Santa Clara County Office of Education

# Vinci Park Elementary School
# Common Core State Standards- Mathematics

October 27, 2014

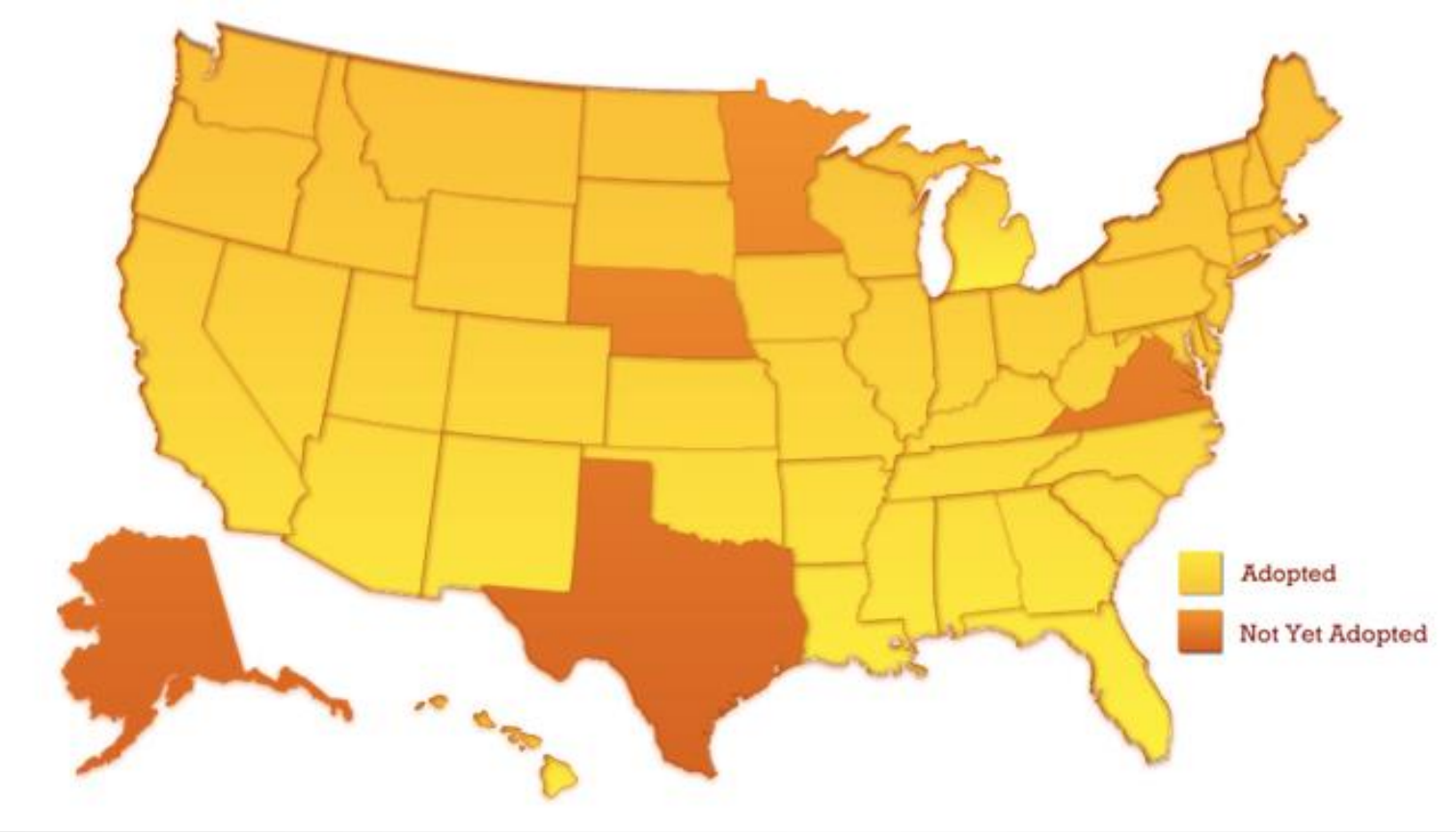
# Outcomes

- Participants will deepen their understanding of the Common Core State Standards-Mathematics (CCSS-M)
- Participants will understand the CCSS-M instructional shifts
- Participants will identify how the new CCSS-M assessments will measure student understanding.

