize text and/or to make within or among text-to-text</li> </ul>  | <ul style="list-style-type: none"> <li>• Apply a variety of strategies to determine meanings of words</li> <li>• Make inferences, draw conclusion, and generalize using textual support</li> <li>• Identify and explain main ideas</li> <li>• Summarize text</li> <li>• Make within and among</li> </ul>   | <ul style="list-style-type: none"> <li>• Analyze and evaluates the use of word meanings and shades of meaning</li> <li>• Analyze and evaluates inferences, conclusions, and generalizations</li> <li>• Effectively summarize all ideas within text</li> <li>• Summarize and evaluate abstract themes</li> </ul>   |

| Below Basic  | Basic   | Proficient  | Advanced  |
|--|---|---|---|
| <ul style="list-style-type: none"> <li>• May use text structure to locate information</li> <li>• Identify figurative language</li> <li>• Identify characters, character traits, plot, and setting</li> <li>• Determines literal meaning</li> <li>• Identify point of view</li> <li>• May identify the theme of a literary text</li> </ul>  | <p>connections</p> <ul style="list-style-type: none"> <li>• Identify and interpret feature of texts, including content appropriate to subsections</li> <li>• Understand the relationships between text structure and organizational patterns</li> <li>• Explain the use of figurative language and literary elements</li> <li>• Differentiate between factual statements and explicitly stated opinions in informational</li> <li>• Identify and describe graphics and charts</li> </ul>  | <p>text-to-text connections</p> <ul style="list-style-type: none"> <li>• Interpret and analyze purpose of text and organizational patterns</li> <li>• Interpret and analyze the use of figurative language of the author’s style and point of view</li> <li>• Interpret and analyze the use of facts and opinions in informational</li> <li>• Analyze and evaluate graphics and charts</li> </ul>   | <ul style="list-style-type: none"> <li>• Analyze and explain within and among text-to-text connections</li> <li>• Analyze and explain differences among features of different texts</li> <li>• Evaluate the author’s use of text elements and organizational patterns</li> <li>• Analyze and evaluate the effect of figurative language author’s style, and point of view</li> <li>• Analyze and evaluate strategies and evidence used in arguments in informational</li> <li>• Evaluate the relevance and accuracy of information in graphics and charts</li> </ul>  |
| Writing  |   |   |   |
| Students at this level:  | In addition to understanding and applying the skills at the Below Basic level, students at this level:  | In addition to understanding and applying the skills at the Basic level, students at this level:  | In addition to understanding and applying the skills at the Proficient level, students at this level:   |
| <ul style="list-style-type: none"> <li>• May develop a thesis</li> <li>• May choose an appropriate topic sentence</li> <li>• May contain an unfocused idea and may lack support</li> <li>• May lack evidence of paragraphing or logical order</li> <li>• May use imprecise language in sentences that may be unclear in structure</li> <li>• Show little or no awareness of audience or purpose</li> <li>• Show little evidence of writing techniques</li> <li>• Lack complexity, freshness of thought, and individual perspective</li> <li>• Contain repeated errors in Standard English and spelling that are distracting</li> </ul> | <ul style="list-style-type: none"> <li>• Develop a thesis</li> <li>• Identify a position or argument with supporting evidence, drawing conclusions, and addressing counterclaims, when appropriate</li> <li>• Show evidence of paragraphing and somewhat logical order</li> <li>• May use imprecise language with some variation in sentence structure</li> <li>• Show some awareness of audience and purpose</li> <li>• May lack writing techniques</li> <li>• Contain errors in sentence formation, usage, mechanics, Standard English, and spelling</li> </ul> | <ul style="list-style-type: none"> <li>• Support a logical thesis with examples</li> <li>• Defend a position or argument with relevant evidence, developing clear ideas while addressing counterclaims, when appropriate</li> <li>• Use paragraphing appropriately and progress in a generally logical order</li> <li>• Use precise language and some variation in sentence structure</li> <li>• Show awareness of audience and purpose</li> <li>• Use writing techniques</li> <li>• Demonstrate reasonable control of sentence formation, usage mechanics, Standard English, and spelling</li> </ul> | <ul style="list-style-type: none"> <li>• Support an original and logical thesis</li> <li>• Construct a position or argument with precise and relevant evidence, elaborating ideas clearly while providing effective conclusions and addressing counterclaims, when appropriate</li> <li>• Use paragraphing effectively and progresses in a logical order</li> <li>• Use precise language and varied sentence structure</li> <li>• Show a clear awareness of audience and purpose</li> <li>• Effectively use writing techniques</li> <li>• Use consistent control of sentence formation, usage, mechanics, Standard English, and spelling</li> </ul> |

**Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)**

**Algebra I**

| Below Basic   | Basic  | Proficient  | Advanced  |
|---|--|---|---|
| <p>Students performing at the Below Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.</p>  | <p>Students performing at the Basic level on the Missouri Algebra I End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.</p>  | <p>Students performing at the Proficient level on the Missouri Algebra I End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.</p>   | <p>Students performing at the Advanced level on the Missouri Algebra I End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.</p>  |
| <p><b>Students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Basic level, students at this level:</b></p>  | <p><b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b></p>   |
| <ul style="list-style-type: none"> <li>• Use algebraic manipulations to rewrite expressions with unit fraction exponents in radical form and vice versa</li> <li>• Identify rational and irrational numbers</li> <li>• Identify parts of an expression.</li> <li>• Factor a quadratic equation with a leading coefficient of 1</li> <li>• Add, subtract, and multiply single-variable polynomials of degree 2 or less</li> <li>• Use symbolic algebra to represent and solve one- and two-step linear equations in one variable</li> <li>• Graph a simple linear equation in two variables on a coordinate plane</li> <li>• Distinguish between functions and nonfunctions and identify the domain and range of a function given a graph</li> </ul> | <ul style="list-style-type: none"> <li>• Use algebraic manipulations and extend integral exponent rules to simplify expressions with rational exponents</li> <li>• Perform operations on rational and irrational numbers</li> <li>• Interpret parts of an expression</li> <li>• Rewrite a quadratic expression with integral coefficients by factoring or completing the square</li> <li>• Add, subtract, and multiply multivariable polynomials of which each monomial is degree 2 or less</li> <li>• Use symbolic algebra to represent and solve one- and two-step linear inequalities and simple quadratic equations in one variable</li> <li>• Graph linear equations and inequalities and simple quadratic equations on a coordinate plane</li> </ul> | <ul style="list-style-type: none"> <li>• Apply and use algebraic manipulations to rewrite expressions with rational exponents and extend all the properties of exponents to rational exponents</li> <li>• Understand that the sums or products of a rational number and an irrational number are irrational</li> <li>• Recognize, use, and interpret the structure of an expression to rewrite the expression</li> <li>• Rewrite, solve, and interpret the zeros of a quadratic expression with rational coefficients by factoring and completing the square</li> <li>• Add, subtract, and multiply multivariable polynomials of any degree</li> <li>• Write and solve multi-step linear equations and inequalities</li> <li>• Solve quadratic equations in one variable</li> </ul> | <ul style="list-style-type: none"> <li>• Differentiate when the rules of rational exponents can and cannot be used to rewrite an expression</li> <li>• Demonstrate that the sums or products of a rational number and an irrational number are irrational</li> <li>• Formulate equivalent forms of expressions and interpret parts of the expression to solve problems and make generalizations</li> <li>• Infer and explain that polynomials form a system similar to integers or rational numbers</li> <li>• Solve quadratic equations in one variable with complex roots</li> <li>• Solve a formula for any variable in the formula</li> <li>• Point out and explain an extraneous solution when solving linear, quadratic, radical, and rational</li> </ul> |

| Below Basic   | Basic  | Proficient  | Advanced  |
|---|--|---|---|
| <ul style="list-style-type: none"> <li>• Interpret linear functions given in a context and identify the appropriate graph given key features</li> <li>• Compare the properties of two linear functions represented in different ways</li> <li>• Identify an explicit or recursive function</li> <li>• Select appropriate graphical representations of data</li> <li>• Determine measures of center and describe a data set in terms of center and spread</li> </ul> | <ul style="list-style-type: none"> <li>• Recognize that the graph of a linear or quadratic equation represents the solution set of the equation</li> <li>• Identify the domain and range of a function given a set of ordered pairs or a linear, quadratic, cubic, or absolute value function</li> <li>• Graph linear and quadratic functions and compare two of the same type of functions represented in different ways</li> <li>• Interpret quadratic functions and their key features in context</li> <li>• Write an explicit or recursive function to model a relationship</li> <li>• Describe the differences in the center and spread of two data sets in a familiar context</li> </ul> | <ul style="list-style-type: none"> <li>• Graph polynomial, rational, absolute value, exponential, and logarithmic functions on a coordinate plane</li> <li>• Graph and estimate the solutions of systems of equations and linear inequalities on a coordinate plane</li> <li>• Recognize that the graph of a line, curve, or region represents the solution set of an equation, inequality, or system</li> <li>• Identify the domain and range of a given function in any form</li> <li>• Evaluate a function given in function notation for a given value</li> <li>• Graph exponential functions</li> <li>• Analyze and compare a linear function to another type of function</li> <li>• Translate between explicit and recursive forms of a function</li> <li>• Use appropriate statistics to interpret and explain differences in correlation (strong, weak) and shape (normal, skewed) of two or more data sets, including the effects of outliers</li> </ul> | <p>equations</p> <ul style="list-style-type: none"> <li>• Use a variety of methods to solve equations and inequalities</li> <li>• Determine the value of <math>x</math> for a given function when <math>f(x)</math> is known</li> <li>• Describe complex features of a graph such as holes, symmetries, and end behavior</li> <li>• Interpret data to explain mathematically why a data value is an outlier</li> <li>• Interpret and calculate the approximate area under a normal curve</li> </ul> |

Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

Algebra II

| Below Basic  | Basic  | Proficient  | Advanced  |
|--|--|---|---|
| <p>Students performing at the Below Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.</p>  | <p>Students performing at the Basic level on the Missouri Algebra II End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.</p>   | <p>Students performing at the Proficient level on the Missouri Algebra II End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.</p>  | <p>Students performing at the Advanced level on the Missouri Algebra II End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in number and quantity, algebra, functions, and statistics and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.</p>   |
| <p><b>Students at this level:</b></p>  | <p><b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Basic level, students at this level:</b></p>  | <p><b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b></p>   |
| <ul style="list-style-type: none"> <li>• Use mathematical properties to create equivalent expressions for polynomial and exponential expressions</li> <li>• Use commutative and associative properties to perform operations with complex numbers</li> <li>• Construct linear and exponential function models to solve routine word problems</li> <li>• Solve routine quadratic equations and systems of equations with real solutions</li> <li>• Calculate the average rate of change of polynomial and exponential functions over a specified interval</li> <li>• Write and graph linear and polynomial functions in equivalent forms and identify key features</li> <li>• Identify the effects of a single transformation, <math>f(x) + k</math> or <math>kf(x)</math>, on the</li> </ul> | <ul style="list-style-type: none"> <li>• Use mathematical properties to create equivalent expressions for rational expressions</li> <li>• Use the distributive property to perform operations with complex numbers</li> <li>• Rewrite rational expressions using factoring</li> <li>• Construct linear, exponential, and quadratic function models to solve routine word problems</li> <li>• Calculate the average rate of change of polynomial and exponential functions over a specified interval and estimate the rate of change from a graph</li> <li>• Build functions to model word problems and use the models to solve problems</li> <li>• Write and graph exponential functions in equivalent forms and identify key features</li> <li>• Identify the effects of a</li> </ul> | <ul style="list-style-type: none"> <li>• Use mathematical properties to create equivalent expressions and use them to sketch graphs and identify characteristics</li> <li>• Rewrite rational expressions using long division</li> <li>• Apply the remainder theorem</li> <li>• Construct linear, exponential, and quadratic function models with real or complex solutions to solve word problems</li> <li>• Calculate and interpret the average rate of change over a specified interval</li> <li>• Build functions, including composition of functions, to model word problems and use the models to solve and interpret problems</li> <li>• Write and graph exponential functions in equivalent forms and identify and compare key features</li> </ul> | <ul style="list-style-type: none"> <li>• Use mathematical properties to create and interpret equivalent expressions that can be used to solve non-routine problems</li> <li>• Describe the effect of changing the parameters of a function on the key features of the graph of the function</li> <li>• Use varied approaches to solve non-routine word problems</li> <li>• Compare the average rate of change for different intervals of a graph</li> <li>• Build functions, including the composition of more than two functions, to model more complex word problems and use the models to solve and interpret problems</li> <li>• Determine how the changes in parameters of a function impact its representation</li> <li>• Identify the effects of one or</li> </ul> |

