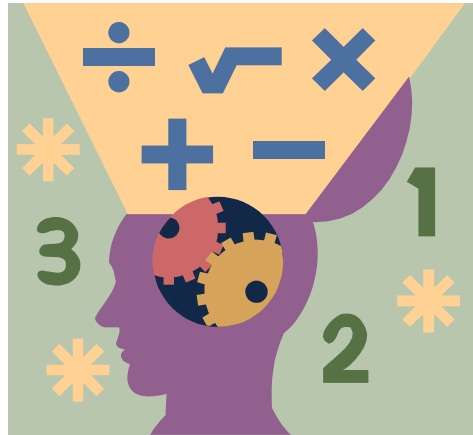


Building a Smarter Balanced Assessment System: Summative, Interim, and Formative

Gail M Pagano
Connecticut State Lead
Item Development/Performance Task Co-Chair
Smarter Balanced Assessment Consortium



NCTM
April 18, 2013



"The world is small now, and we're not just competing with students in our county or across the state. We are competing with the world," said Robert Kosicki, who graduated from a Georgia high school this year after transferring from Connecticut and having to repeat classes because the curriculum was so different. "This is a move away from the time when a student can be punished for the location of his home or the depth of his father's pockets."

Future Smarter Students

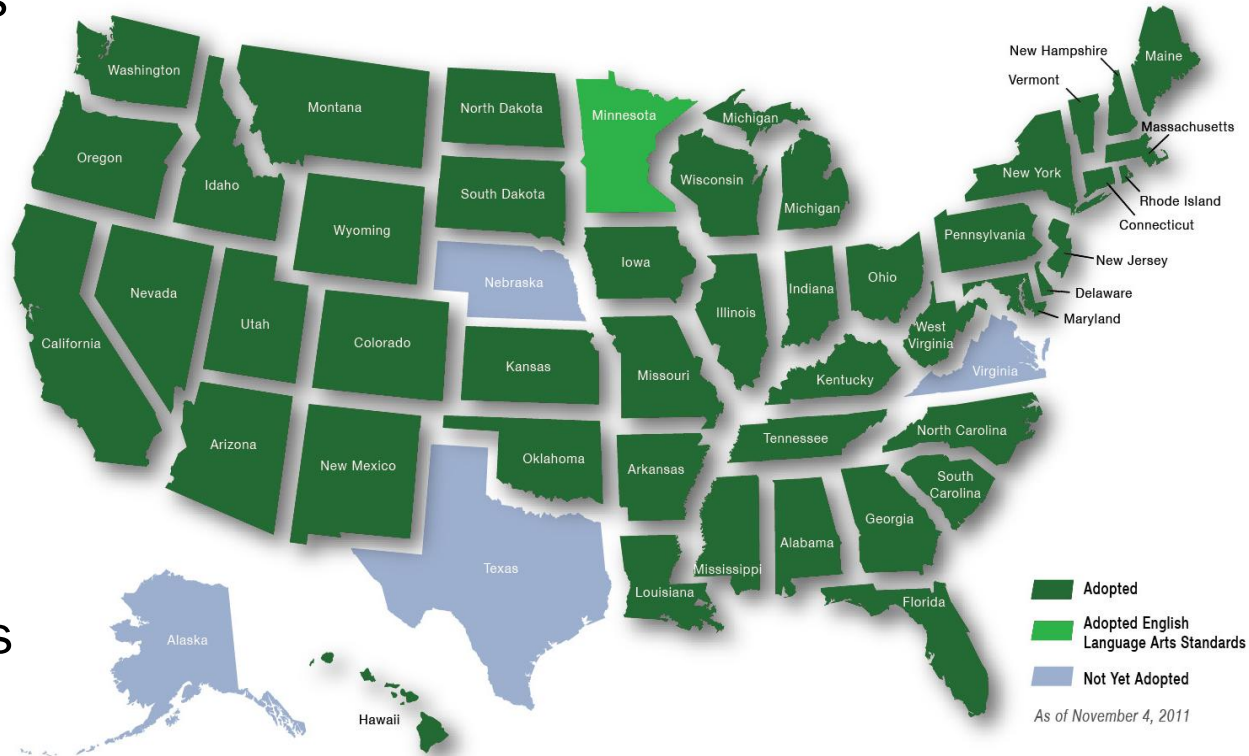


Imagine if we lived in a world that expected this level of mathematical expertise....



Common Core State Standards

- Define the knowledge and skills students need for college and career
- Developed voluntarily and cooperatively by states; more than 40 states have adopted
- Provide clear, consistent standards in English language arts/literacy and mathematics



Source: www.corestandards.org

Next Generation Assessments

The U.S. Department of Education has funded two consortia of states with development grants for new assessments aligned to the Common Core State Standards

- Rigorous assessment of progress toward “college and career readiness”
- Common cut scores across all Consortium states
- Provide both achievement and growth information
- Valid, reliable, and fair for all students, except those with “significant cognitive disabilities”
- Administer online
- Use multiple measures
- Operational in 2014-15 school year

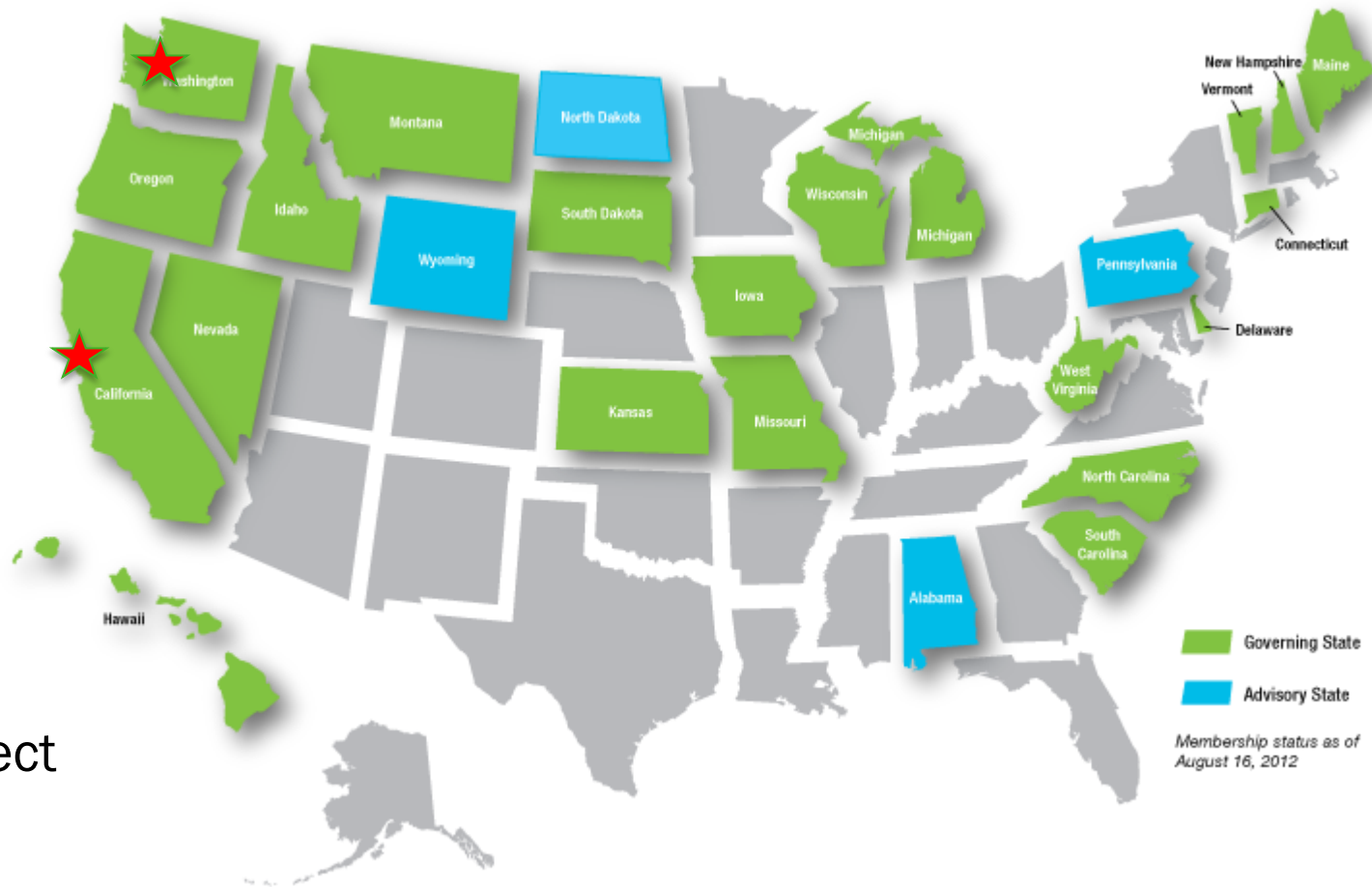
State Led

Committed to Transparency



A National Consortium of States

- 25 states representing 40% of K-12 students
- 21 governing, 4 advisory states
- Washington state is fiscal agent
- WestEd provides project management services