# Agenda

- Welcome/Introductions
- Standards
- Instructional Shifts
- Depth of Knowledge
- Assessment

# States that have Adopted the Common Core State Standards




***http://www.corestandards.org/in-the-states***

# Why the Common Core State Standards?

Ensure that our students are:

- Meeting college and work expectations;
- Provided a vision of what it means to be an academically literate person in the twenty-first century;
- Prepared to succeed in our global economy and society; and
- Provided with rigorous content and applications of higher knowledge through higher order thinking skills.

# Benefits of the CCSS

- Internationally benchmarked
- Evidence and research-based
- Expectations clear to students, parents, teachers, and the general public
- Costs to the state reduced
- Consistent expectations for all—***not*** dependent on a zip code

# COMMON CORE STATE STANDARDS-MATHEMATICS

# Standards for Mathematical Practices

1. Make sense of problems and persevere in solving them

   *…start by explaining to themselves the meaning of a problem and looking for entry points to its solution*

2. Reason abstractly and quantitatively

   *…make sense of quantities and their relationships to problem situations*

3. Construct viable arguments and critique the reasoning of others

   *…understand and use stated assumptions, definitions, and previously established results in constructing arguments*

# Standards for Mathematical Practice

4. Model with mathematics

   *…can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace*

5. Use appropriate tools strategically

   *…consider the available tools when solving a mathematical problem*

6. Attend to precision

   *…communicate precisely using clear definitions and calculate accurately and efficiently*

# Standards for Mathematical Practice

7. Look for and make use of structure

   *…look closely to discern a pattern or structure*

8. Look for and express regularity in repeated reasoning

   *…notice if calculations are repeated, and look for both general methods and for shortcuts*

# CCSS Standards for Mathematical Practice

Please examine the first three words of each of the 8 mathematical practices…what do you notice?

