Standard Setting Results for the OCCT Grades 3-8 Mathematics Assessments, OMAAP Grades 3-8 Mathematics Assessments, and OMAAP EOI U.S. History Assessment

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General Overview

- OCCT and OMAAP testing programs are criterion referenced tests (CRT) that tie directly to the domain of knowledge and skill defined by the PASS content standards.
  - A criterion-referenced interpretation involves comparing a student's score with a subjective standard of performance against which comparisons can be made.
  - While the number of correct items does relates to what a student knows or does not know, a raw score or percent correct is meaningful only to the set of items and to the group of students tested.
    - Percent correct is a statistic that is dependent on the difficulty of the items and the abilities of students.

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General Overview

- So, why do classroom test scores work for teachers?
  - Teachers learn to do their own:
    - Calibrations of items
    - Calibrations of students
    - Teachers learn to set their own grading standards.
- For large-scale standardized testing, we want test scores that are meaningful over different sets of items (different test forms across years) of varying difficulty, with different groups of students, and a range of student ability.
- Items are designed to span a range of difficulty and probe at different depths of knowledge, thus allowing distinction among students at many levels.

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Rationale for Resetting Math Standards in 2011

- In 2010, the PASS standards for Mathematics grades 3 to 8 went through significant revision.
  - The standards were aligned in such a way that the same standards appear in each grade level (much like the organization of the common core standards).
  - New objectives and skills were added each grade level.
- As the PASS standards defines the content covered on the OCCT and OMAAP tests, in 2011 both the OCCT and OMAAP tests we modified to align with the new PASS content standards
- Because the content and structure of the OCCT and OMAAP grade 3 to 8 mathematics tests changed, student expectations also changed.

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Rationale for Resetting Math Standards in 2011

- Lastly, the test length of the OCCT mathematics assessments were increased by 5 items.
- Given the large number of changes, the old cut score may not adequately capture student performance.
- Thus, a standard setting was held to bring together committees of experts to evaluate the reasonableness of the current cut scores given the updates.
- There were some important ground rules (for OCCT):
  - Expectations had not lowered.
  - They were to be reviewed against the NAEP standards - the primary purpose of the 2009 standard setting in Mathematics and Reading grades 3-8.

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Standard Setting and Cut Scores

- Standard setting is the process that allows experts to make judgments about the content that a student should know and what he/she should be able to do in order to be classified in a specific performance level.

- Three cut scores divide the possible scores on a given assessment into the four performance levels utilized in Oklahoma:
  1) Unsatisfactory
  2) Limited Knowledge
  3) Proficient (or Satisfactory in OMAAP tests)
  4) Advanced

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Performance Level Descriptors (OCCT Grade 5 Math)

***Unsatisfactory*:** Students have not performed at least at the Limited Knowledge level. Students scoring at the Unsatisfactory level should be given comprehensive mathematics instruction.

***Limited Knowledge*:** Students demonstrate partial mastery of the essential knowledge and skills appropriate to their grade level. Students scoring at the Limited Knowledge level are inconsistent in applying the general knowledge and mathematical process skills at the Proficient level necessary to solve problems effectively and reason mathematically.

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Performance Level Descriptors (OCCT Grade 5 Math)

***Proficient*:** Students demonstrate mastery over appropriate grade-level subject matter, and students are ready for the next grade level. Students scoring at the Proficient level typically will:

- Multiply, divide, estimate, compare, and convert fractions, mixed numbers, decimals, and percents to solve single- and multi-step problems.
- Generalize and extend patterns and functions using tables, graphs, and number properties.
- Use substitution and the order of operations to simplify and evaluate algebraic expressions (including exponents and parentheses).
- Write and solve one-step equations with one variable using number sense, the properties of operations, and the properties of equality.
- Convert, compare, and order decimals, fractions, and percents using a variety of methods.
- Estimate and find solutions to single and multi-step problems using whole numbers, decimals, fractions, and percents.
- Build and recognize models of multiples to develop the concept of exponents and simplify numerical expressions with exponents and parentheses using order of operations.
- Compare and contrast the basic characteristics of three-dimensional figures.
- Compare and contrast congruent and similar figures.
- Use formulas to find the circumference and area of circles in terms of pi.
- Organize, construct displays, and interpret data to solve problems.
- Use the fundamental counting principle on sets with up to five items to determine the number of possible combinations.
- Find the measures of central tendency (mean, median, mode, and range) of a set of data and understand why a specific measure provides the most useful information in a given context.