Appendix B: Draft MO EOC ALDs

| Below Basic  | Basic  | Proficient  | Advanced  |
|--|--|---|---|
| <p>graphs of functions</p> <ul style="list-style-type: none"> <li>Identify lines of best fit for scatter plots</li> <li>Describe a data set in terms of center and spread</li> </ul> | <p>single transformation, <math>f(kx)</math> or <math>f(x+k)</math>, on the graphs of functions</p> <ul style="list-style-type: none"> <li>Draw and identify lines of best fit for scatter plots</li> <li>Select the appropriate measure, mean or median, to represent the center of a data set with familiar context</li> </ul> | <ul style="list-style-type: none"> <li>Identify the effects of multiple transformations on the graphs of functions and determine if the resulting function is even or odd</li> <li>Make predictions from lines of best fit for scatter plots</li> <li>Interpret more complex data sets using measures of center and spread</li> </ul> | <p>more transformations given in context on the graphs of functions</p> <ul style="list-style-type: none"> <li>Write equations for lines of best fit for scatter plots and make predictions</li> <li>Use appropriate measures of center to compare two or more data sets</li> </ul> |

Draft

**Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)**

**Geometry**

| <b>Below Basic</b>  | <b>Basic</b>   | <b>Proficient</b>  | <b>Advanced</b>  |
|---|--|--|--|
| <p>Students performing at the Below Basic level on the Missouri Geometry End-of-Course Assessment demonstrate limited understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition, students scoring at the Below Basic level carry out strategies to solve simple problems with limited precision and fluency.</p>   | <p>Students performing at the Basic level on the Missouri Geometry End-of-Course Assessment demonstrate partial understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level carry out strategies to solve routine problems with partial precision and fluency.</p>   | <p>Students performing at the Proficient level on the Missouri Geometry End-of-Course Assessment demonstrate sufficient understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level carry out strategies to solve problems with sufficient precision and fluency.</p>   | <p>Students performing at the Advanced level on the Missouri Geometry End-of-Course Assessment demonstrate a thorough understanding of important college and career ready mathematical content and concepts. They demonstrate these skills in geometric and spatial relationships, measurement, and probability. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level carry out strategies to solve non-routine problems with high precision and fluency.</p>  |
| <p><b>Students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Basic level, students at this level:</b></p>   | <p><b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b></p>  |
| <ul style="list-style-type: none"> <li>• Use geometric theorems and properties to solve problems about properties of lines, angle measurement, distance, triangles, and congruence</li> <li>• Specify a transformation that will carry a given figure onto an image or vice versa</li> <li>• Use the Pythagorean Theorem to solve for the missing side in a right triangle in familiar word problems</li> <li>• Use geometric relationships to solve problems involving area and perimeter</li> <li>• Apply geometric concepts to describe, model, and solve applied problems related to geometric shapes, their measures, and properties</li> <li>• Identify basic geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the</li> </ul> | <ul style="list-style-type: none"> <li>• Use geometric theorems and properties to prove statements about properties of lines, angle measurement, distance, triangles, and congruence</li> <li>• Identify relationships among geometric figures using transformations and use them to solve problems</li> <li>• Specify a sequence of transformations, using precise geometric terminology, that will carry a given figure onto an image or vice versa</li> <li>• Use geometric relationships in the coordinate plane to solve problems involving area, perimeter, and ratios of lengths</li> <li>• Solve right triangle problems using the Pythagorean Theorem and its converse</li> <li>• Apply geometric properties and concepts to describe,</li> </ul> | <ul style="list-style-type: none"> <li>• Determine and use appropriate geometric theorems and properties to solve routine problems and prove statements about properties of lines, angle measurement, distance, triangles, and congruence</li> <li>• Use transformations and congruence and similarity criteria for triangles to prove relationships among geometric figures and to solve problems</li> <li>• Use similarity transformations with right triangles to define trigonometric ratios for acute angles</li> <li>• Use trigonometric ratios, the Pythagorean Theorem, and its converse to solve right triangles in mathematical or applied problems</li> <li>• Apply geometric concepts and trigonometric ratios to</li> </ul> | <ul style="list-style-type: none"> <li>• Use transformations, congruence, and similarity criteria to solve multi-step problems and to prove relationships among composite geometric figures</li> <li>• Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied non-routine problems</li> <li>• Apply geometric concepts and trigonometric ratios to describe, model, and solve non-routine applied geometric problems</li> <li>• Apply properties and theorems of angles, segments, and arcs in circles to solve problems, model relationships, and formulate generalizations</li> <li>• Use formulas to solve mathematical and contextual problems that involve the volume of composite figures</li> </ul> |