*Mathematically Proficient Students…*

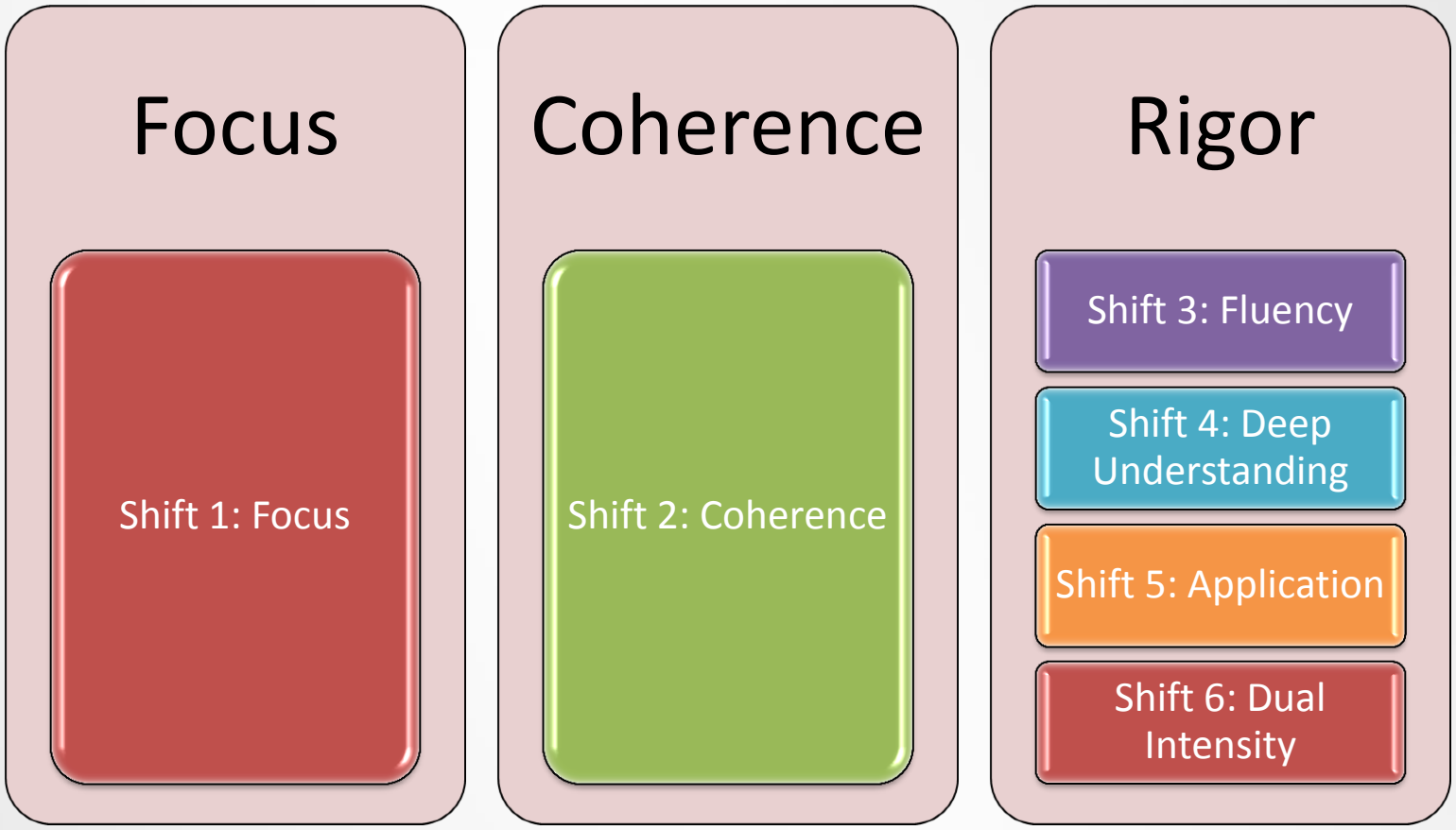
# California Comparison

| Common Core State Standards for CA DOMAINS | California Standards · Grades K-7 STRANDS |
|---|---|
| <u>K-5</u><br>•Counting and Cardinality (K only)<br>•Operations and Algebraic Thinking<br>•Number and Operations in Base 10<br>•Number and Operations-Fractions<br>•Measurement and Data<br>•Geometry<br><br><u>6-8</u><br>•Ratio and Proportional Relationships (grade 6-7)<br>•The Number System<br>•Expressions and Equations<br>•Functions (Grade 8)<br>•Geometry<br>•Statistics and probability | • Number Sense<br>• Algebra and Functions<br>• Measurement and Geometry<br>• Statistics, Data Analysis and Probability<br>• Mathematical Reasoning |

Common Core State Standards

# INSTRUCTIONAL SHIFTS IN MATHEMATICS

# Instructional Shifts Combined



# Shift #1: Focus Strongly where the Standards Focus

- Significantly narrow the scope of content and deepen how time and energy is spent in the math classroom.
- Focus deeply on what is emphasized in the standards, so that students gain strong foundations.