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Performance Level Descriptors (OCCT Grade 5 Math)

***Advanced*:** Students demonstrate superior performance on challenging subject matter. In addition to demonstrating a broad and in-depth understanding and application of all skills at the Proficient level, students scoring at the Advanced level typically: use a wide range of strategies to solve problems; regularly use various types of reasoning effectively; consistently connect one area or idea of mathematics to another; and communicate mathematical ideas through a variety of representations.

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The Standard Setting Process

- Standard setting committees convened in early June to determine cut score recommendations.
- Recommendations were based on:
  - Content of the items and test as it related to the PASS standards.
  - The performance level descriptors and how they related to the specific items on the test.
  - Empirically estimated item difficulty.
  - Changes to the test blueprint.
  - Comparisons with the NAEP standards.
- The cut scores were NOT based on number of test items answered correctly or the desired distribution of students across the four performance levels.

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Item Mapping Method

- Method was developed by Daniel Lewis, Howard Mitzel, and Ross Green – "Bookmark" method.
- Allows you to translate content-based expectations regarding what students should know and be able to do at a given level, to performance standards (cut scores).
- Most widely used procedure to set cut scores for large-scale assessments.
- Similar methods have to set standards on the NAEP, TIMMS, PISA, etc.

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Steps in the Item Mapping Process

1. Review *PASS* Curriculum and Test Specifications.
2. Review, Discuss and Clarify the Performance Level Descriptors.
   - Defines students at each level.
   - Distinguishes students at adjacent levels.
   - Characteristics that define students at the "threshold".
3. Review the ordered item booklet and indicate "bookmarks" that separate out groups of items that are specific to certain performance levels.
4. In this standard setting, additional pieces of information were also supplied.
   - The location of the current cuts were placed in the OIB.
   - The results from NAEP were translated into cut scores on the OCCT OIB.

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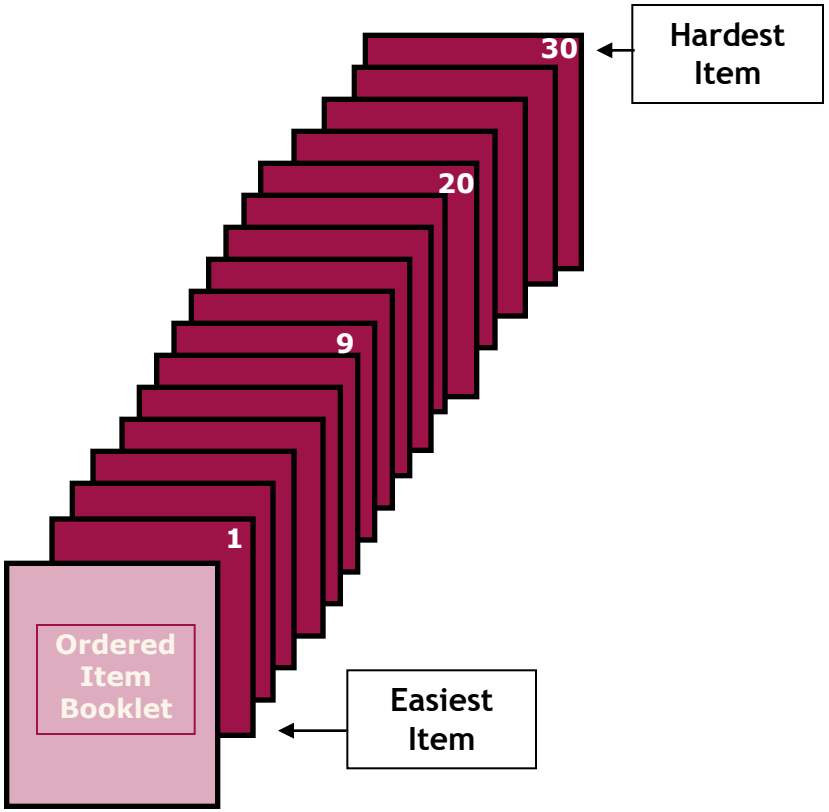
Ordered Item Book

- Represents the range of skills/abilities assessed.
- May include both operational and field-test items.
- Tool by which cut score recommendations are made.
- Based on Oklahoma student performance on the Spring 2011 tests.
- Location of an items represents the ability level necessary to have a 0.67 chance of answering the item correctly.
- Location is an indication of an item's difficulty.
- Each item is related to a place on the reporting scale .