Consortium Work Groups

Work group engagement of 110 state-level staff:

Each work group:

- Led by co-chairs from governing states
- 8 or more members from advisory or governing states, including 2 higher education representatives
- 1 liaison from the Executive Committee
- 1 WestEd partner

Work group responsibilities:

- Define scope and time line for work in its area
- Develop a work plan and resource requirements
- Determine and monitor the allocated budget
- Oversee Consortium work in its area, including identification and direction of vendors



A Balanced Assessment System

Common Core State Standards specify K-12 expectations for college and career readiness



Teachers and schools have information and tools they need to improve teaching and learning



All students leave high school college and career ready

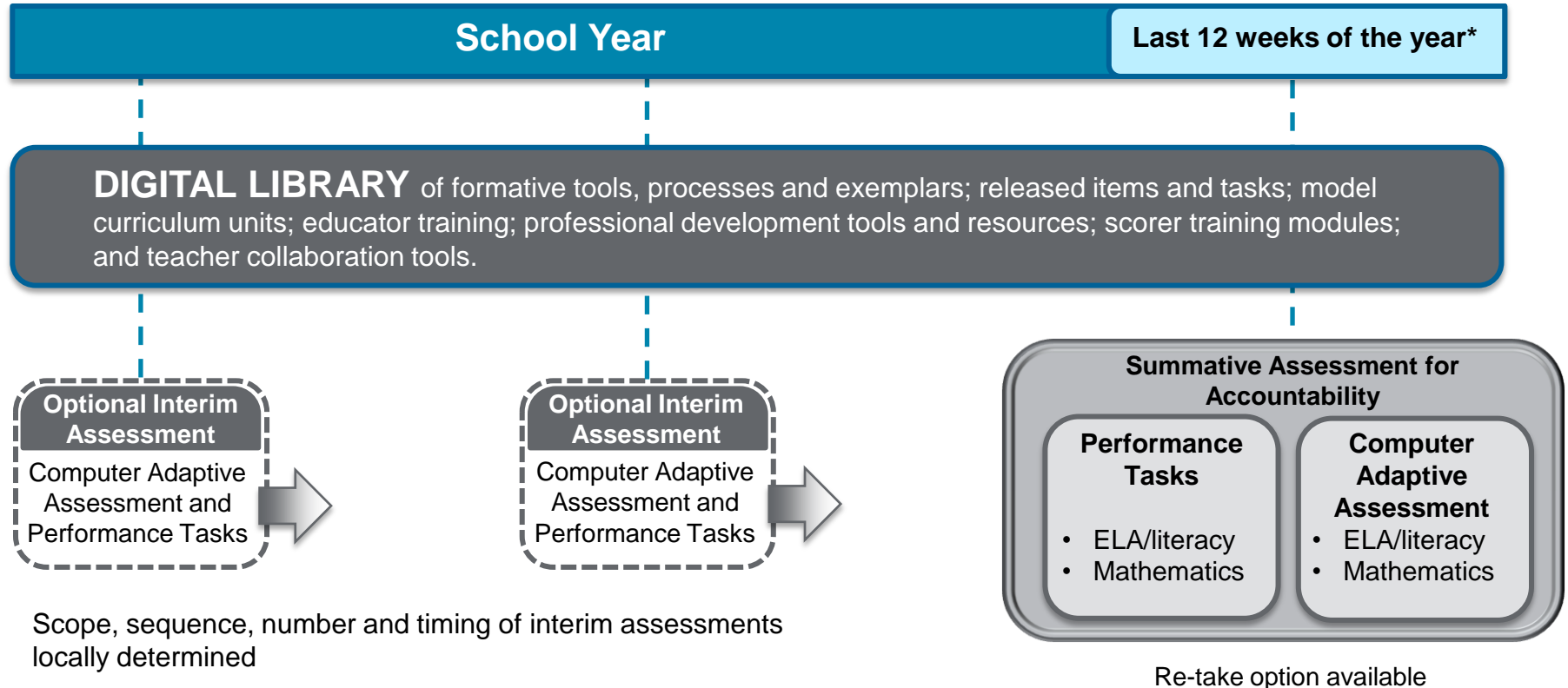
Teacher resources for **formative assessment practices** to improve instruction

Interim assessments
Flexible, open, used for actionable feedback

Summative assessments
Benchmarked to college and career readiness

A Balanced Assessment System

ELA/Literacy and Mathematics, Grades 3-8 and High School



*Time windows may be adjusted based on results from the research agenda and final implementation decisions.

The Summative Assessment System



Summative Assessment: Purpose, Benefits and Limitations

Purpose

- Accountability for K-12 at the state, district, school and classroom/teacher levels
- Accurate Information about individual students' achievement, growth over time, and (in 11th grade) readiness for college in English and math.

Benefits

- Far more sophisticated and comprehensive measure of student knowledge and skills than most existing K-12 accountability or placement exams.
- Linked to known, high-quality content standards (Common Core).
- Early warning for students not yet college ready.

Limitations

- Summative exams are not diagnostic in nature.
- Will not measure readiness for advanced mathematics (Calculus) requiring 12th grade instruction.

Summative Assessment: Two-pronged Approach

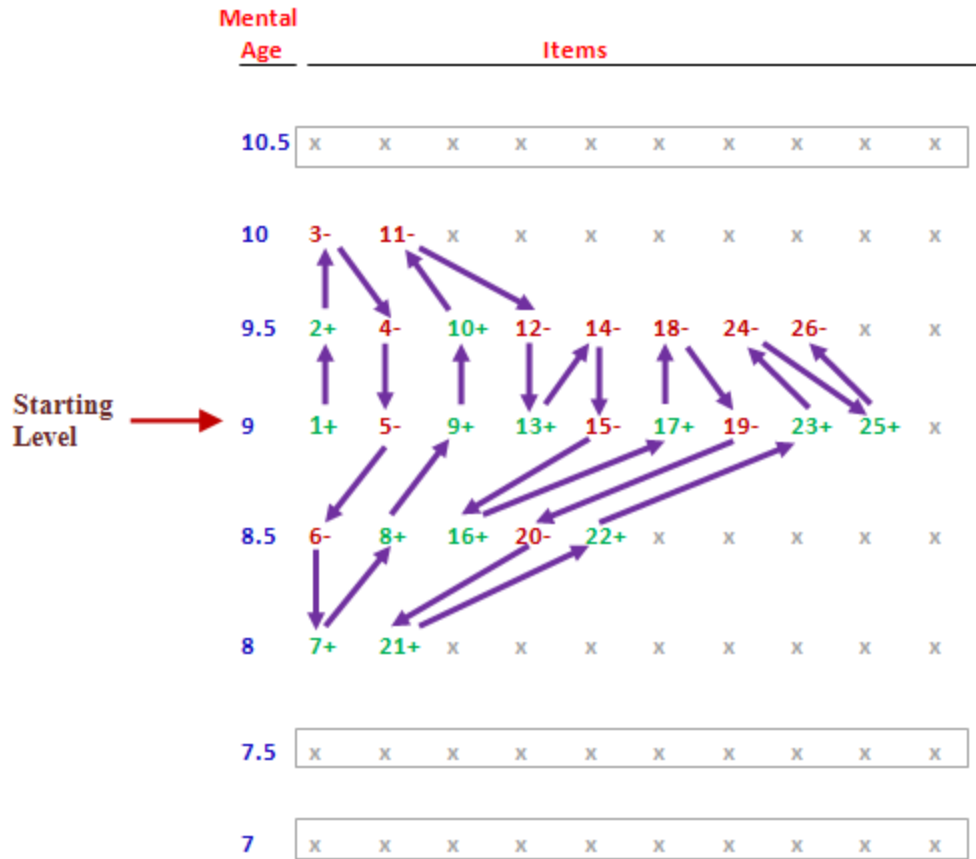
Computer Adaptive Test

- Assesses the full range of Common Core in English language arts/literacy and mathematics for students in grades 3-8 and 11 (interim assessments can be used in grades 9 and 10)
- Measures current student achievement and growth across time, showing progress toward college and career readiness
- Includes a variety of question types: selected response, short constructed response, extended construction response, technology enhanced