| Below Basic  | Basic  | Proficient   | Advanced  |
|--|--|--|---|
| <p>perpendicular bisector of a line segment</p> <ul style="list-style-type: none"> <li>• Apply properties and theorems of angles, segments, and arcs in circles to solve problems</li> <li>• Use formulas to find the volume of cylinders, pyramids, cones, and spheres</li> </ul> | <p>model, and solve applied problems related to the Pythagorean Theorem, geometric shapes, their measures, and properties</p> <ul style="list-style-type: none"> <li>• Define trigonometric ratios</li> <li>• Make geometric constructions: copying a segment, copying an angle, bisecting an angle, bisecting a segment, including the perpendicular bisector of a line segment</li> <li>• Construct perpendicular and parallel lines given a line and a point not on the line</li> <li>• Complete the square to find the center and radius of a circle given by an equation</li> <li>• Identify the shapes of two-dimensional cross-sections of three-dimensional objects</li> </ul> | <p>describe, model, and solve more complex applied geometric problems</p> <ul style="list-style-type: none"> <li>• Make geometric constructions, given a line and a point not on the line, using a variety of tools and methods (perpendicular and parallel lines, equilateral triangles, squares and regular hexagons inscribed in circles)</li> <li>• Apply properties and theorems of angles, segments, and arcs in circles to solve problems and model relationships</li> <li>• Use formulas to solve mathematical and contextual problems that involve the volume of cylinders, pyramids, cones, and spheres</li> </ul> | <p>formed with cylinders, pyramids, cones, and spheres</p> <ul style="list-style-type: none"> <li>• Apply Cavalieri’s principle to find the volume of an oblique cylinder, pyramid, or cone</li> <li>• Identify the shapes of two-dimensional cross-sections of three-dimensional objects and identify three-dimensional objects generated by rotations of two-dimensional objects</li> </ul> |

## Missouri End-of-Course Assessment Achievement Level Descriptors (ALDs)

## Physical Science

| Below Basic   | Basic  | Proficient  | Advanced   |
|---|--|---|--|
| Students performing at the Below Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate a limited understanding of the course-level expectations for Physical Science. Students scoring at the Below Basic level demonstrate little ability to apply the skills, knowledge, and concepts from the course.  | Students performing at the Basic level on the Missouri Physical Science End-of-Course Assessment demonstrate an incomplete understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Below Basic level, students scoring at the Basic level demonstrate an incomplete ability to apply the skills, knowledge, and concepts from the course.   | Students performing at the Proficient level on the Missouri Physical Science End-of-Course Assessment demonstrate an understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Basic level, students scoring at the Proficient level demonstrate an ability to apply the skills, knowledge, and concepts from the course.  | Students performing at the Advanced level on the Missouri Physical Science End-of-Course Assessment demonstrate a thorough understanding of the course-level expectations for Physical Science. In addition to understanding and applying the skills at the Proficient level, students scoring at the Advanced level demonstrate a complete ability to apply the skills, knowledge, and concepts from the course.  |
| <b>Students at this level:</b>  | <b>In addition to understanding and applying the skills at the Below Basic level, students at this level:</b>  | <b>In addition to understanding and applying the skills at the Basic level, students at this level:</b>   | <b>In addition to understanding and applying the skills at the Proficient level, students at this level:</b>   |
| <ul style="list-style-type: none"> <li>Classify a substance as being made up of one kind of atom when given the structural formula for the substance</li> <li>Contrast the common properties of metals and nonmetals</li> <li>Contrast the properties of acidic and basic solutions</li> <li>Using the Kinetic Theory model, explain the changes that occur in the temperature of a substance as energy is absorbed or released</li> <li>Predict the effect of a temperature change on the volume of a gas</li> <li>Predict the effect of a pressure change on the volume of a gas</li> <li>Calculate the number of protons of an element given its atomic number</li> <li>Describe the information provided by the atomic number</li> <li>Classify elements as metals and nonmetals according to their location on the Periodic Table</li> </ul> | <ul style="list-style-type: none"> <li>Identify pure substances by their physical properties</li> <li>Classify a substance as being made up of one kind of atom or a compound when given the structural formula for the substance</li> <li>Compare and contrast the common properties of metals and nonmetals</li> <li>Compare and contrast the properties of acidic and basic solutions</li> <li>Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules of a substance as energy is absorbed or released</li> <li>Predict the effect of a temperature change on the pressure and volume of a liquid or gas</li> <li>Predict the effect of a pressure change on the volume and density of a liquid or gas</li> <li>Describe the atom as having a dense, positive nucleus surrounded by a cloud of</li> </ul> | <ul style="list-style-type: none"> <li>Identify pure substances by their chemical properties</li> <li>Classify a substance as being made up of one kind of atom or a compound when given the molecular formula for the substance</li> <li>Compare and contrast the common properties of metals, nonmetals, metalloids and noble gases</li> <li>Compare and contrast the properties of acidic, basic, and neutral solutions</li> <li>Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and temperature of a substance as energy is absorbed or released</li> <li>Predict the effect of a temperature change on the properties of a liquid or gas</li> <li>Predict the effect of a pressure change on the properties of a liquid or gas</li> <li>Calculate the number of protons, neutrons, and electrons of an element given</li> </ul> | <ul style="list-style-type: none"> <li>Compare the densities of regular and irregular objects using their respective measures of volume and mass</li> <li>Identify pure substances by their physical and chemical properties</li> <li>Classify a substance as being made up of one kind of atom or a compound when given the molecular formula or structural formula for the substance</li> <li>Using the Kinetic Theory model, explain the changes that occur in the distance between atoms/molecules and temperature of a substance as energy is absorbed or released during a phase change</li> <li>Predict the effect of a temperature change on the properties of a material</li> <li>Predict the effect of pressure changes on the properties of a material</li> <li>Calculate the number of protons, neutrons, and</li> </ul> |

