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Jim Vidak, County Superintendent of Schools

PREPARING FOR LAUNCH: UNDERSTANDING THE CCSSM GRADES 6-8

November 2, 2013



Presented by Julie Joseph
Tulare County Office of Education

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GOALS

- Key Shifts with CCSS Mathematics
- A Closer Look at the Standards
 - Standards for Mathematical Practice
 - Content Standards
- SBAC Assessment Consortium
- Resources







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TIMED-ROUND-ROBIN

Have each person at your table share their response to the following questions. Be prepared to share with the whole group.


- What do I *want to learn* about the Common Core State Standards?
- What questions do I have about CCSS?

COMMON CORE STANDARDS INITIATIVE - CALIFORNIA

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Adopted August 2010






- Framework
 - Draft framework currently available at www.cde.ca.gov.
 - New math Framework scheduled to be adopted in November 2013.
- Materials
 - New math materials will be adopted for K-8 by January 2014.
 - 35 programs have been submitted and 30 were recommended for approval.
- Assessment
 - Field Testing SBAC 2014-15 (ELA or Math)

"Common Core State Standards Systems Implementation Plan for California," California Department of Education

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KEY SHIFTS FOR THE COMMON CORE STATE STANDARDS FOR MATHEMATICS

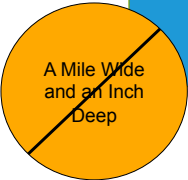




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CCSS for Mathematics

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What does it mean to have deep understanding of mathematics?




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HOW DO YOU CREATE BETTER STANDARDS IN MATH?

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Phil Daro - Chair, Mathematics College and Career Readiness Standards Work Group; Writing Team, Mathematics K-12 Common Core Standards Committee; Senior Fellow, America's Choice, currently Director at the San Francisco field site for SERP Institute.



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HOW DO YOU CREATE BETTER STANDARDS IN MATH?

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Key Instruction Shifts of the Common Core State Standards for Mathematics

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Focus	<ul style="list-style-type: none"> • Focus strongly where the Standards focus
Coherence	<ul style="list-style-type: none"> • Think across grades and link to major topics within grades
Rigor	<ul style="list-style-type: none"> • In major topics, pursue with equal intensity: <ul style="list-style-type: none"> ○ Conceptual understanding ○ Procedural skill and fluency ○ Application

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FOCUS Focus Strongly Where the Standards Focus


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The goal of focus is:

None of this is realistic in a mile-wide, inch deep world.

greater **depth** of understanding of mathematics

a rich classroom environment in which reasoning, sense-making, applications, and a range of mathematical practices all thrive.



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K-8 Publishers' Criteria for the Common Core State Standards for Mathematics, July 20, 2012, corestandards.org

FOCUS Focus Strongly Where the Standards Focus

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“Teaching Less, Learning More”

K-5
Arithmetic
 With the **FOCUS** on measurement that support it.

Concepts underlying arithmetic

Skills of arithmetic computation

Ability to **apply** arithmetic to solve problems

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FOCUS AREAS

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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
3-5	Multiplication and Division of Whole Numbers and Fractions – Concepts, Skills, and Problem Solving
6	Ratios and Proportional Relationships; Early Expressions and Equations
7	Ratios and Proportional Relationships; Arithmetic of Rational Numbers
8	Linear Algebra and Linear Functions

COHERENCE Think across grades and link to major topics within grades

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Making Math Make Sense

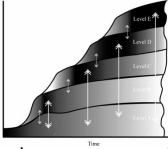

Mathematics is an elegant subject in which **powerful knowledge** results from **reasoning** with a small number of **principles** such as place value and properties of operations.

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COHERENCE Think across grades and link to major topics within grades

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- The standards define progressions of learning that leverage the principles of mathematics as they build knowledge over the grades.

Sports	Number of Students
Soccer	10
Football	5
Basketball	3
Other	2

- The standards emphasize connections between topics within the grade.
- Do not treat standards as separate events.