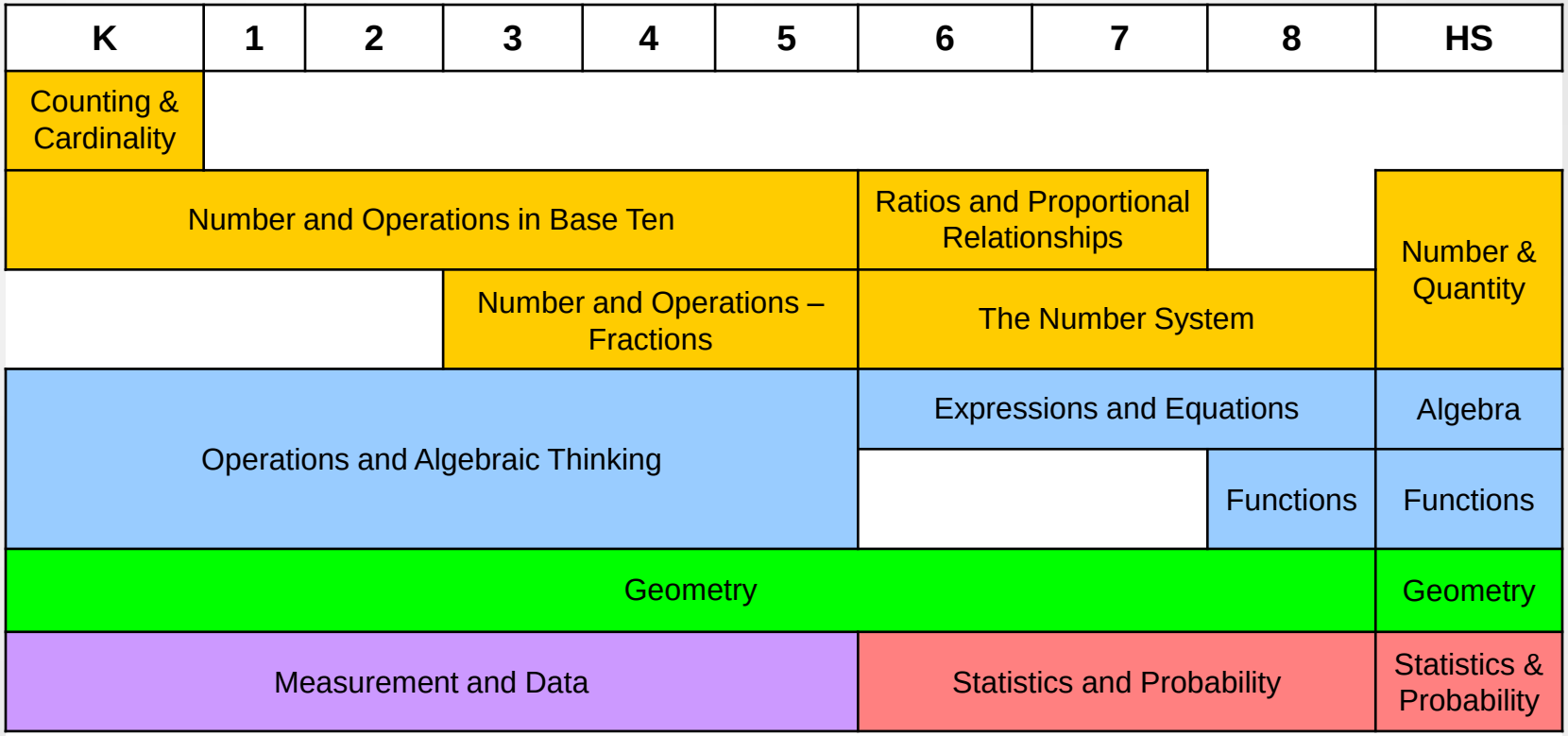
# Key Areas of Focus in Mathematics

| 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; linear functions |

# 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.

# Coherence: *Think* Across Grades




Findwell, Bradford & Foughty, Zachary. ""Preparing to Implement the Common Core State Standards for Mathematics. Indiana Department of Education and Ohio Department of Education. March 30, 2011

