PREPARING FOR LAUNCH: UNDERSTANDING THE CCSM GRADES 6-8

November 2, 2013
Presented by Julie Joseph
Tulare County Office of Education

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

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**

Adopted August 2010

- **Framework**
  - Draft framework currently available at [www.cde.ca.gov](http://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)

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**KEY SHIFTS FOR THE COMMON CORE STATE STANDARDS FOR MATHEMATICS**

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**CCSS for Mathematics**

What does it mean to have deep understanding of mathematics?

A Mile Wide and an Inch Deep
How do you create better standards in Math?

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.

Focus

Coherence

Rigor

- Focus strongly where the Standards focus
- Think across grades and link to major topics within grades
- In major topics, pursue with equal intensity:
  - Conceptual understanding
  - Procedural skill and fluency
  - Application
FOCUS  Focus Strongly Where the Standards Focus

The goal of focus is:

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

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

Teaching Less, Learning More

Concepts underlying arithmetic

Skills of arithmetic computation

Ability to apply arithmetic to solve problems

Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding

<table>
<thead>
<tr>
<th>Grade</th>
<th>Focus Areas in Support of Rich Instruction and Expectations of Fluency and Conceptual Understanding</th>
</tr>
</thead>
<tbody>
<tr>
<td>K-2</td>
<td>Addition and Subtraction – Concepts, Skills, and Problem Solving</td>
</tr>
<tr>
<td>3-5</td>
<td>Multiplication and Division of Whole Numbers and Fractions – Concepts, Skills, and Problem Solving</td>
</tr>
<tr>
<td>6</td>
<td>Ratios and Proportional Relationships; Early Expressions and Equations</td>
</tr>
<tr>
<td>7</td>
<td>Ratios and Proportional Relationships; Arithmetic of Rational Numbers</td>
</tr>
<tr>
<td>8</td>
<td>Linear Algebra and Linear Functions</td>
</tr>
</tbody>
</table>
COHERENCE

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.

Think across grades and link to major topics within grades

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

• The standards emphasize connections between topics within the grade.

• Do not treat standards as separate events.

RIGOR

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

Grade 6 – Ratios and Proportional Relationships 6.RP.1
• Understand ratio concepts and use ratio reasoning to solve problems.
  1. Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example...

Grade 8 – Expression and Equations 8.EE.5
• Understand the connections between proportional relationships, lines, and linear equations.
  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...
• In major topics, pursue with equal intensity:
  - Conceptual understanding
  - Procedural skill and fluency
  - Application

Fluency is defined as accurate and reasonably fast.

Know single-digit products and sums from memory.

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

K.OA.5 — Fluently add and subtract within 5.

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

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

ANSWER GETTING VS. LEARNING MATHEMATICS

- 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?
TIMED-PAIR-SHARE
(WITH SH PARTNER)

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

CA CCSS MATH STANDARDS

CONTENT STANDARDS - DOMAINS
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

INTRODUCTION TO THE GRADE LEVEL
GRADE 6 EXAMPLE

GRADE 6 EXAMPLE

GRADE 6 EXAMPLE

GRADE SHIFTS

GRADE SHIFTS

GRADE SHIFTS

GRADE SHIFTS

GRADE SHIFTS

GRADE SHIFTS

GRADE SHIFTS
Keeping Focus and Coherence

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

Highest Priority

“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

What About 8th Grade & Acceleration?
DRAFT MATHEMATICS FRAMEWORK
POSSIBLE ACCELERATION OPTIONS

### Standard Sequence

<table>
<thead>
<tr>
<th>Grade</th>
<th>8th</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Algebra 1 or Math 1</td>
<td>Geometry or Math 2</td>
<td>Algebra 2 or Math 3</td>
<td>4th year course</td>
<td></td>
</tr>
</tbody>
</table>

### Accelerated Sequence – High School

<table>
<thead>
<tr>
<th>Grade</th>
<th>8th</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Algebra 1 or Math 1 Accelerated</td>
<td>Geometry or Math 2 Accelerated</td>
<td>Algebra 2 or Math 3 Accelerated</td>
<td>AP Calculus</td>
<td></td>
</tr>
</tbody>
</table>

### Accelerated Sequence – Middle School

<table>
<thead>
<tr>
<th>Grade</th>
<th>8th</th>
<th>9th</th>
<th>10th</th>
<th>11th</th>
<th>12th</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Algebra 1 or Math 1</td>
<td>Geometry or Math 2</td>
<td>Algebra 2 or Math 3</td>
<td>Pre-Calculus</td>
<td>AP Calculus</td>
</tr>
</tbody>
</table>

### Middle School Acceleration Option

**Accelerated Sequence – Middle School**

- Acceleration in Middle School
- Grades 6 & 7

- 8th: Algebra 1 or Math 1
- 9th: Geometry or Math 2
- 10th: Algebra 2 or Math 3
- 11th: Pre-Calculus
- 12th: AP Calculus

### A Closer Look at SBAC Assessment

- **Smarter Balanced Assessment Consortium**
A S S E S S M E N T

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

S B A C D E S I G N

The SMARTER Balanced Assessment Consortium (SBAC) Design

- English language arts and mathematics, grades 3-11
- Adaptable to all learning environments
- Equally accessible for all learners
- Field-tested and aligned