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RIGOR In major topics, pursue with equal intensity:

- Conceptual understanding
- Procedural skill and fluency
- Application

The word "understand" is used in the Standards to set explicit expectations for conceptual understanding...

Grade 6 – Ratios and Proportional Relationships 6.RP.1	Grade 8 – Expression and Equations 8.EE.5
<ul style="list-style-type: none"> Understand ratio concepts and use ratio reasoning to solve problems. <p>1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example...</p>	<ul style="list-style-type: none"> Understand the connections between proportional relationships, lines, and linear equations. <p>5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example,...</p>

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RIGOR

- In major topics, pursue with equal intensity:
 - Conceptual understanding
 - Procedural skill and fluency**
 - Application

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- Fluency is defined as accurate and reasonably fast.

K.OA.5 – *Fluently* add and subtract within 5.

- Know single-digit products and sums from memory.

5.NBT.5 - *Fluently* multiply multi-digit whole numbers using the standard algorithm.

- Methods and algorithms are general and based on **principles of mathematics**, not mnemonics or tricks.




RIGOR

- In major topics, pursue with equal intensity:
 - Conceptual understanding
 - Procedural skill and fluency
 - Application**

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The phrase “real-world problems” and the star symbol (*) is used to set expectations and flag opportunities for applications and modeling.

- Ample single-step and multi-step contextual problems
- Modeling real-world problems builds slowly across K-8. It is a conceptual category in high school.



Problem Solving Individually and Collaboratively

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ANSWER GETTING VS. LEARNING MATHEMATICS

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- USA:
How can I teach my kids to get the answer to this problem?
Use mathematics they already know. Easy, reliable, works with bottom half, good for classroom management.
- Japan:
How can I use this problem to teach the mathematics of this unit?

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commoncoretools.wordpress.com

TIMED-PAIR-SHARE (WITH SH PARTNER)

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Discuss:

- Share one key shift for CCSS mathematics that stands out in your mind and why you chose it.

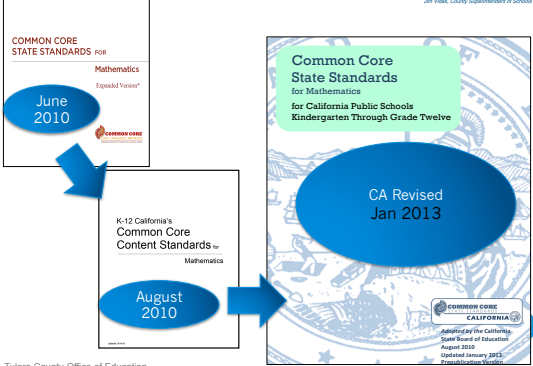


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Kagan Cooperative Learning: It's All About Engagement, by Laurie Kagan, Dr. Spencer Kagan, and Miguel Kagan

CA CCSS MATH STANDARDS

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COMMON CORE STATE STANDARDS for Mathematics
June 2010

Common Core State Standards for Mathematics
for California Public Schools
Kindergarten Through Grade Twelve
CA Revised Jan 2013

K-12 California's Common Core Content Standards in Mathematics
August 2010

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CONTENT STANDARDS - DOMAINS

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→ 5	Grade 6	Grade 7	Grade 8
Geometry			
Measurement + Data		Statistics and Probability	
Number and Operations in Base Ten		Number System	
Operations and Algebraic Thinking		Expressions and Equations	
Number and Operations - Fractions	Ratios + Proportional Relationships	Functions	

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COMMON CORE STANDARDS FOR MATHEMATICS: TWO TYPES



- Mathematical Practice
(recurring throughout the grades)
- Mathematical Content
(different at each grade level or course)

STANDARDS FOR MATHEMATICAL PRACTICE MATHEMATICALLY PROFICIENT STUDENTS:



1. Make sense of problems and persevere in solving them
2. Reason abstractly and quantitatively
3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

6 Mathematics | Grade 6

In Grade 6, instructional time should focus on four critical areas: (1) connecting ratio and rate to whole number multiplication and division, and using concepts of ratio and rate to solve problems; (2) understanding division of fractions and extending the notion of number to the rational number line, which includes negative numbers; (3) writing, interpreting, and using expressions and equations; and (4) developing understanding of statistical thinking.