| Below Basic   | Basic   | Proficient   | Advanced   |
|---|---|--|--|
| <ul style="list-style-type: none"> <li>• Distinguish between physical and chemical changes in matter</li> <li>• Differentiate between examples of conductors and insulators</li> <li>• Describe the effect of different frequencies of electromagnetic waves on living organisms</li> <li>• Interpret examples of heat transfer as conduction or radiation</li> <li>• Measure and analyze an object's motion in terms of speed</li> <li>• Describe gravity as an attractive force among all objects</li> <li>• Compare the gravitational forces between two objects in terms of the distances between them</li> <li>• Recognize that inertia is a property of matter</li> <li>• Identify forces acting on a falling object and how those forces affect the rate of acceleration</li> <li>• Describe the relationship between applied net force and the distance an object moves</li> <li>• Formulate testable questions</li> <li>• Explain the importance of the public presentation of scientific work to the scientific community</li> <li>• Recognize contributions to science are not limited to the work of one particular group, but are made by a diverse group of scientists representing various ethnic and gender groups</li> <li>• Explain why accurate record-keeping and openness are essential for maintaining an investigator's credibility</li> </ul> | <ul style="list-style-type: none"> <li>negative electrons</li> <li>• Calculate the number of protons and electrons of an element given its atomic number</li> <li>• Describe the information provided by the atomic number and the mass number</li> <li>• Classify elements as metals, nonmetals, and noble gases according to their location on the Periodic Table</li> <li>• Contrast the types of chemical bonds</li> <li>• Differentiate between thermal energy and temperature</li> <li>• Differentiate between the properties and examples of conductors and insulators</li> <li>• Describe common uses of different forms of energy</li> <li>• Identify advantages/disadvantages of using various sources of energy for human activity</li> <li>• Describe the effect of different frequencies of electromagnetic waves on the Earth and living organisms</li> <li>• Interpret examples of heat transfer as convection, conduction, or radiation</li> <li>• Distinguish between examples of kinetic and potential energy within a system</li> <li>• Describe the effect of work on an object's potential energy</li> <li>• Identify the role of nuclear energy as it serves as a source of energy for the Earth and human activity</li> <li>• Measure and analyze an object's motion in terms of speed and velocity</li> <li>• Compare the momentum of two objects in terms of mass and velocity</li> <li>• Identify the forces acting on an object using a force diagram</li> </ul> | <ul style="list-style-type: none"> <li>its mass number and atomic number</li> <li>• Explain the structure of the periodic table in terms of the elements with common properties</li> <li>• Classify elements as metals, nonmetals, metalloids, and noble gases according to their location on the Periodic Table</li> <li>• Predict the chemical reactivity of elements using the Periodic Table</li> <li>• Describe how the valence electron configuration determines how atoms interact and may bond</li> <li>• Compare and contrast the types of chemical bonds</li> <li>• Compare the mass of the reactants to the mass of the products in a physical change as support for the Law of Conservation of Mass</li> <li>• Differentiate between thermal energy, heat, and temperature</li> <li>• Describe sources and common uses of different forms of energy</li> <li>• Identify and evaluate advantages/disadvantages of using various sources of energy for human activity</li> <li>• Relate kinetic energy to an object's mass and its velocity</li> <li>• Relate an object's gravitational potential energy to its weight and height relative to the surface of the Earth</li> <li>• Describe the effect of work on an object's kinetic and potential energy</li> <li>• Identify stars as producers of electromagnetic energy</li> <li>• Identify the role of nuclear energy as it serves as a source of energy for the Earth, stars, and human activity</li> <li>• Describe the transfer of</li> </ul> | <ul style="list-style-type: none"> <li>electrons of an element/isotopes given its mass number and atomic number</li> <li>• Explain the structure of the periodic table in terms of the elements with common properties and repeating properties</li> <li>• Predict the chemical reactivity of elements, and the type of bonds that may result between them, using the Periodic Table</li> <li>• Compare the mass of the reactants to the mass of the products in a chemical reaction or physical change as support for the Law of Conservation of Mass</li> <li>• Describe how electromagnetic energy is transferred through space as electromagnetic waves of varying wavelength and frequency</li> <li>• Describe how changes in the nucleus of an atom during a nuclear reaction result in emission of radiation</li> <li>• Compare the efficiency of systems</li> <li>• Classify the different ways to store energy and describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system</li> <li>• Represent and analyze the motion of an object graphically</li> <li>• Compare and describe the gravitational forces between two objects in terms of their masses and the distances between them</li> <li>• Explain how the efficiency of a mechanical system can be expressed as a ratio of work output to work input</li> <li>• Describe power in terms of work and time</li> <li>• Describe and analyze the</li> </ul> |