# Rigor

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

# Fluency (Shift 3)

- 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

Rigor

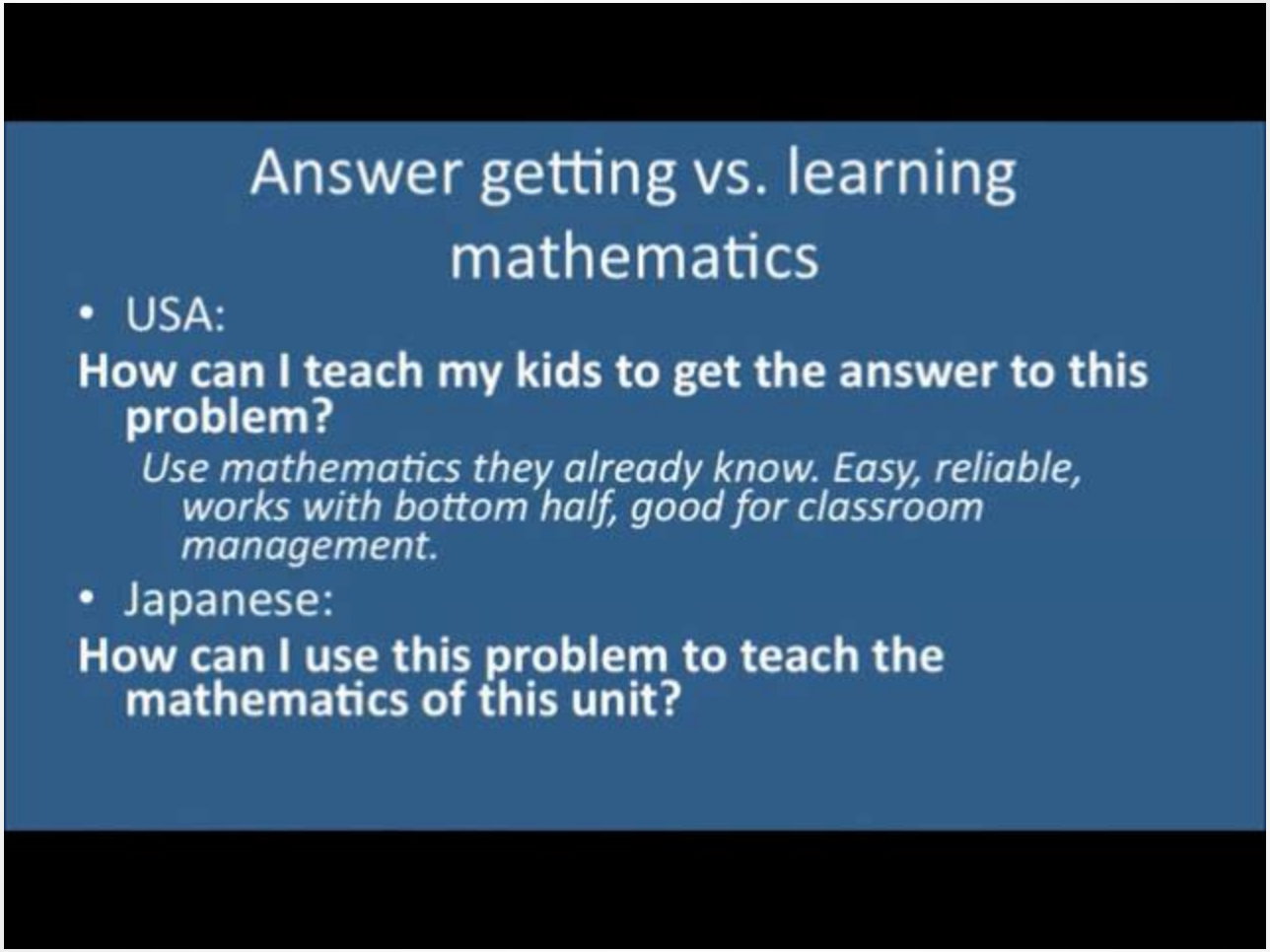
# Required Fluencies in K-6

| Grade | Standard | Required Fluency |
|---|---|---|
| K | K.OA.5 | Add/subtract within 5 |
| 1 | 1.OA.6 | Add/subtract within 10 |
| 2 | 2.OA.2<br>2.NBT.5 | Add/subtract within 20 (know single-digit sums from memory)<br>Add/subtract within 100 |
| 3 | 3.OA.7<br>3.NBT.2 | Multiply/divide within 100 (know single-digit products from memory)<br>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<br>Multi-digit decimal operations |

# Deep Understanding (Shift 4)

- 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)

Rigor


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.
• Japanese:
How can I use this problem to teach the mathematics of this unit?

# Application (Shift 5)

- Students can use appropriate concepts and procedures for application even when not prompted to do so.
- Teachers provide opportunities at all grade levels for students to apply math concepts in "real world" situations, recognizing this means different things in K-5, 6-8, and HS.
- Teachers in content areas outside of math, particularly science, ensure that students are using grade-level-appropriate math to make meaning of and access science content.

Rigor

# Shift 6: Dual Intensity

- Students are practicing and understanding.
  - Both occur with intensity
  - Fluency Practice
  - Extended application of math concepts
  - Driven by specific mathematical content; varies throughout the year.

Rigor

# It Starts With Focus

- The current U.S. curriculum is "a mile wide and an inch deep."
- Focus is necessary in order to achieve the rigor set forth in the standards.
- Remember Hong Kong example: more in-depth mastery of a smaller set of things pays off.