(1) Students use reasoning about multiplication and division to solve ratio and rate problems about quantities. By viewing equivalent ratios and rates as deriving from, and extending, simple drawings that parts are the relative size of quantities, students connect their understanding of multiplication and division with ratios and rates. Their students regard the scope of problems for which they can use multiplication and division to solve problems involving ratios and connect ratios and fractions. Students solve a wide variety of problems involving ratios and rates.

(2) Students use the meaning of fractions, the meanings of multiplication and division, and the relationship between multiplication and division to understand and explain why the procedures for dividing fractions make sense. Students use their operations to solve problems. Students extend their previous understandings of number and the ordering of numbers to the full system of rational numbers, which includes negative rational numbers, and in particular negative integers. They reason about the order and absolute value of rational numbers and about the location of points in all four quadrants of the coordinate plane.

(3) Students understand the use of variables in mathematical expressions. They write expressions and equations that correspond to given situations, analyze expressions, and use expressions and formulas to solve problems. Students understand that equations in different forms can be equivalent, and they use the properties of operations to rewrite expressions in equivalent forms. Students know that the solutions of an equation are the values of the variables that make the equation true. Students use properties of operations and the idea of maintaining the equality of both sides of an equation to solve simple one-step equations. Students construct and analyze tables, such as tables of relationships that are step equations. Students construct and analyze tables, such as tables of relationships that are equivalent ratios, and they use equations (such as $y = 3x$) to describe relationships between quantities.

(4) Building on and reinforcing their understanding of number, students begin to develop their ability to think statistically. Students recognize that data distributions may not have a definite center and that different ways to measure center yield different values. The median measurement is the value that it is roughly the middle value. The mean measures center



INTRODUCTION TO THE GRADE LEVEL

6 Grade 6 Overview

Ratios and Proportional Relationships

- Understand ratio concepts and use ratio reasoning to solve problems.

The Number System

- Apply and extend previous understandings of multiplication and division to divide fractions by fractions.
- Compute fluently with multi-digit numbers and find common factors and multiples.
- Apply and extend previous understandings of numbers to the system of rational numbers.

Expressions and Equations

- Apply and extend previous understandings of arithmetic to algebraic expressions.
- Reason about and solve one-variable equations and inequalities.
- Represent and analyze quantitative relationships between dependent and independent variables.

Geometry

- Solve real-world and mathematical problems involving area, surface area, and volume.

Statistics and Probability

- Develop understanding of statistical variability.
- Summarize and describe distributions.

Mathematical Practices

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

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SECTION OVERVIEW PAGE

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GRADE 6 EXAMPLE

6 Grade 6

Ratios and Proportional Relationships 6.RP

Understand ratio concepts and use ratio reasoning to solve problems.

- Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." "For every vote candidate A received, candidate C received nearly three votes."
- Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." "We paid \$25 for 15 hamburgers, which is a rate of \$5 per hamburger."
- Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.
 - Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios.
 - Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?
 - Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means $30/100$ times the quantity); solve problems involving finding the whole, given a part and the percent.
 - Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

The Number System 6.NS

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

- Interpret and compute quotients of fractions, and solve word problems involving division of fractions by fractions, e.g., by using visual fraction models and equations to represent the problem. For example, create a story context for $(2/3) \div (3/4)$ and use a visual fraction model to show the quotient; use the relationship between multiplication and division to explain that $(2/3) \div (3/4) = 8/9$ because $3/4$ of $8/9$ is $2/3$. In general, $(a/b) \div (c/d) = ad/bc$. How much chocolate will each person get if 3 people share $3/4$ lb.