| Below Basic | Basic  | Proficient  | Advanced  |
|-------------|--|---|---|
|             | <ul style="list-style-type: none"> <li>• Compare and describe the gravitational forces between two objects in terms of the distances between them</li> <li>• Describe weight in terms of the force of a planet’s or moon’s gravity acting on a given mass</li> <li>• Recognize all free falling bodies accelerate at the same rate due to gravity regardless of their mass</li> <li>• Recognize that inertia is a property of matter that can be described as an object’s tendency to resist a change in motion</li> <li>• Analyze force pairs when given a scenario and describe their magnitudes and directions.</li> <li>• Predict the path of an object when the net force changes</li> <li>• Describe the relationship between work and the distance an object moves</li> <li>• Predict eclipses when given the relative positions of the moon, planet, and Sun</li> <li>• Explain orbital motions of moons around planets, and planets around the Sun, as the result of gravitational forces between those objects</li> <li>• Formulate testable questions and hypotheses</li> <li>• Identify the components when analyzing an experiment</li> <li>• Recognize the relationships linking technology and science</li> <li>• Identify current theories that are being questioned</li> <li>• Identify major scientific and technological challenges to society</li> <li>• Identify the ethical issues in experimentation</li> <li>• Identify and evaluate the role of models as an ethical alternative to direct experimentation</li> <li>• Explain why accurate</li> </ul> | <p>energy that occurs as energy changes from kinetic to potential within a system</p> <ul style="list-style-type: none"> <li>• Describe the transfer of energy as it changes from kinetic to potential, while the total amount of energy remains constant, within a system</li> <li>• Analyze the velocity of two objects in terms of distance and time</li> <li>• Measure and analyze an object’s motion in terms of speed, velocity, and acceleration</li> <li>• Explain that the total momentum remains constant within a system</li> <li>• Identify and describe the forces acting on an object using a force diagram</li> <li>• Compare the gravitational forces between two objects in terms of their masses and the distances between them</li> <li>• Recognize that inertia is a property of matter that can be described as an object’s tendency to resist a change in motion, and is dependent upon the object’s mass</li> <li>• Determine the effect of the sum of the forces acting on an object</li> <li>• Determine the effect on acceleration using information about net force and mass</li> <li>• Describe the relationships among work, applied net force, and the distance an object moves</li> <li>• Describe and analyze the relationships among force, distance, and work</li> <li>• Explain how Earth’s environmental characteristics and location in the universe provide a life-supporting environment</li> <li>• Identify information that the electromagnetic spectrum provides about the stars and</li> </ul> | <p>relationships among force, distance, work, efficiency, and power</p> <ul style="list-style-type: none"> <li>• Predict the moon rise/set times, phases of the moon, and/or eclipses when given the relative positions of the moon, planet, and Sun</li> <li>• Explain how the gravitational forces, due to the relative positions of a planet, moon, and Sun, determine the height and frequency of tides</li> <li>• Recognize that the gender and ethnicity of scientists often influence the questions asked and/or the methods used in scientific research and may limit or advance science knowledge and/or technology</li> <li>• Identify and analyze current theories that are being questioned, and compare them to new theories that have emerged to challenge older ones</li> <li>• Analyze the roles of science and society as they interact to determine the direction of scientific and technological progress</li> <li>• Identify and describe major scientific and technological challenges to society and their ramifications for public policy</li> <li>• Analyze and evaluate the drawbacks benefits, and factors affecting progress toward meeting major scientific and technological challenges</li> <li>• Identify and evaluate the need for informed consent in experimentation</li> </ul> |

| Below Basic | Basic  | Proficient  | Advanced |
|-------------|--|---|----------|
|             | <p>record-keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists</p> | <p>the universe</p> <ul style="list-style-type: none"> <li>• Predict the phases of the moon and/or eclipses when given the relative positions of the moon, planet, and Sun</li> <li>• Identify the components and explain their importance to the design of a valid experiment when analyzing an experiment</li> <li>• Recognize that the gender and ethnicity of scientists often influence the questions asked and/or the methods used in scientific research</li> <li>• Identify and describe how explanations of scientific phenomena have changed over time as a result of new evidence</li> <li>• Identify current theories that are being questioned, and compare them to new theories that have emerged to challenge older ones</li> <li>• Identify and describe major scientific and technological challenges to society</li> <li>• Analyze factors affecting progress toward meeting major scientific and technological challenges</li> <li>• Identify the need for informed consent in experimentation</li> <li>• Identify the role of models as an ethical alternative to direct experimentation</li> <li>• Evaluate a given source for its scientific credibility</li> <li>• Explain why accurate record-keeping, openness, and replication are essential for maintaining an investigator's credibility with other scientists and society</li> </ul> |          |

## Appendix C: Draft Standard Setting Agenda

### Day 1: Tuesday, Feb. 17, 2015

7:45 a.m.: Registration and breakfast

- Welcome, introductions, and logistics (DESE)
- General process overview
  - Overview of the MO EOC Assessments (DESE)
  - Overview of the three-day standard setting workshop (Questar)
  - Overview of the achievement level descriptors (ALDs) (Questar)
- “Experience” the assessment—panelists take the Fall 2014 operational test
- Discussion and fine-tuning of the ALDs
- Introduction to Modified Angoff

Noon: Lunch break

1:00 p.m.:

- Qualifying test
- Practice exercise
- Round 1 judgments

5:30 p.m.: Panelists excused

### Day 2: Wednesday, Feb. 18, 2015

7:45 a.m.: Registration and breakfast

- Review of Round 1 judgments and preparation for Round 2
- Round 2 judgments
- Review of Round 2 judgments and preparation for Round 3 (final round)
- Round 3 (final) judgments
- Meeting evaluation
- Final review of ALDs