Common Core State Standards

# DEPTH OF KNOWLEDGE (DOK)

# Why Rigor Matters?

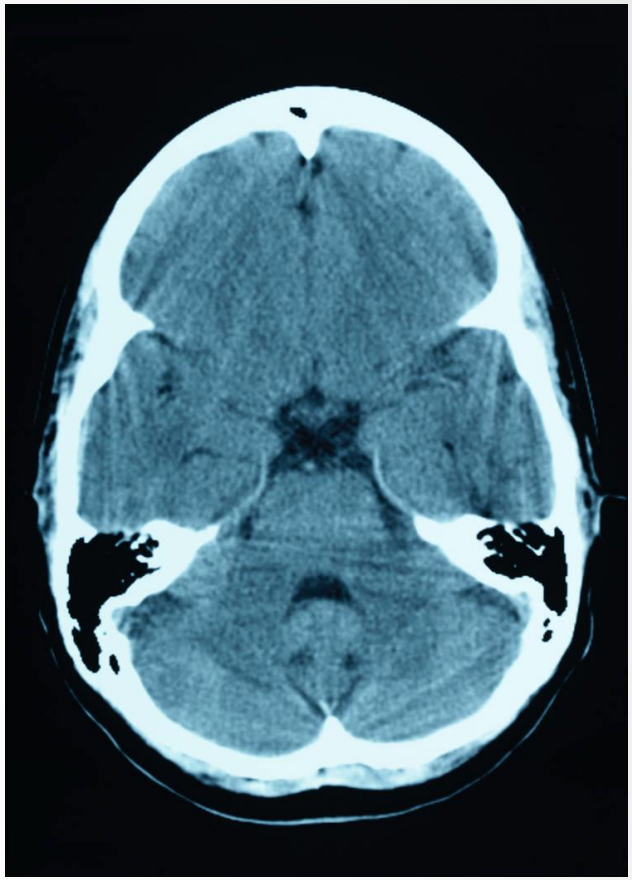

"I think we're being educated for failure. We learn math in case the calculator fails. We learn to read in case the TV breaks, and we learn to spell in case the computer's Spell-checker fails."

# Webb's Depth-of-Knowledge Levels

| | |
|---|---|
| **DOK-1**<br>**Recall and Reproduction** | Recall of a fact, term, principle, concept, or perform a routine procedure |
| **DOK-2**<br>**Application of Skills/ Concepts** | Use of information, conceptual knowledge, select appropriate procedures for a task, two or more steps with decision points along the way, routine problems, organize/display data, interpret/use simple graphs |
| **DOK-3**<br>**Strategic Thinking** | Requires reasoning, developing a plan or sequence of steps to approach problem; requires some decision making and **justification**; abstract, complex, or non-routine; often more than one possible answer or approach |
| **DOK-4**<br>**Extended Thinking** | An **original** investigation or application to real world; requires time to research, problem solve, and process **multiple** conditions of the problem or task; non-routine manipulations, across disciplines/content areas/multiple sources |

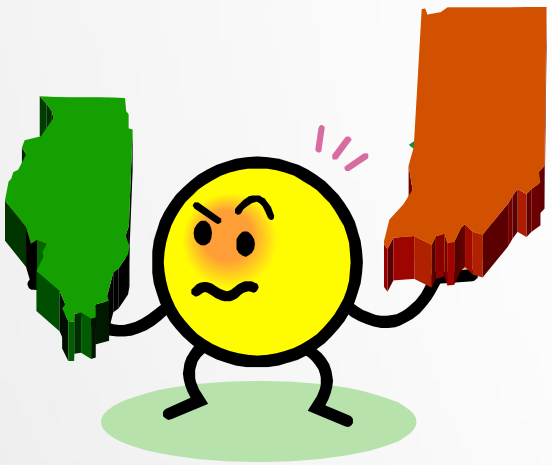
# Metacognition

- What is going on inside your brain as you are trying to answer each of these questions?
- Think about the difference in your thinking as the questions progress?




# Name the capital of California.

# Name the capitals of three other states.



# Compare and contrast two state capitals from your list.


Evaluate the location of Sacramento as your state capital.


# Theorize possible impacts of moving your state capital to San Francisco.

# DOK Depth of Knowledge

Identify an assessment for each level of DOK for a unit on chocolate chip cookies

# Depth of Knowledge (DOK)

DOK 1: What are the ingredients in chocolate chip cookies?

DOK 2: What happens if I put too much flour in my cookies?

DOK 3: Does it matter if I use melted butter of soft butter. Design an experiment to see if it makes a difference and explain your results?

# Depth of Knowledge (DOK)

DOK 4: Examine different chocolate chip cookie recipes. How are they alike? Different? Develop your own recipe based on your research and write a persuasive essay explaining why your recipe is best.