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GRADE SHIFTS

Concept	1997 Standards	CCSS
Dividing fractions by fractions	Grade 5	Grade 6
Concepts of mean and median to summarize data sets	Grade 5	Grade 6
Operations with numbers in scientific notation	Grade 7	Grade 8
Pythagorean Theorem	Grade 7	Grade 8

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KEEPING FOCUS AND COHERENCE

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Key: ■ Major Clusters; □ Supporting Clusters; ○ Additional Clusters

Operations and Algebraic Thinking

- Represent and solve problems involving addition and subtraction.
- Understand and apply properties of operations and the relationship between addition and subtraction.
- Add and subtract within 20.
- Work with addition and subtraction equations.

Number and Operations in Base Ten

- Extending the counting sequence.
- Understand place value.
- Use place value understanding and properties of operations to add and subtract.

Measurement and Data

- Measure lengths indirectly and by iterating length units.
- Tell and write time.
- Represent and interpret data.

Geometry

- Reason with shapes and their attributes.

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Key Instruction Shifts of the Common Core State Standards for Mathematics, achievethecore.org

HIGHEST PRIORITY

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"Some of the highest priority for college and career readiness comes from Grades 6-8. This body of material involves powerfully used proficiencies such as applying ratio reasoning in real world and mathematical problems, computing fluently with positive and negative fractions and decimals, and solving real-world and mathematical problems involving angle measure, area, surface area, and volume.

- Jason Zimba
Examples of Structure in the *Common Core State Standards* for Mathematical Content

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WHAT ABOUT 8TH GRADE & ACCELERATION?

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Common Core State Standards

DRAFT MATHEMATICS FRAMEWORK
POSSIBLE ACCELERATION OPTIONS

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Standard Sequence

8 th Grade 8	9 th Algebra 1 Or Math 1	10 th Geometry or Math 2	11 th Algebra 2 or Math 3	12 th 4 th year course
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Accelerated Sequence – High School

8 th Grade 8	9 th Algebra 1 Or Math 1 Accelerated	10 th Geometry or Math 2 Accelerated	11 th Algebra 2 or Math 3 Accelerated	12 th AP Calculus
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Accelerated Sequence – Middle School

8 th Algebra 1 Or Math 1	9 th Geometry or Math 2	10 th Algebra 2 or Math 3	11 th Pre- Calculus	12 th AP Calculus ³¹
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DRAFT MATHEMATICS FRAMEWORK
MIDDLE SCHOOL ACCELERATION OPTION

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Accelerated Sequence – Middle School

Acceleration in Middle School
 Grades 6 & 7


8 th Algebra 1 Or Math 1	9 th Geometry or Math 2	10 th Algebra 2 or Math 3	11 th Pre- Calculus	12 th AP Calculus ³²
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**A CLOSER LOOK AT
 SBAC ASSESSMENT**



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ASSESSMENT

- One of two Assessment Consortia
- California is one of 22 governing states
- www.smarterbalanced.org

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SBAC DESIGN

The SMARTER Balanced Assessment Consortium (SBAC) Design

English Language Arts and Mathematics, Grades 3-8 and High School

RE BEGINNING OF YEAR

END OF YEAR

Last 12 weeks of year*

DIGITAL CLEARINGHOUSE of formative tools, processes and exemplars, released items and tasks; model instructional units, professional development tools and resources; an interactive report generation system; scorer training modules; teacher collaboration tools, and a system feedback/evaluation mechanism.

INTERIM ASSESSMENT: Computer Adaptive Assessment and Performance Tasks

INTERIM ASSESSMENT: Computer Adaptive Assessment and Performance Tasks

SCOPE, SEQUENCE, NUMBER AND TIMING OF INTERIM ASSESSMENTS LOCALLY DETERMINED

PERFORMANCE TASKS: Reading/Writing/Math

END OF YEAR ADAPTIVE ASSESSMENT

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SMARTER BALANCED ASSESSMENT CONSORTIUM

- Test will be for grades 3-8 and grade 11.
 - Additionally, California currently requires testing in grade 2.
- Administered via computer.
 - Paper-and-pencil will be offered for three years for those that lack sufficient technology.
- Assess full range of CCSS in English language arts and mathematics.
- Includes Summative Assessment and Optional Interim Assessments.
- Results of Summative are expected within two weeks.
 - Show current achievement and growth across time.
 - Comparable from state-to-state.