4:45 p.m.: Panelists excused

**Appendix D: Standard Setting Qualifying Test**

Content Area: \_\_\_\_\_

Panelist ID (optional): \_\_\_\_\_

1. Why are achievement level descriptors (ALDs) such an integral part of the standard setting process?
  - a. They provide an anchor that gives concrete meaning to the terms Basic, Proficient, and Advanced.
  - b. They describe critical knowledge and skills that all students at a given achievement level should possess.
  - c. They define all of the items in the MO EOC Assessments.
  - d. They summarize elements of the Course-Level Expectations (CLEs) for the course.
2. Which of these statements about standard setting is TRUE?
  - a. Panelists should use their best judgment to make their recommendations but should rely more on various empirical data to be provided during the sessions.
  - b. While the MO EOC Assessments are given statewide, panelists should make recommendations based on the unique characteristics of their districts since other panelists will focus on other district types.
  - c. A panelist who concludes that the “proper” cut score for Proficient is 24 should make a final recommendation of 22 or 23 to account for errors in any assessment.
  - d. Panelists must consider both the stem and answer options in selected-response items in deciding what percentage of students should answer correctly.
3. Panelist John Doe decided that about 50% of the typical Proficient students in Missouri taking the MO EOC Assessment should answer item 32 correctly. He coded 50% under Proficient on his rating sheet. What error did he make?
  - a. He should have coded 45% since some percentage of special-needs students will take the assessment.
  - b. He should have considered minimally Proficient, not typically Proficient, students.
  - c. He should reconsider his judgment since 50% correct could not possibly be considered Proficient.
  - d. He made no error. This was the correct procedure.
4. Panelist Jane Doe thought that a particular item on the MO EOC Assessment was clear and measured very important content. She also thought that students should answer this correctly if they were Proficient. Which percentage should she most likely enter for Proficient on her rating sheet?
  - a. 90%—because almost all students whose course achievement is Proficient should answer correctly
  - b. 65%—because this is the approximate percentage that corresponds to “pass” in the school’s grading system
  - c. 50%—because many students taking this test will be learning-disabled or disadvantaged or will not take the assessment seriously

- d. 35%—because large percentages of students taking this test are not receiving instruction following the state’s content standards
5. Which of these sets of Modified Angoff judgments for a selected-response item appears to be improper and why?

|   | Cut Score             |                      |                         |
|---|-----------------------|----------------------|-------------------------|
|   | Below Basic/<br>Basic | Basic/<br>Proficient | Proficient/<br>Advanced |
| A | 25%                   | 35%                  | 40%                     |
| B | 80%                   | 90%                  | 100%                    |
| C | 50%                   | 50%                  | 55%                     |
| D | 40%                   | 75%                  | 95%                     |

- a. A, because these are unrealistically low expectations for a selected-response item
- b. B, because it is unreasonable to expect students to score this well on a selected-response item
- c. C, because the panelist does not expect higher-achieving students to perform any better on the item than lower-achieving students
- d. D, because the increase in percentages across the three groups is unrealistically large

**Appendix E: Standard Setting Readiness Form**

Content Area: \_\_\_\_\_

Panelist ID (optional): \_\_\_\_\_

Instructions: Please circle your response to the following questions.

|                                   |           |            |
|-----------------------------------|-----------|------------|
| <b>Round 1</b>                    |           |            |
| I understand my task for Round 1. | <b>No</b> | <b>Yes</b> |
| I am ready to begin Round 1.      | <b>No</b> | <b>Yes</b> |

|  |           |            |
|--|-----------|------------|
| <b>Round 2</b>   |           |            |
| I understand my task for Round 2.                      | <b>No</b> | <b>Yes</b> |
| I understand the data that was presented from Round 1. | <b>No</b> | <b>Yes</b> |
| I am ready to begin Round 2.                           | <b>No</b> | <b>Yes</b> |

|  |           |            |
|--|-----------|------------|
| <b>Round 3</b>   |           |            |
| I understand my task for Round 3.                      | <b>No</b> | <b>Yes</b> |
| I understand the data that was presented from Round 2. | <b>No</b> | <b>Yes</b> |
| I am ready to begin Round 3.                           | <b>No</b> | <b>Yes</b> |

**Appendix F: Standard Setting Evaluation Survey**

Panelist ID (optional): \_\_\_\_\_

*Please complete the following survey. Your responses will be anonymous and will be analyzed in conjunction with those of the other standard setting panelists.*

**Part I: About You**

- 1. Position:  Classroom teacher  
 Nonteacher educator  
 Higher education professional  
 Business professional
  
- 2. Gender:  Female  
 Male
  
- 3. Ethnicity\*:  American Indian or Alaska Native  
 Asian  
 Black or African American (not Hispanic origin)  
 Hispanic or Latino  
 Multiracial (not Hispanic origin)  
 Native Hawaiian/Other Pacific Islander  
 White (not Hispanic origin)

\*This information is used solely to ensure diversity in panelist representation.

- 4. Community Size:  Rural  
 Suburban  
 Urban  
 Not Applicable
  
- 5. RPDC\* Region:  Southeast  
 Heart of Missouri  
 Kansas City  
 Northeast  
 Northwest  
 South Central  
 Southwest  
 St. Louis  
 Central  
 Not Applicable

\*Regional Professional Development Center

**Part II: Opening Overview Session**

This section seeks your judgments about the opening sessions for the standard setting. Please indicate your agreement level with each of the following statements.

- 6. The opening session provided adequate background information about the MO EOC Assessments.
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
  
- 7. The topics covered in the opening session provided sufficient context for my role as a panelist.
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
  
- 8. The content of the opening session was very useful.
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
  
- 9. The opening session was very organized.
  - Strongly Agree
  - Agree
  - Neutral
  - Disagree
  - Strongly Disagree
  
- 10. Did you have questions or concerns that were not answered or addressed in the opening session?
  - Yes
  - No

If yes, please indicate your questions and concerns below. Use the back for additional space.

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11. What was most helpful about the opening session? Use the back for additional space.

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12. Any additional comments about the opening session? Use the back for additional space.

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**Part III: Taking the Operational Assessment**

This section seeks your judgments about taking the operational Fall 2014 Physical Science MO EOC Assessment. Please indicate your agreement level with the following statements.

13. This activity was very useful to help me become familiarized with the assessment content.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

14. Any additional comments about taking the operational assessment? Use the back for additional space.

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**Part IV: Discussing the ALDs**

This section seeks your judgments about the discussions and fine-tuning of the ALDs as they relate to the Physical Science MO EOC Assessment. Please indicate your agreement level with the following statements.

15. The activities used to refine and elaborate each of the ALDs were very useful.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

16. By the end of the activity, my conception of Advanced, Proficient, Basic, and Below Basic levels was very well formed.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

17. Any additional comments about the activities around the ALDs? Use the back for additional space.

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**Part IV: Introduction to Modified Angoff**

This section seeks your judgments about the introduction to the Modified Angoff method. Please indicate your agreement level with the following statements.