Performance Tasks

- Extended projects demonstrate real-world writing and analytical skills
- May include online research, group projects, presentations
- Require 1 to 2 class periods to complete
- Included in both English language arts/literacy and mathematics assessments
- Applicable in all grades being assessed
- Evaluated by teachers using consistent scoring rubrics

How CAT Works (Binet's Test)



Number of items administered = 26

Number Correct = 13

Proportion correct = .50

Using Computer Adaptive Technology for Summative and Interim Assessments

Increased precision

- Provides accurate measurements of student growth over time

Tailored for Each Student

- Item difficulty based on student responses

Increased Security

- Larger item banks mean that not all students receive the same questions

Shorter Test Length

- Fewer questions compared to fixed form tests

Faster Results

- Turnaround time is significantly reduced

Mature Technology

- GMAT, GRE, COMPASS (ACT), Measures of Academic Progress (MAP)

The Interim Assessment System



The Interim Assessment System

- Optional comprehensive and content-cluster assessment to help **identify specific needs of each student**
- Can be administered **throughout the year**
- Includes a **variety of question types**: selected response, short constructed response, extended constructed response, technology enhanced
- **Computer adaptive** tests and performance tasks
- **Fully accessible** for instruction and professional development

The Formative Assessment System



Vision for the Formative Assessment System

Smarter Balanced will create a Digital Library that:

- Helps educators skillfully adopt the formative process with fidelity, so that educators:
 - Formatively evaluate students' understanding during instruction
 - Make appropriate changes based on what they learn
 - Provide students actionable feedback
- Helps parents understand where their children are within the learning progressions
- Improves parents' (students') ability to guide the learning of their children (or self) at home



Digital Library

- Smarter Balanced is committed to providing educators the resources, tools, and professional learning opportunities so that they can tailor instruction to student needs based on information from a coherent, balanced assessment system.
- The heart of the resources for formative practice is the **Digital Library**, an online, interactive clearinghouse for educators, as well as families and students.
- The Digital Library:
 - Includes only fully vetted resources
 - Is an intuitive and user-friendly system
 - Is searchable
 - Encourages collaboration
 - Allows users to rate resources

State Leadership Teams

State Networks of Educators

Engage the field

Vet existing resources
using Quality Criteria

Recommend additional
resources to create a
comprehensive Digital
Library

Build state capacity in the
CCSS and effective use of
balanced assessment
systems to improve
teaching and learning

Commissioned Resources

Assessment
Literacy
Modules

Exemplar
Instructional
Modules

K-12 Teacher Involvement



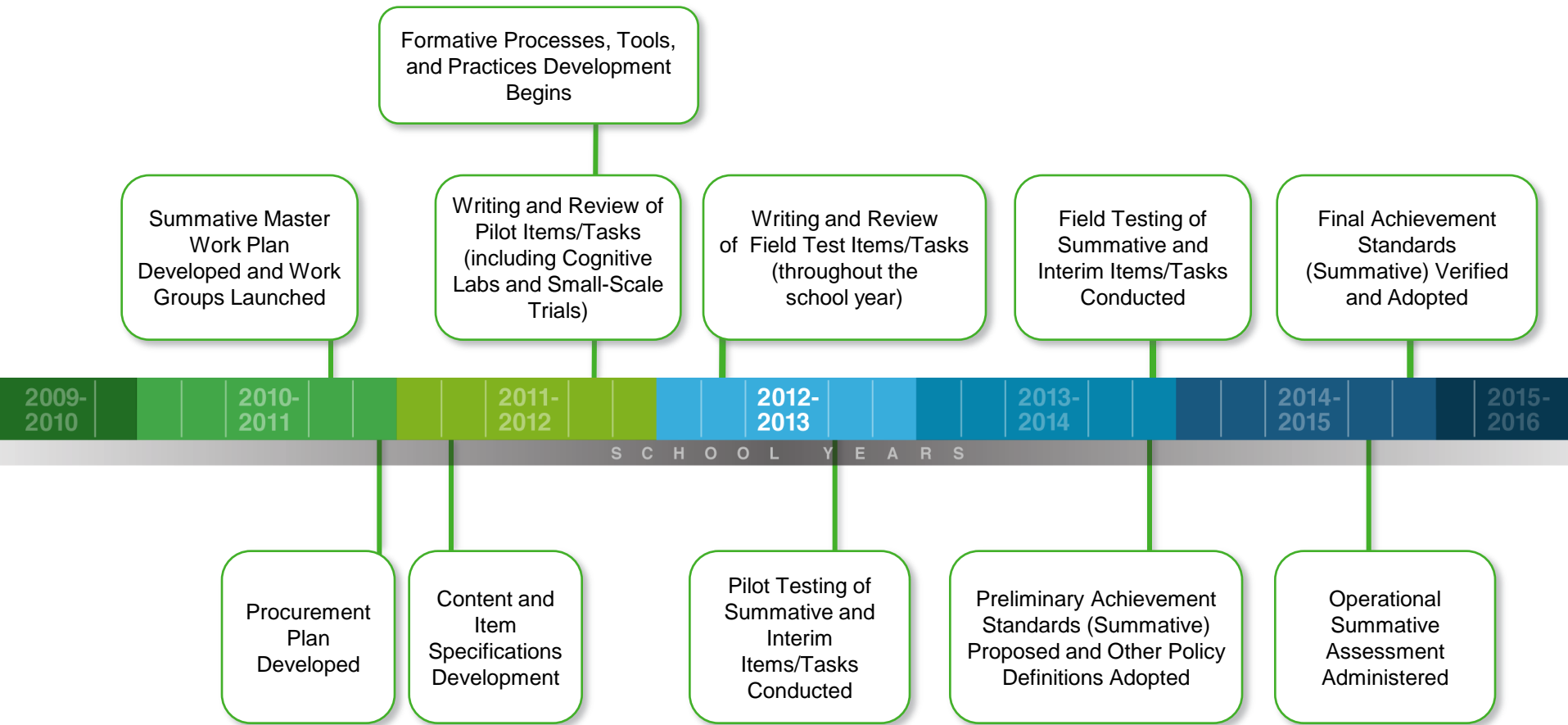
- Support for implementation of the Common Core State Standards (2011-12)
- Write and review items/tasks for the pilot test (2012-13) and field test (2013-14)
- Development of teacher leader teams in each state (2012-14)
- Evaluate formative assessment practices and curriculum tools for inclusion in digital library (2013-14)
- Score portions of the interim and summative assessments (2014-15 and beyond)

Higher Education Collaboration



- Involved 175 public and 13 private systems/institutions of higher education in application
- Two higher education representatives on the Executive Committee
- Higher education lead in each state and higher education faculty participating in work groups
- Goal: The high school assessment qualifies students for entry-level, credit-bearing coursework in college or university

Timeline



Smarter Balanced

2013 Pilot Test



Pilot Test Opportunities

- Scientific Pilot
 - Schools preselected throughout the Consortium based on certain demographic and psychometric values
- Voluntary Pilot Test
 - Replaced with grade-level Practice Tests to be posted on the Smarter Balanced Web site May 29

Overview of the Grade-Level Practice Tests

- Provide **all** students, educators and parents an opportunity to experience test items, the online testing platform and various online tools.
- May be used for professional development, discussions with parents and policy makers and other stakeholders.
- Will serve as training tests for students prior to the field test next spring and the operational test during Spring 2015
- Developed to follow a test blueprint similar to the blueprint for the operational test.
- A full array of item types, including performance tasks at each grade-level

Major Upcoming Milestones for the Summative Assessment

PILOT

Feb – May
2013

FIELD TEST

Mar – June
2014

STANDARD SETTING

Summer 2014

OPERATIONAL USE

2014 -15

Operational assessment will include a bank of 40,000 test items and performance tasks administered to 9 million students across 21 states.

The Mathematics Assessment

What is Changing?



Claims for the Mathematics Summative Assessment

Overall Claim for Grades 3-8

“Students can demonstrate progress toward college and career readiness in mathematics.”

Overall Claim for Grade 11

“Students can demonstrate college and career readiness in mathematics.”

Claim #1 - Concepts & Procedures

“Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.”

Claim #2 - Problem Solving

“Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.”

Claim #3 - Communicating Reasoning

“Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.”

Claim #4 - Modeling and Data Analysis

“Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.”

Illustrative Examples for Grade 3

Claim 1 - Target A

Jackie baked 4 trays of cookies. Each tray holds 12 cookies. How many cookies did Jackie bake?

Claim 2 - Primary Target A

Jackie arranges cookies on trays. On each tray, there are 4 rows with 3 cookies per row. How many trays does Jackie need to arrange 60 cookies?