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SUMMATIVE ASSESSMENT FOR ACCOUNTABILITY

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Final 12 weeks of school year

- o **Performance Tasks**
 - 1 reading/writing and 1 math
 - Delivered via computer
 - Time – 1 to 1.5 hours
- o **Computer Adaptive Assessments**
 - 30-45 Items types
 - o Selected-response
 - o Constructed response
 - o Technology-enhanced items
 - Time – 1.5 to 2 hours
 - Retake option
 - o Each student may complete one retake
 - o No cost

Grades 3-8
1 hour
Grade 11
1.5 hours

Grades 3-5
1.5 hours
Grade 6-8, 11
2 hours

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OVERVIEW OF SBAC CLAIMS

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- o Claim 1 – Concepts and Procedures
 - Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.
- o 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.
- o Claim 3 – Communicating Reasoning
 - Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.
- o 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.

Claims 2 and 4 are Combined

<http://www.smarterbalanced.org>

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SBAC ITEM TYPES

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Computer Adaptive

- o **Selected Response**
- o **Constructed Response**
- o **Technology Enhanced**

Performance Task

- o **Extended Response**
- o **Performance Task**

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SBAC: Mathematics Item Specifications Grades 3-5, developed by Measured Progress/ETS Collaborative, April 16, 2012.
<http://www.smarterbalanced.org/smarter-balanced-assessments/#item>

SELECTED RESPONSE – YES/NO (7TH GRADE)

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For numbers 1a-1e, select Yes or No to indicate whether each of these expressions is equivalent to $2(2x + 1)$.

1a. $4x + 2$ Yes No
 1b. $2(1 + 2x)$ Yes No
 1c. $2(2x) + 1$ Yes No
 1d. $2x + 1 + 2x + 1$ Yes No
 1e. $x + x + x + x + 1 + 1$ Yes No

- Research based
- More complex than traditional multiple choice
- Worth multiple points

7.EE.1, 7.EE.2

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SBAC Zip Files: 6-8, <http://www.smarterbalanced.org/smarter-balanced-assessments/#item>

SELECTED RESPONSE – ALL THAT APPLY – GRADE 6

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In art class, Marvin painted tiles to use for a project. For every 5 tiles he painted blue, he painted 8 tiles green.

Identify the equivalent ratio(s) of blue tiles to green tiles. Select all that apply.

(A) 20:23
 (B) 40:25
 (C) 50:800
 (D) 60:96

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SBAC Zip Files,

CONSTRUCTED RESPONSE- 7TH GRADE

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In the following equation, a and b are both integers.

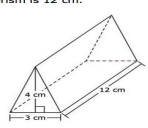
$$a(3x - 8) = b - 18x$$

What is the value of a ?

What is the value of b ?

7.EE.1

Look at the triangular prism below. Each triangular face of the prism has a base of 3 centimeters (cm) and a height of 4 cm. The length of the prism is 12 cm.



What is the volume, in cm^3 , of this triangular prism?

cm^3

7.G.6

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SBAC Zip Files: 6-8, <http://www.smarterbalanced.org/smarter-balanced-assessments/#item>

TECHNOLOGY ENHANCED

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Classify the numbers in the box as perfect squares and perfect cubes. To classify a number, drag it to the appropriate column in the chart. Numbers that are neither perfect squares nor perfect cubes should **not** be placed in the chart.