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Ordered Item Booklet

- Compare each item to the previous one.
  - What about this item is causing student's to respond correctly less often?
  - Why does a student need to be of a higher ability to get this item correct?)
  - Is this item measuring a higher level of performance?
- Consider the knowledge and skills a student must know to answer each item correctly.
- Relate the required knowledge and skills back to the expectations in the PLDs.
- Place a bookmark that divides out the tipping point of between two performance levels.

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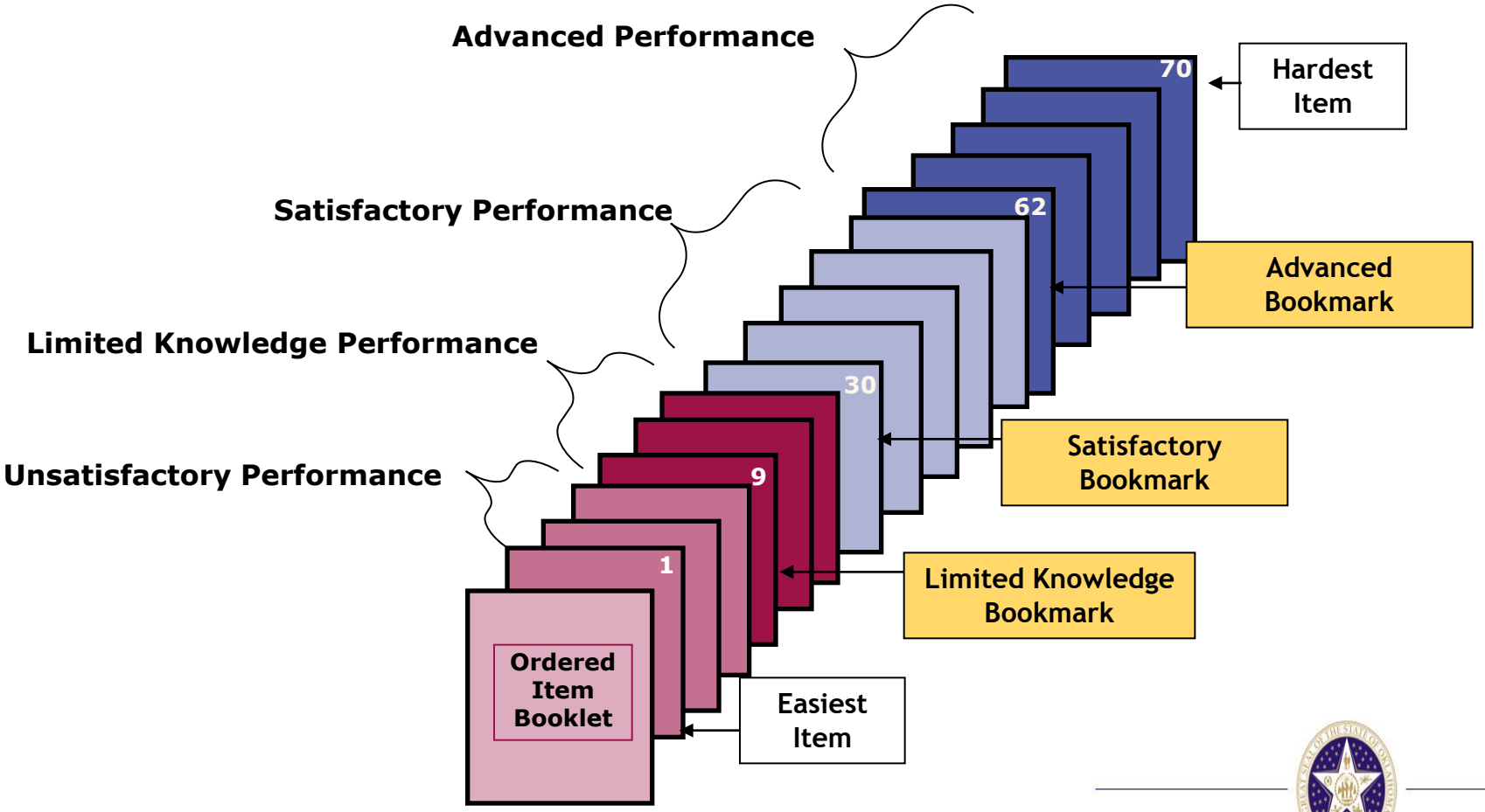
End Product of Item Mapping Round