Claim 3 – Primary Target B

Jackie bakes 36 cookies. She gives 10 away on Monday. She gives some more away on Tuesday. Travis says that Jackie now has fewer than 25 cookies left. Explain why you agree or disagree with Travis.

Claim 4 – Primary Target F

Jackie is going to a party. She plans to bake 3 cookies for each person at the party. What other information does Jackie need to know to figure out the number of cookies she needs to bake?

Smarter Balanced Web site

www.smarterbalance.org

Content and Item Specifications:
<http://www.smarterbalanced.org/smarter-balanced-assessments/>

The Mathematics Assessment

Complexity versus Difficulty



Smarter Balanced: Complexity vs. Difficulty

In the Smarter Balanced adaptive test, ALL students will see items across the full range of *complexity*; appropriate items will be selected for examinees based on their calibrated *difficulty* levels.

Appendix C – [Cognitive Rigor Matrix/Depth of Knowledge \(DOK\)](#) – Mathematics Content Specifications.

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	- Recall conversions, terms, facts			
Understand	-Evaluate an expression -Locate points on a grid or number on number line -Solve a one-step problem -Represent math relationships in words, pictures, or symbols	- Specify, explain relationships -Make basic inferences or logical predictions from data/observations -Use models /diagrams to explain concepts -Make and explain estimates	-Use concepts to solve non-routine problems -Use supporting evidence to justify conjectures, generalize, or connect ideas -Explain reasoning when more than one response is possible -Explain phenomena in terms of concepts	-Relate mathematical concepts to other content areas, other domains -Develop generalizations of the results obtained and the strategies used and apply them to new problem situations
Apply	-Follow simple procedures -Calculate, measure, apply a rule (e.g., rounding) -Apply algorithm or formula -Solve linear equations -Make conversions	-Select a procedure and perform it -Solve routine problem applying multiple concepts or decision points -Retrieve information to solve a problem -Translate between representations	-Design investigation for a specific purpose or research question - Use reasoning, planning, and supporting evidence -Translate between problem & symbolic notation when not a direct translation	-Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results
Analyze	-Retrieve information from a table or graph to answer a question -Identify a pattern/trend	-Categorize data, figures -Organize, order data -Select appropriate graph and organize & display data -Interpret data from a simple graph -Extend a pattern	-Compare information within or across data sets or texts -Analyze and draw conclusions from data, citing evidence -Generalize a pattern -Interpret data from complex graph	-Analyze multiple sources of evidence or data sets

Increasing Complexity

- **Understand:**

What is the value of $2(14) - 3$?

- **Apply:**

- Susan has \$14. Jack has \$3 less than twice the amount of money Susan has. How much money does Jack have?
- Jack has \$3 less than twice the amount of money Susan has. Write an expression for the amount of money, (s) , Susan has.

Increasing Difficulty

- What is the value of this expression?

$$2(14) - 3$$

- What is the value of this expression?

$$2(9 + 8) - (17 - 4)$$

- What is the value of this expression?

$$7(8 - 5) - 2^3 + (6)(3)$$

Adaptive Versioning of Items

Easier than Level 1 – Item mapped to 5.MD.5a

Level 1 (CCSS 6.G.2)

Mike is using cubes that measure $\frac{1}{2}$ inch on each side to fill a box that has a height of $5\frac{1}{2}$ inches, width of 3 inches, and length of $2\frac{1}{2}$ inches. How many $\frac{1}{2}$ inch cubes will Mike need to fill the box?

Level 2 (CCSS 6.G.2)

Mike is using cubes that measure $\frac{1}{4}$ inch on each side to fill a box that has a height of $5\frac{1}{4}$ inches, width of 3 inches, and length of $2\frac{1}{2}$ inches. How many $\frac{1}{4}$ inch cubes will Mike need to fill the box?

Level 3 (CCSS 6.G.2)

Mike is using cubes that measure $\frac{3}{4}$ inch on each side to fill a box that has a height of $5\frac{1}{4}$ inches, width of $3\frac{3}{4}$ inches, and length of $7\frac{1}{2}$ inches. How many $\frac{3}{4}$ inch cubes will Mike need to fill the box?

Using Student Work Formatively

When a student is below the “floor” of the standard (e.g., cannot respond to easiest item written for a particular standard)...

Mike is using cubes that measure $\frac{1}{2}$ inch on each side to fill a box that has a height of $5\frac{1}{2}$ inches, width of 3 inches, and length of $2\frac{1}{2}$ inches. How many $\frac{1}{2}$ inch cubes will Mike need to fill the box?

Teachers need to look at what came before...

5.MD.5a. Find the volume of a right rectangular prism with whole-number side lengths by packing it with unit cubes, and show that the volume is the same as would be found by multiplying the edge lengths, equivalently by multiplying the height by the area of the base. Represent threefold whole-number products as volumes, e.g., to represent the associative property of multiplication.

5.MD.5b. Apply the formulas $V = l \times w \times h$ and $V = b \times h$ for rectangular prisms to find volumes of right rectangular prisms with whole number edge lengths in the context of solving real world and mathematical problems.

Adapting Items – Adjusting the Difficulty of Grade 3 Multiplication Items

$8 \times 5 = \square$ Fluently multiply and divide within 100.

$8 \times \square = 40$ Represent and solve problems involving multiplication and division.

$9 \times 4 = \square \times 9$ Understand properties of multiplication...

$4 \times \square = 40 - 8$

$9 \times 4 = 2 \times \square$

$8 \times \square = 4 \times \square$

Give two different pairs of numbers that could fill the boxes to make a true equation (selected response, drag and drop, or fill-in would work).

Perimeter: Grade-level alignment?

- Find the perimeter of a rectangle with length 14 feet and width 8 feet.
- Find the perimeter of a rectangle with length $8\frac{3}{4}$ inches and width 5 inches.
- Find the perimeter of a rectangle with length 5430 inches and width 348 inches. Give the answer in feet.
- A rectangle is 6 feet long and has a perimeter of 20 feet. What is the width of this rectangle? Explain how you solved this problem.
- A rectangle is $6\frac{1}{3}$ feet long and has a perimeter of 20 feet. What is the width of this rectangle? Explain how you solved this problem.

Standards for the Previous Examples

3.MD.8. Solve real world and mathematical problems involving perimeters of polygons, including finding the perimeter given the side lengths, finding an unknown side length, and exhibiting rectangles with the same perimeter and different areas or with the same area and different perimeters.

4.MD.3. Apply the area and perimeter formulas for rectangles in real world and mathematical problems. *For example, find the width of a rectangular room given the area of the flooring and the length, by viewing the area formula as a multiplication equation with an unknown factor.*

7.EE.4a. Solve word problems leading to equations of the form $px + q = r$ and $p(x + q) = r$, where p , q , and r are specific rational numbers. Solve equations of these forms fluently. Compare an algebraic solution to an arithmetic solution, identifying the sequence of the operations used in each approach. *For example, the perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width?*