1 64 96 125 200 256 333 361

8.EE.2

Perfect Squares but Not Perfect Cubes	Both Perfect Squares and Perfect Cubes	Perfect Cubes but Not Perfect Squares

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SBAC Zip Files: <http://www.smarterbalanced.org/smarter-balanced-assessments/#item>

EXTENDED RESPONSE

6TH GRADE

(PART OF PERFORMANCE TASK SET)

Cube-shaped boxes will be loaded into the cargo hold of a truck. The cargo hold of the truck is in the shape of a rectangular prism. The edges of each box measure 2.50 feet and the dimensions of the cargo hold are 7.50 feet by 15.00 feet by 7.50 feet, as shown below.

What is the volume, in cubic feet, of each box?

Determine the number of boxes that will completely fill the cargo hold of the truck. Use words and/or numbers to show how you **determined your answer**.

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SBAC Zip Files: <http://www.smarterbalanced.org/smarter-balanced-assessments/#item>

PERFORMANCE TASK – 6TH

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Smarter Balanced Assessment Consortium
Grade 6 Performance Task

Student Task

Your class and your teacher are going on a field trip. There are three possible choices for the field trip: an aquarium, a science museum, or a zoo. Your teacher asked students to write down their first and second choices. In this task, you will determine where the class should go on the field trip based on the survey results and the cost per student.

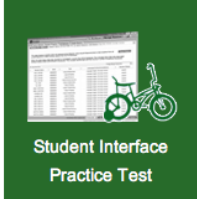
This is a map of your school and the three different field trip locations.

Claims 2, 3, and 4


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SBAC PRACTICE TESTS

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Student Interface
Practice Test



Practice Test

<http://www.cde.ca.gov/ta/tg/sa/practicetest.asp>
http://sbac.portal.airast.org/Practice_Test/resources.html


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SAMPLE ASSESSMENT ITEMS

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Discuss:

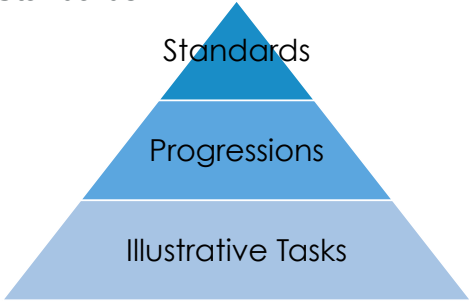
- What specific impact will this type of assessment system have on classroom instruction?



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Understanding the Standards

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Standards
Progressions
Illustrative Tasks

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DRAFT PROGRESSIONS

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- 6-7, Ratios and Proportional Relationships
- 6-8, Expressions and Equations
- K-6, Geometry
- 6-8, Statistics and Probability
- 6-8, The Number System
- Grade 8, High School, Functions

6-8, Expressions and Equations

Overview

An expression represents something. For real expressions, expressions are things. Mathematical expressions are the calculations with numbers. Some of the numbers might be given explicitly, like $2 + 3$. Other numbers in the expression might be represented by letters, such as x , y , P , or n . The calculation an expression represents might use only simple operations, as in $2 + 3$, or it might use a series of nested or parallel operations, as in $3(x + 4) - 2y$. An expression can consist of just a single number, such as 17.

Letters standing for numbers in an expression are called variables. In grade progressions, including in middle writing, the meaning of a variable is specified by the surrounding text; an expression by itself gives no intrinsic meaning to the variable it is. Depending on the context, a variable might stand for a specific number (for example, the solution to a word problem); it might be used in a universal statement true for all numbers (for example, when we say that $x^2 + 3x + 2 = 0$ for all numbers x and 0); or it might stand for a range of numbers (for example, when we say that $x^2 + 3x + 2 = 0$ for all x in the interval between 1 and 2). In choosing variables to represent quantities, students specify a unit, rather than saying "let x represent the number of apples."

An expression is a phrase in a sentence about a mathematical or mathematical situation. The words of that expression, however, can stand on their own as algebraic expressions (an expression with variables) or as mathematical statements (if it is a statement of this program for students to use expressions on objects in their own right, and to read the general appearance and the details of algebraic expressions).