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Standard Setting Committee Members

- The experts included on the standard setting committees were educators with significant experience in instruction at the appropriate grade level in the appropriate subject (e.g., 3rd and 4th grade math teachers were placed in the standard setting committees for 3rd & 4th grade math).
- In the OMAAP standard settings, teachers were selected to represent both general education teachers and special education equally.
- Committees also contained representatives from institutions of higher education with expertise in teacher training or curriculum development.

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Standard Setting Committee Members

- For OCCT and OMAAP mathematics, the panels consisted of 20-28 experts who conducted standard settings for the tests at two adjacent grade levels within a testing program (e.g., a panel of 28 set standards for the OCCT 7th & 8th grade Mathematics assessments, a panel of 21 set the standards for the OMAAP 3rd & 4th grade assessments).

- One panel of 16 experts conducted the standard settings for OMAAP EOI U.S. History.

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Standard Setting Committee Members

- The standard setting committees represented teachers from across the state, from district and schools of various sizes, and were diverse in terms of race/ethnicity.
- Each committee had a wealth of classroom experience.

Years of Teaching Experience in Each Committee

Committee	Average	Total
OCCT Math 3 & 4	16.3	300+
OCCT Math 5 & 6	16.5	300+
OCCT Math 7 & 8	19.6	500+
OMAAP Math 3 & 4	16.1	200+
OMAAP Math 5 & 6	18.8	325+
OMAAP Math 7 & 8	19.1	300+
OMAAP EOI US History	20.5	275+

Recommended Performance Benchmarks (Cut Scores)

- The committees' recommendations for cut scores are presented on the following slides.
- The results are provided as:
  - A scale score, which provides a consistent interpretation of assessments across years and administrations.
  - A raw score that would be used for the spring 2011 as the cut under the recommendation from these committees.
  - Comparison to the raw scores that would be the cut scores on the Spring 2011 assessments under the existing standards.
  - Impact data, which show how students that completed the assessments in Spring 2011 would be classified using the recommended cuts.

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OCCT Math 3-8: Recommended and Current and Cut Scores

Grade	Limited Knowledge					Proficient					Advanced				
	Raw Score		%Correct		Scale Score	Raw Score		%Correct		Scale Score	Raw Score		%Correct		Scale Score
	Cur.	Rec.	Cur.	Rec.		Cur.	Rec.	Cur.	Rec.		Cur.	Rec.	Cur.	Rec.	
3	26	25	52%	50%	633	35	35	70%	70%	700	45	45	90%	90%	798
4	25	25	50%	50%	639	33	33	66%	66%	700	45	44	90%	88%	805
5	24	23	48%	46%	638	32	32	64%	64%	700	41	43	82%	86%	791
6	22	22	44%	44%	664	28	28	56%	56%	700	36	42	72%	84%	795
7	23	24	46%	48%	674	27	27	54%	54%	700	37	41	74%	82%	800
8	23	21	46%	42%	642	28	29	56%	58%	700	39	40	78%	80%	774

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OMAAP EOI U.S. History: Recommended and Current Cut Scores

Limited Knowledge				
Raw Score		%Correct		Scale Score
Current	Recommended	Current	Recommended	
19	19	40%	40%	239
Satisfactory				
Raw Score		%Correct		Scale Score
Current	Recommended	Current	Recommended	
26	24	55%	51%	250
Advanced				
Raw Score		%Correct		Scale Score
Current	Recommended	Current	Recommended	
32	32	68%	68%	264

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Recommendations

- Accept the median recommended cut scores of the standard setting committees.

- Make these recommended cuts effective immediately (i.e., apply to the student scores collected in Spring 2011).

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