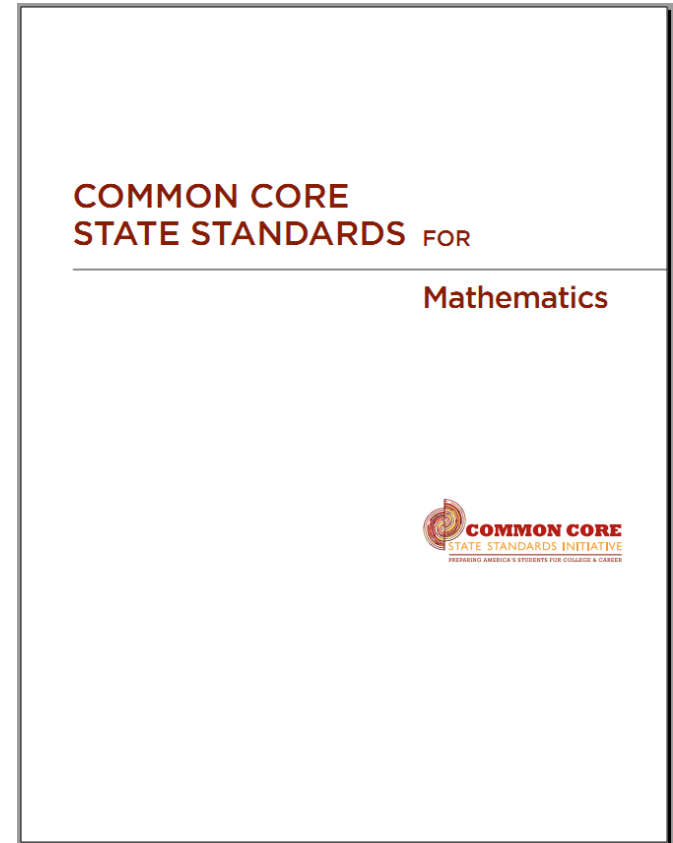
The Mathematics Assessment

The Three Shifts in Mathematics



The CCSS Require Three Shifts in Mathematics

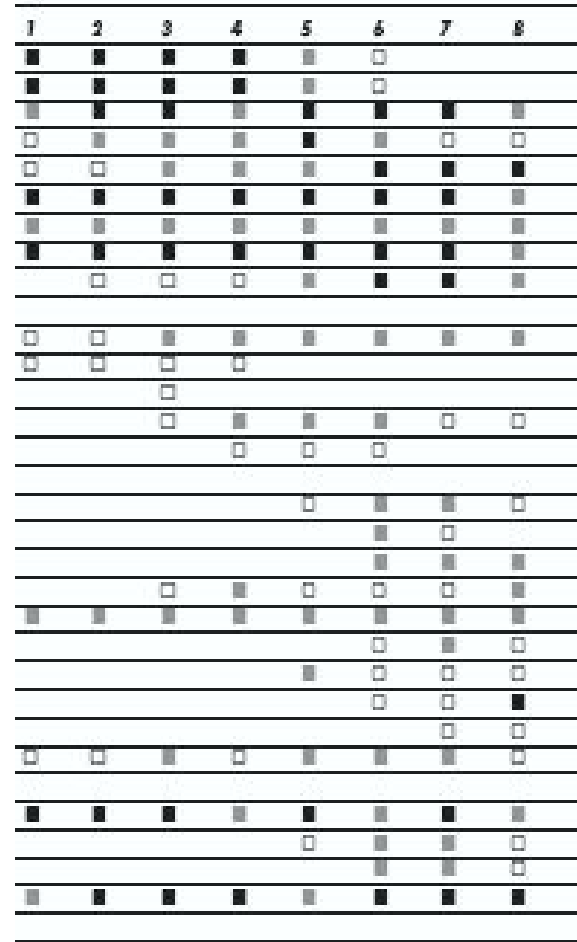
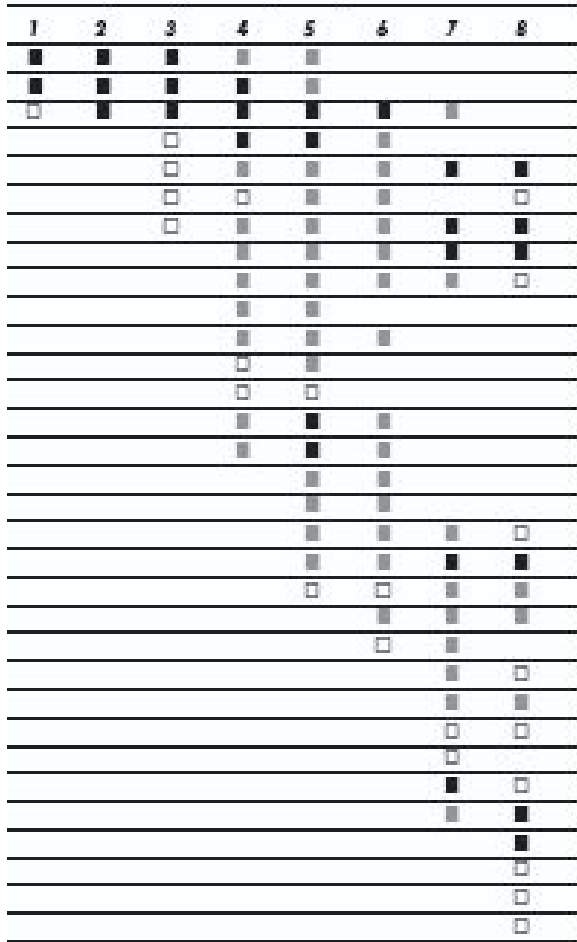
- **Focus** strongly where the standards focus
- **Coherence: Think** across grades and **link** to major topics within grades
- **Rigor:** In major topics, pursue **conceptual understanding**, procedural skill and **fluency**, and **application** with equal intensity



Shift #1: Focus Strongly where the Standards Focus

The shape of math in A+ countries

Mathematics topics intended at each grade by at least two-thirds of A+ countries



Mathematics topics intended at each grade by at least two-thirds of 21 U.S. states

¹ Schmidt, Houang, & Cogan, "A Coherent Curriculum: The Case of Mathematics." (2002).

Shift #1: Focus

Key Areas of Focus in Mathematics

Grade	Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding
K–2	Addition and subtraction - concepts, skills, and problem solving and place value
3–5	Multiplication and division of whole numbers and fractions – concepts, skills, and problem solving
6	Ratios and proportional reasoning; early expressions and equations
7	Ratios and proportional reasoning; arithmetic of rational numbers
8	Linear algebra and linear functions

Shift #1: Focus

Content Emphases by Cluster

The Smarter Balanced Content Specifications help support focus by identifying the content emphasis by cluster. The notation [m] indicates content that is major and [a/s] indicates content that is additional or supporting.

Grade 4 Cluster-Level Emphases

m = major clusters; a/s = additional and supporting clusters

Operations and Algebraic Thinking

[m] Use the four operations with whole numbers to solve problems.

[a/s] Gain familiarity with factors and multiples.

[a/s] Generate and analyze patterns.

Number and Operations in Base Ten

[m] Generalize place value understanding for multi-digit whole numbers.

[m] Use place value understanding and properties of operations to perform multi-digit arithmetic.

Number and Operations—Fractions

[m] Extend understanding of fraction equivalence and ordering.

[m] Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers.

[m] Understand decimal notation for fractions, and compare decimal fractions.

Shift #2: Coherence

Think Across Grades, and Link to Major Topics Within Grades

- Carefully connect the learning within and across grades so that students can build new understanding on foundations built in previous years.
- Begin to count on solid conceptual understanding of core content and build on it. Each standard is not a new event, but an extension of previous learning.

Shift #2: Coherence

Think Across Grades

Example: Fractions

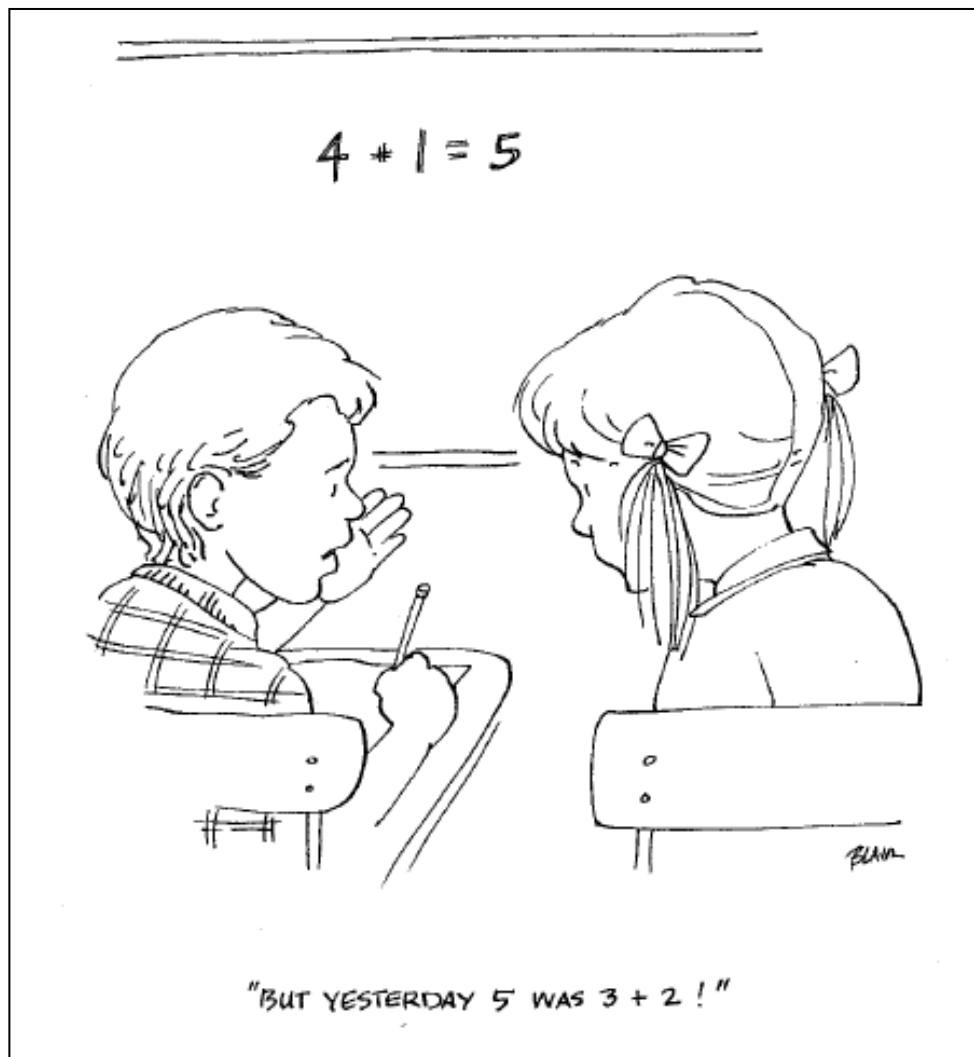
“The **coherence** and sequential nature of mathematics dictate the foundational skills that are necessary for the learning of algebra. The most important foundational skill not presently developed appears to be proficiency with fractions (including decimals, percents, and negative fractions). **The teaching of fractions must be acknowledged as critically important and improved before an increase in student achievement in algebra can be expected.**”