An equation is a statement that two expressions are equal, such as $3x + 4 = 2x + 1$, or $3x + 4 = 2x + 1 = 3x + 2$. It is an important aspect of equations that the two expressions on either side of the equal sign might be actually already be equal, but the equation might be a true statement for some values of the variable(s) and a false statement for others. For example,

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<http://ime.math.arizona.edu/progressions/>

ILLUSTRATIVEMATHEMATICS.ORG

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www.illustrativemathematics.org

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K-8 Standards

High School Standards

Practice Standards

Illustrative Mathematics provides guidance to states, districts, schools, teachers, parents, and curriculum developers by illustrating the range and types of mathematical work that students experience in studying mathematics in the Common Core State Standards, and by publishing other tools that support implementation of the standards.

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USING PROGRESSIONS TO SUPPORT UNDERSTANDING THE STANDARDS

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

Now in Grade 6 students develop a general understanding of fraction division. They can use story contexts and visual models to develop this understanding.

For example, to see the relation between $\frac{2}{3} \div \frac{3}{4}$ and $\frac{2}{3} \times \frac{4}{3} = ?$

Visual model for $\frac{2}{3} \div \frac{3}{4}$ and $\frac{2}{3} \times \frac{4}{3} = ?$

We find a common unit for comparing $\frac{2}{3}$ and $\frac{3}{4}$ by dividing each into 12 parts and each $\frac{3}{4}$ into 9 parts. Then $\frac{2}{3}$ is 8 parts when it is divided into 12 equal parts, so $\frac{2}{3} = \frac{8}{12} = \frac{8}{3} \times \frac{1}{3}$, which is the same as saying that $\frac{2}{3} \div \frac{3}{4} = \frac{8}{9}$.

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ILLUSTRATIVE TASK

“HOW MANY _____ ARE IN...?”

Solve each problem using pictures and using a number sentence involving division.

- How many fives are in 15?
- How many halves are in 3?
- How many sixths are in 4?
- How many two-thirds are in 2?
- How many three-fourths are in 2?
- How many $\frac{1}{6}$'s are in $\frac{1}{3}$?
- How many $\frac{1}{6}$'s are in $\frac{2}{3}$?
- How many $\frac{1}{4}$'s are in $\frac{2}{3}$?
- How many $\frac{5}{12}$'s are in $\frac{1}{2}$?

6.NF.1

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BEYOND THE ANSWER

- <http://www.americaachieves.org/issues/common-core-in-practice-great-teachers-demonstrate-moving-to-deeper-learning?bcpid=2324725292001&bckey=AQ~~.AAACGDPFq8k~.wOfemldt92Jl4VFi2Xmzt6rwNjjo-NjD&bclid=2296617881001&bctid=2305455503001>

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IMPLEMENTING CCSSM

Implementation of the CCSSM will take **time** and **effort**, but it also provides a new opportunity to ensure that California' students are held to the same high expectations in mathematics as their national and global peers. Educators are challenged to become familiar with the standards and to raise the bar for student achievement through rigorous curriculum and instruction that develops students' **conceptual understanding**, **procedural skill and fluency**, and the ability to **apply mathematics**.

- Draft California Mathematics Framework, Introduction page 15

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Common Core Connect

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Resources

commoncore.tcoe.org

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TCOE EDMODO GROUPS

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Edmodo.com

- Go to edmodo.com
- Register as a user
- Join one of our groups:
 - CCSS TCOE Math TK-2: 2speyj
 - CCSS TCOE Math 3-5: x5535h
 - CCSS TCOE Math 6-8: iym9mw
 - CCSS TCOE Math 9-12: vmcqe6
 - CCSS TCOE Math: svheaq

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RESOURCES

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- TCOE CCSS Mathematics Bitly
 - <http://bit.ly/TCOE6-7> - Grades 6-7
 - <http://bit.ly/LU9iWz> - Grade 8
- TCOE Website
 - www.tcoe.org/commoncore
- TCOE Common Core Website
 - <http://commoncore.tcoe.org>
- E-mail
 - Julie Joseph - jjoseph@ers.tcoe.org

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