S M A R T E R   B A L A N C E D
A S S E S S M E N T   C O N S O R T I U M

- 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.
SUMMATIVE ASSESSMENT FOR ACCOUNTABILITY

Final 12 weeks of school year
- **Performance Tasks**
  - 1 reading/writing and 1 math
  - Delivered via computer
  - Time – 1 to 1.5 hours
- **Computer Adaptive Assessments**
  - 30-45 items types
    - Selected-response
    - Constructed response
    - Technology-enhanced items
  - Time – 1.5 to 2 hours
  - Retake option
    - Each student may complete one retake
    - No cost

OVERVIEW OF SBAC CLAIMS

- **Claim 1 – Concepts and 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.

SBAC ITEM TYPES

- **Computer Adaptive**
  - Selected Response
  - Constructed Response
  - Technology Enhanced

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

SELECTED RESPONSE – YES/NO (7th GRADE)

For numbers 1a-1f, select Yes or No to indicate whether each of these expressions is equivalent to 2(2x + 1).
1a. 4x + 2 ○ Yes ○ No
1b. 2x + 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

SELECTED RESPONSE – ALL THAT APPLY – GRADE 6

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

7.G.6

CONSTRUCTED RESPONSE – 7th GRADE

In the following equation, a and b are both integers:
a(3x – b) = 0 – 18x
What is the value of a?
What is the value of b?

Look at the triangular prism below. Each triangular face of the prism has a base of 6 centimeters (cm) and a height of 4 cm. The length of the prism is 12 cm.

What is the volume, in cm³, of this triangular prism?
TECHNOLOGY ENHANCED

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.

<table>
<thead>
<tr>
<th>Perfect Squares but Not Perfect Cubes</th>
<th>Both Perfect Squares and Perfect Cubes</th>
<th>Perfect Cubes but Not Perfect Squares</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 64 96 125 200 256 333 361</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

8.EE.2

EXTENDED RESPONSE

6TH GRADE

(PART OF PERFORMANCE TASK SET)

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 3.50 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.

PERFORMANCE TASK – 6TH

Grade 6 Performance Task

Claims 2, 3, and 4
SBAC PRACTICE TESTS

Student Interface
Practice Test

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

SAMPLE ASSESSMENT ITEMS

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

Understanding the Standards

Standards
Progressions
Illustrative Tasks
can be interpreted as how many
go into that?” to “how much of this is in that?” For example
particularly suited to the measurement
interpretation of division. When
multiplication and division are also said that
fraction division. They can use story contexts and visual models to
solution to the multiplication equation
size of a share when
interpretation of division, which conceptualizes
a unit fraction can be conceptualized in terms of the measurement
interpretation of division, two special cases of fraction division that are relatively easy
computing quotients of fractions.

include the work with operations on fractions, started in Grade 1 by

value and the properties of operations. On this foundation they
As Grade 6 dawns, students have a firm understanding of place

Functions

\[ \frac{3}{4} \times \frac{2}{3} = \frac{1}{2} \]

This multiplication equation can be used
to conceptualize and visualize the division of fractions.

In Grade 5 students divided

equal shares, that is, the

equal parts, then

of those parts make up the whole, so

\[ \frac{3}{2} \div \frac{1}{3} = \frac{9}{2} \]

Thus, division of a whole number by a unit fraction can be interpreted as

\[ \frac{3}{2} \div \frac{1}{3} = \frac{9}{2} \times \frac{3}{1} \]

which is the same as saying that

\[ \frac{3}{2} \div \frac{1}{3} = \frac{9}{2} \]
ILLUSTRATIVE TASK
“How MANY ______ ARE IN…?”
Solve each problem using pictures and using a number sentence involving division.

a. How many fifths are in 15?
b. How many halves are in 37?
c. How many sixths are in 47?
d. How many two-thirds are in 27?
e. How many three-fourths are in 27?
   f. How many \( \frac{1}{2} \)’s are in \( \frac{5}{2} \)?
g. How many \( \frac{1}{3} \)’s are in \( \frac{4}{3} \)?
h. How many \( \frac{1}{4} \)’s are in \( \frac{3}{4} \)?
i. How many \( \frac{1}{5} \)’s are in \( \frac{2}{5} \)?

6.NF.1

BEYOND THE ANSWER

bcpid=2324725292001&bckey=AQ~~,AAACGDPFg8k~,w0femIdt92JI4VFi2Xmzt6rwNjjo-NjD&bclid=2296617881001&bctid=2305455503001

IMPLEMENTING CCSSM

Implementation of the CCSSM will take time and effort, but it also provides a new opportunity to ensure that California’s 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
Resources

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: lym9hmw
  - CCSS TCOE Math 9-12: vmcq86
  - CCSS TCOE Math: svheaq

RESOURCES
- TCOE CCSS Mathematics Bitly
- TCOE Website
  - www.tcoe.org/commoncore
- TCOE Common Core Website
  - http://commoncore.tcoe.org
- E-mail
  - Julie Joseph – jjoseph@ers.tcoe.org