Assessments Must Attend to the Coherence in the Standards

1.OA.7 Understand the meaning of the equal sign, and determine if equations involving addition and subtraction are true or false. *For example, which of the following equations are true and which are false? $6 = 6$, $7 = 8 - 1$, $5 + 2 = 2 + 5$, $4 + 1 = 5 + 2$.*

Some standards from early grades are critical through Grade 12

Understanding the Meaning of the Equal Sign



What it Looks Like in Grade 3

True or False:

$3 \times 8 = 20 + 4$ T F

$50 \div 10 = 5 \times 1$ T F

$9 \times 9 = 8 \times 10$ T F

What it Looks Like in Grade 5

True or False:

$$\frac{1}{2} \times \frac{1}{3} = \frac{3}{6} \times \frac{1}{3}$$

$$\frac{1}{2} \times \frac{1}{3} = \frac{\square}{6} \times \frac{1}{3}$$

$$\frac{2}{2} \times \frac{1}{3} = \frac{3}{6} \times \frac{1}{3}$$

What it Looks Like in Grade 8

Tell how many solutions:

$$3x + 17 = 3x + 12$$

What it Looks Like in High School

$$X^4 - 5x^3 + x^2 + 2x + 1 =$$

Drag the correct expression to make a true equation.

$$x^3 + (x + 1)^2 + X^4 - 6x^3$$

$$X^4 - 3x^3 + 2x^3 + x^2 + 2x + 1$$

$$X^4 - 5x^3 + x + x + 2x + 1$$

...

Shift #3: Rigor

In Major Topics, Pursue Conceptual Understanding, Procedural Skill and Fluency, and Application

- The CCSSM require a balance of:
 - Solid conceptual understanding
 - Procedural skill and fluency
 - Application of skills in problem solving situations
- Pursuit of all three requires equal intensity in time, activities, and resources.

Shift #3: Rigor

Solid Conceptual Understanding

- Teach more than “how to get the answer” and instead support students’ ability to access concepts from a number of perspectives
- Students are able to see math as more than a set of mnemonics or discrete procedures
- Conceptual understanding supports the other aspects of rigor (fluency and application)

Shift #3: Rigor

Procedural Skill and Fluency

- The standards require speed and accuracy in calculation.
- Teachers structure class time and/or homework time for students to practice core functions such as single-digit multiplication so that they are more able to understand and manipulate more complex concepts.

Shift #3: Rigor

Required Fluencies for Grades K-6

Grade	Standard	Required Fluency
K	K.OA.5	Add/subtract within 5
1	1.OA.6	Add/subtract within 10
2	2.OA.2 2.NBT.5	Add/subtract within 20 (know single-digit sums from memory) Add/subtract within 100
3	3.OA.7 3.NBT.2	Multiply/divide within 100 (know single-digit products from memory) Add/subtract within 1000
4	4.NBT.4	Add/subtract within 1,000,000
5	5.NBT.5	Multi-digit multiplication
6	6.NS.2,3	Multi-digit division Multi-digit decimal operations

How Can Assessments Deliver on the Promise of Focus, Coherence and Rigor?

- ***FOCUS: Assessments focus where the standards focus.***

Major content represents the majority of points and problems on assessments.

- ***COHERENCE: Assessments honor the coherence in the standards.***

Balance of tasks assessing individual standards and related standards within the context of the grade and, as relevant, the progressions.

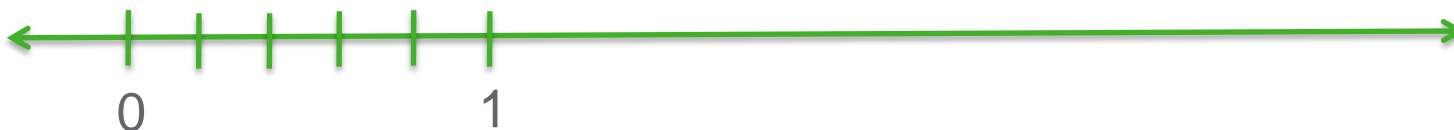
- ***RIGOR: Assessments reflect the rigor of the standards.***

Balance of tasks assessing conceptual understanding, procedural skill and fluency, and application of mathematics to solve problems.

A Shift Away from “Cookie Cutter” Items

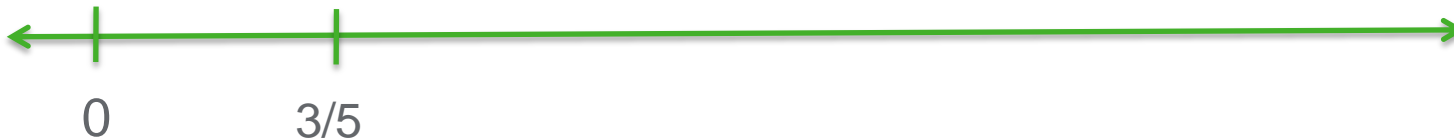
From

The numbers 0 and 1 are shown on the number line. Put a point on the line to represent the number $\frac{3}{5}$.



To

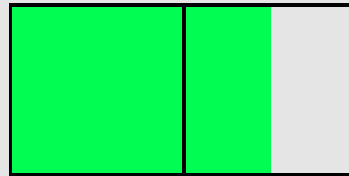
The numbers 0 and $\frac{3}{5}$ are shown on the number line. Put a point on the line to represent the number 1.



From the Progressions

3.NF.1 Understand a fraction $1/b$ as the quantity formed by 1 part when a whole is partitioned into b equal parts; understand a fraction a/b as the quantity formed by a parts of size $1/b$.

The importance of specifying the whole



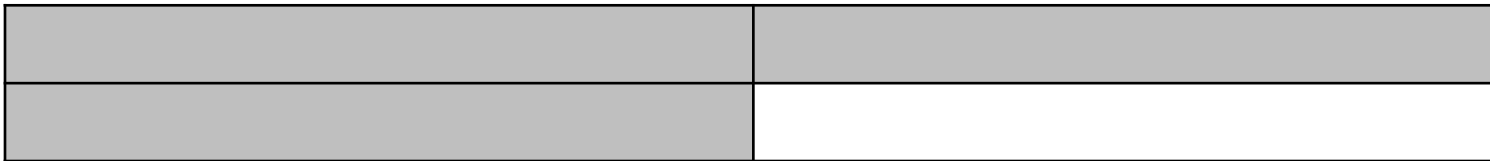
Without specifying the whole it is not reasonable to ask what fraction is represented by the shaded area. If the left square is the whole, the shaded area represents the fraction $\frac{3}{2}$; if the entire rectangle is the whole, the shaded area represents $\frac{3}{4}$.

Source:

commoncoretools.files.wordpress.com/2011/08/ccss_progression_nf_35_2011_08_12.pdf

How do we “Shift” Item Writers’ Understanding of the Mathematics?

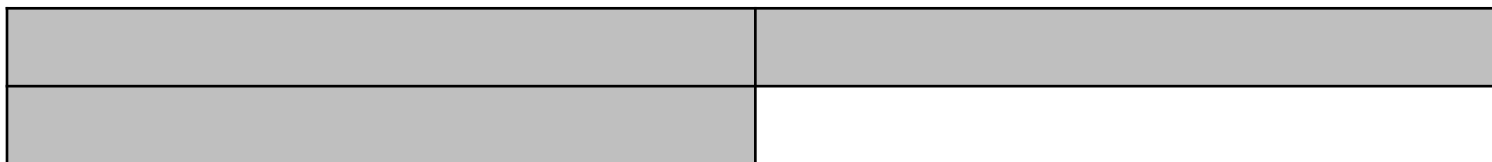
What fraction is represented by the shaded area?