18. The information presented during the introduction to Modified Angoff was very clear and understandable.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

19. After the introduction to Modified Angoff, I felt confident in my ability to use the method during standard setting to establish the recommended cut scores.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

20. Any additional comments about the introduction to the Modified Angoff method? Use the back for additional space.

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**Part VI: Item Rating Activities**

This section seeks your judgments about the item rating activities during the standard setting. Please indicate your agreement level with the following statements.

21. Using the sample items to prepare for the actual item rating was very helpful.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

22. The explanation of the item data during the sample item portion of the training was very helpful.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

23. The information provided prior to each round was very useful.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

24. I understood the tasks I needed to accomplish for each round.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

25. I had the right amount of time to complete the tasks during each round.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

26. Any additional comments about the item rating activities? Use the back for additional space.

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**Part VII: Overall Experience**

This section seeks your judgments about the overall processes and procedures used during standard setting. Please indicate your agreement level with the following statements.

27. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Proficient performance.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

28. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Basic performance.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

29. This standard setting provided me an opportunity to use my best judgment in selecting and revising estimates for a recommended standard of Advanced performance.

- Strongly Agree
- Agree
- Neutral
- Disagree
- Strongly Disagree

Any comments about the quality of assistance provided by the standard setting staff? Use the back for additional space.

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Any additional comments about the overall meeting? Use the back for additional space.

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**Appendix G: Example of Psychometric Reports**

After Round 1 of standard setting:

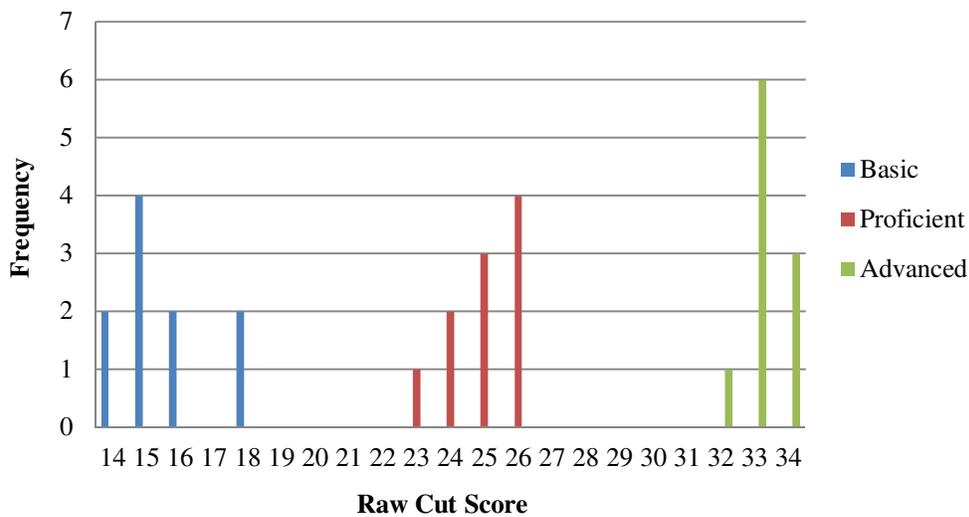
Report 1

**Table 1. Raw Cut Scores—Round 1**

| Panelist     | English I |            |          | English II |            |          |
|--------------|-----------|------------|----------|------------|------------|----------|
|              | Basic     | Proficient | Advanced | Basic      | Proficient | Advanced |
| 1            | 18        | 26         | 32       | 14         | 23         | 33       |
| 2            | 18        | 26         | 33       | 14         | 24         | 33       |
| 3            | 16        | 25         | 33       | 16         | 24         | 33       |
| 4            | 15        | 25         | 33       | 18         | 26         | 32       |
| 5            | 15        | 26         | 34       | 19         | 25         | 32       |
| 6            | 15        | 25         | 34       | 19         | 25         | 32       |
| 7            | 14        | 24         | 33       | 17         | 24         | 32       |
| 8            | 16        | 24         | 33       | 17         | 24         | 32       |
| 9            | 14        | 23         | 33       | 17         | 27         | 33       |
| 10           | 15        | 26         | 34       | 19         | 25         | 32       |
| <b>Group</b> |           |            |          |            |            |          |
| Median       | 15        | 25         | 33       | 17         | 25         | 32       |
| Mean         | 16        | 25         | 33       | 17         | 25         | 32       |
| SD           | 1.43      | 1.05       | 0.63     | 1.89       | 1.16       | 0.52     |
| Min          | 14        | 23         | 32       | 14         | 23         | 32       |
| Max          | 18        | 26         | 34       | 19         | 27         | 33       |

Report 2

**Frequency of Panelists by Cut Score**



## Appendix H: Draft Cutpoint Validation Agenda

### Day 1: Tuesday, Feb. 17, 2015

8 a.m.: Registration and Breakfast

*(large-group session—both cutpoint validation panels together)*

- Welcome, introductions, and logistics (DESE)
- General process overview
  - Overview of the MO EOC Assessments (DESE)
  - Overview of the achievement level descriptors (ALDs) (Questar)

*Panelists now break into individual groups, separately facilitated. All subsequent panel work will take place in the separate sessions.*

- Panelists review Fall 2014 operational test (first content area)
- Presentation of impact data (first content area)
- Finalized cut scores (first content area)

5:00 p.m.: Panelists excused

### Day 2: Wednesday, Feb. 18, 2015

8:00 a.m.: Registration and breakfast

- Panelists review Fall 2014 operational test (second content area)
- Presentation of impact data (second content area)
- Finalized cut scores (second content area)

For cutpoint validation panel 2:

- Panelists review Fall 2014 operational test (third content area)
- Presentation of impact data (third content area)
- Finalized cut scores (third content area)

5 p.m.: Wrap-up and final evaluation