Disclaimer: This is not a Smarter Balanced item.

Grow Capacity Through Many, Many Examples and Continuous Professional Learning

What fraction is represented by the shaded area?



Four students give responses. Explain what must be true for each student to be correct.

Student A: $\frac{3}{4}$

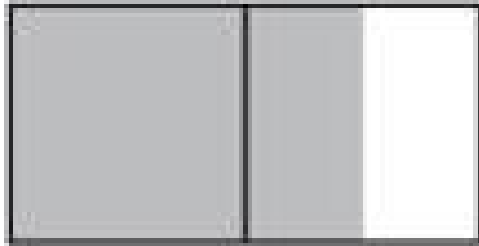
Student B: $\frac{3}{2}$

Student C: $\frac{3}{1}$

Student D: $\frac{30}{1}$

Fractions Example

Look at the fraction model shown.



The shaded area represents $\frac{3}{2}$. Drag the figures below to make a model that represents $3 \times \frac{3}{2}$.

A



B



C

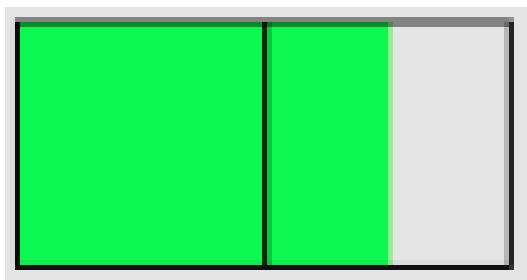


D



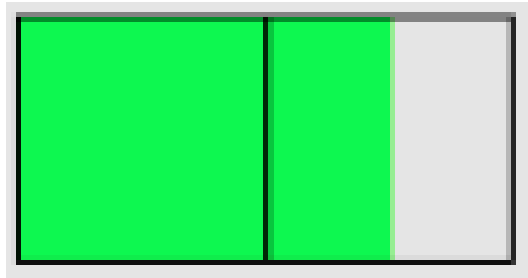
Student A drags three of shape B, which is equal in area to the shaded region. This student probably has good understanding of cluster 5.NF.B he knows that $3 \times \frac{3}{2}$ is equal to 3 iterations of $\frac{3}{2}$. Calculation of the product is not necessary because of the sophisticated understanding of multiplication.

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.



Student B reasons that $3 \times \frac{3}{2} = \frac{9}{2} = 4 \frac{1}{2}$. She correctly reasons that since the shaded area is equal to $\frac{3}{2}$, the square is equal to one whole, and drags 4 wholes plus half of one whole to represent the mixed number.

Apply and extend previous understandings of multiplication and division to multiply and divide fractions.

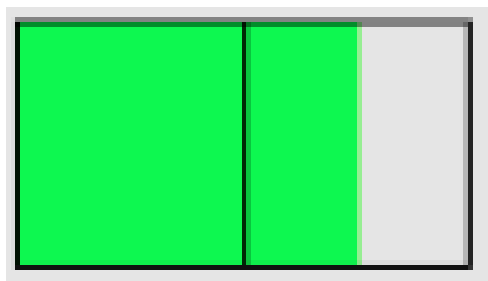


Note that unlike the previous chain of reasoning, this requires that the student determines how much of the shaded area is equal to 1.



Student C multiplies $3 \times \frac{3}{2} = \frac{9}{2}$. She reasons that since the shaded area is $\frac{3}{2}$, this is equal to 3 pieces of size $\frac{1}{2}$. Since $\frac{9}{2}$ is 9 pieces of size $\frac{1}{2}$, she drags nine of the smallest figure to create her model.

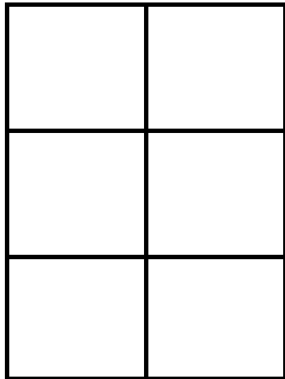
Apply and extend previous understandings of multiplication and division to multiply and divide fractions.



This chain of reasoning links nicely back to the initial development of $\frac{3}{2}$ in 3.NF.1 “understand a fraction $\frac{a}{b}$ as the quantity formed by a parts of size $\frac{1}{b}$, illustrating the coherence in the standards across grades 3-5.

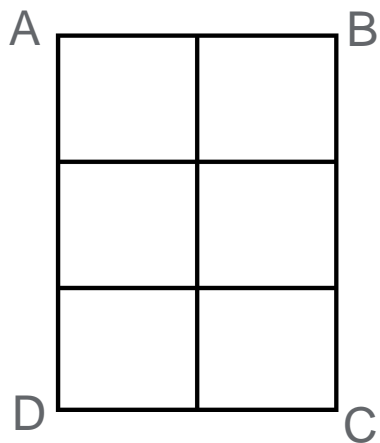


Give the area of the figure in square units.



Disclaimer: This is not a Smarter Balanced item.

The area of Rectangle ABCD is 24 square units. Draw a picture of 1 square unit.



Summary

- What you see in 2015 will be far better than what you currently see
 - proof by contradiction for those who initially thought the consortium couldn't pull it off
- Putting a pilot test out early has taught us a lot about process and how to improve our process
- We will continue to put the mathematics first and figure out the supporting components of delivery, response capture, and scoring based on what the math requires

Smarter Balanced

Sample Items



Purpose of the Sample Items

- Illustrate rigor and complexity of ELA/literacy and mathematics items on Smarter Balanced assessments
- Signal to educators the shifts in instruction that will be required to help students meet the demands of the Common Core State Standards and new assessments
- Showcase variety of item types:
 - Selected response
 - Constructed response
 - Technology enhanced
 - Performance tasks

Key Talking Points for the Sample Items for Smarter Balanced Assessments

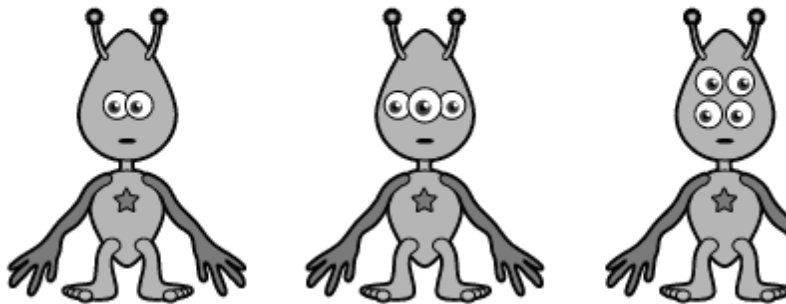
Interactive sample items and tasks:

www.smarterbalanced.org/sample-items-and-performance-tasks/

Key Talking Points for Item 43083: The Contest

- This is a “line item” that shows how the content of grade 3 progresses up to grade 4, from multiplication and division within 100 to understanding the factors of a number and interpreting the remainder in a division problem

The two-eyed space creatures, three-eyed space creatures, and four-eyed space creatures are having a contest to create a group with 24 total eyes.

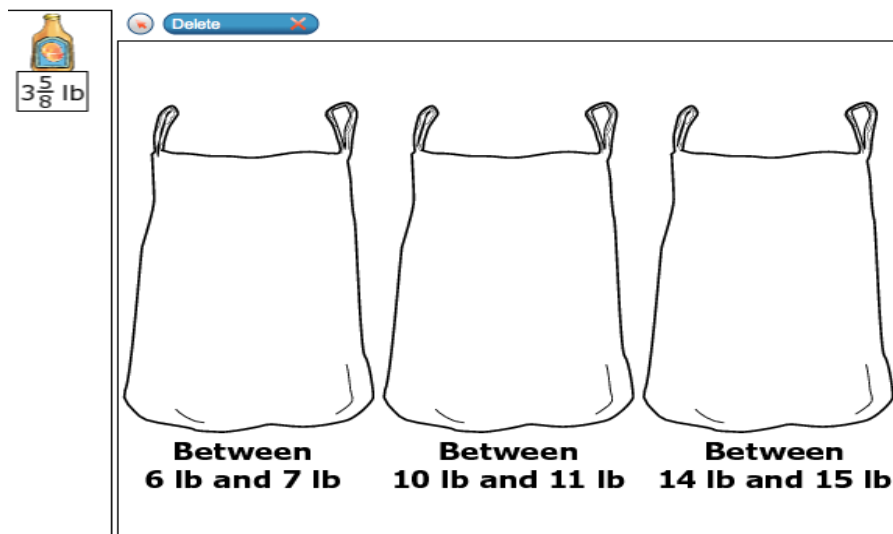


Part C: How many four-eyed space creatures are needed to make a group with 24 total eyes? (grade 3)

Part D: Somebody told the five-eyed space creatures that they could not join the contest. Explain why five-eyed space creatures cannot make a group with 24 total eyes.

Key Talking Points for Item 43328: Fractions 2a

- This item is one of a set of four in the domain “Fractions” across grades 3-5
- Although part of the focus of this item is on operations with fractions (either multiplication of a mixed number by whole number or addition with mixed numbers), the response format asks students to “understand” that the resulting number is between two whole numbers, which is a more global goal of the standards in this domain
- Although the item has text with it, the set-up allows for students to easily understand what it is asking them to do, a nice feature for assessing mathematics of struggling readers and English Learners



Key Talking Points for Item 42933: Calculator

- This item maps the 21st century onto the standards, acknowledging that students use apps, applets, and other tools – and determining whether these tools are functioning (or calculating) as intended is a critical skill
- This item type will be very useful in assessing students ability to create explicit formulas based on input and resulting output (while giving the student some control over the input)

- Select Calculator A, B, or C.
- Enter a purchase price.
- Then select “Find Sales Tax” to compute the sales tax for that purchase price.

You may use the calculators as many times as you need to solve the problem to the right.

Calculator	Purchase Price	Sales Tax

Select a Calculator

Calculator A

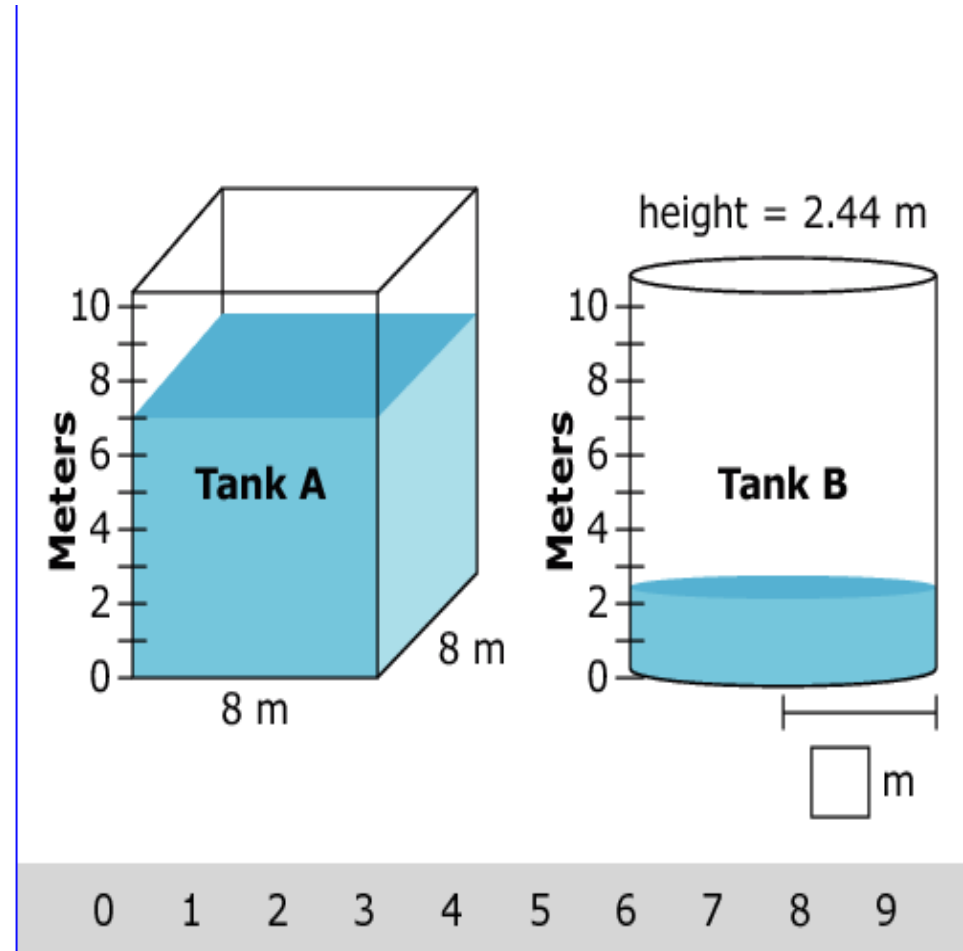
Calculator B

Calculator C

Purchase Price

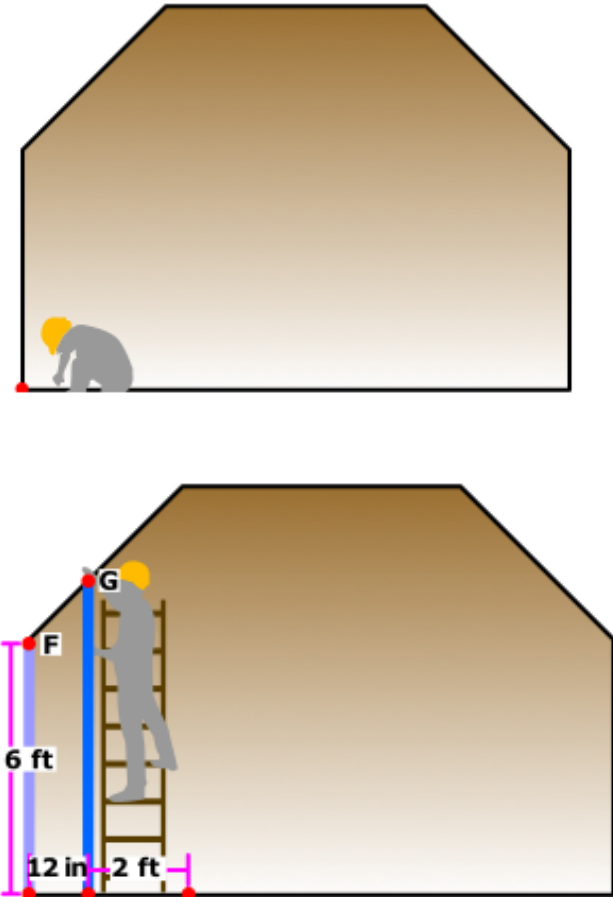
Key Talking Points for Item 42968: Water Tank

- This item allows some student choice in how much water is moved from Tank A to Tank B to derive the radius of Tank B.
- The set-up allows students to deduce what is being asked even if they struggle to read the item text
- The item draws on the content of earlier grades, but calling for more sophisticated use of that mathematics



Key Talking Points for Item 43057: Room Wall

- The animation shows how the relationship between slope and angle measure (using slope to determine congruence) is used in real life, a concept that would be difficult to portray with a static image
- This item attempts to push the field forward in terms of response capture and scoring capabilities



Find Out More

Smarter Balanced
can be found
online at:

SmarterBalanced.org

The screenshot shows the Smarter Balanced Assessment Consortium website. At the top left is the logo, which consists of three overlapping triangles (green, blue, and grey) forming a larger triangle, with the text "Smarter Balanced Assessment Consortium" to its right. In the top right corner, there are navigation links: "Home", "Contact Us", and "Member States Login". Below these is a "Stay Connected" section with an envelope icon and a search bar containing the text "What are you looking for?" and a "Search" button. A horizontal navigation menu below the search bar includes: "ABOUT", "SMARTER BALANCED ASSESSMENTS", "K-12 EDUCATION", "HIGHER EDUCATION", "PARENTS & STUDENTS", and "RESOURCES & EVENTS". The main content area features a large banner with a background image of diverse students. The banner text reads: "Helping States Prepare for New Assessments". Below this, it states: "Smarter Balanced and PARCC are collaborating to develop a Technology Readiness Tool to support states as they transition to online assessments." and includes a "READ MORE" link. Below the banner, there are two columns of content. The left column has a section titled "Smarter Balanced Assessment Consortium" with a paragraph describing the consortium's mission and a "READ MORE" link. Below that is a "Latest News" section with a sub-heading "Computer Adaptive Testing Event Now Available" and a paragraph of text with a "READ MORE" link. The right column has a section titled "School Years" with a paragraph of text and a "READ MORE" link. Below this is a vertical list of school years: "2009-2010", "2010-2011", "2011-2012" (which is highlighted in green and has a white circle next to it), "2012-2013", "2013-2014", and "2014-2015". Below the "2011-2012" year is a sub-section titled "What's Happening" with a paragraph of text and a "READ MORE" link.

Contact Information

Gail Pagano

Connecticut State Department of Education
Bureau of Student Assessment

Gail.pagano@ct.gov