# Common Core Big Ideas
# Depth of Knowledge (DOKs)

| | Mathematics | | ELA/Literacy | |
|---|---|---|---|---|
| | DOK3 | DOK4 | DOK3 | DOK4 |
| Current Assessments | <2% | 0% | 20% | 2% |
| New SBAC Assessments | 49% | 21% | 43% | 25% |



Yuan & Le (2012); Herman & Linn (2013) from Linda Darling-Hammond, Assembly Hearing, 3.6.13

# ASSESSMENT

# Assessment: What We Know

- Assessments were given to students as a field test in 2013-2014
- Students will receive scores in 2014-15.
- California is a governing state in the SMARTER Balanced Assessment Consortium.
- Assessments will include:
  - Computer Adaptive Assessments (interim & summative)
    - Selected Response
  - Performance Assessments (interim & summative)
    - Technology Enhanced
    - Constructed Response
    - Performance Task
    - Extended Performance Event

# Traditional Selected Response CST Example

A company has 6 big trucks. Each truck has 18 wheels. How many wheels is this in all?

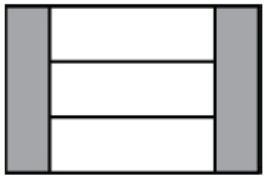
**A** 24
**B** 96
**C** 108
**D** 116

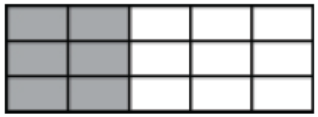
*2009 California Standards Test Released Test Question pg. 14, #34*

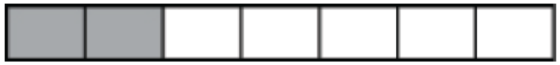
# Non-Traditional Selected Response

For numbers 1a-1d, state whether or not each figure has $\frac{2}{5}$ of its whole shaded.

1a.  (Y) Yes (N) No

1b.  (Y) Yes (N) No

1c.  (Y) Yes (N) No

1d.  (Y) Yes (N) No

# Non-Traditional Selected Response Rubric

*Scoring Rubric*

*Responses to this item will receive 0-2 points, based upon the following:*

2 points: YNYN  The student has a solid understanding of 2/5 as well as an equivalent form of 2/5.

1 point:  YNNN, YYNN, YYYN  The student has only a basic understanding of 2/5. Either the student doesn't recognize an equivalent fraction for 2/5 or doesn't understand that all 5 parts must be equal-sized in figure 1b.

0 points:  YYYY, YNNY, NNNN, NNYY, NYYN, NYNN, NYYY, NYNN, NNNN, NYNY, NNYN, NNNY  The student demonstrates inconsistent understanding of 2/5 or answers "Y" to figure 1d, clearly showing a misunderstanding of what 2/5 means. Figure 1d is considered a "disqualifier" and an answer of "Y" to this part of the item would cancel out any other correct responses as "guesses" on the part of the student.

# Performance Task

## Sponsored Walk

This problem gives you the chance to:
- choose and use number operations in a real context

Students at the Mountain View Elementary School do a sponsored walk.

1. Jack is sponsored for $6 for each lap.
   Bill is sponsored for $4 for each lap.
   Jack and Bill each do 5 laps.
   How much money do Jack and Bill raise in all? $ _____
   Show your work.

2. Maria does 6 laps.
   She raises $30.
   How much for each lap was she sponsored? $ _____
   Show how you figured it out.

# Performance Task Rubric

| **Sponsored Walk** Grade 3 | | | Rubric |
|---|---|---|---|
| The core elements of performance required by this task are:<br>• choose and use number operations in a real context<br><br>Based on these, credit for specific aspects of performance should be assigned as follows | | points | section points |
| 1. Gives correct answer: **$50** | | 1 | |
| Shows work such as: | | | |
| 6 + 4 = 10<br>10 x 5 = | or | 5 x 6 = 30<br>5 x 4 = 20<br>30 + 20 = | 1<br>1<br>1ft |
| Accept repeated addition | | | 4 |
| 2. Gives correct answer: **$5** | | 1 | |
| Shows work such as:<br>$30 ÷ 6 = | | 1 | |
| Accept repeated addition/subtraction | | | 2 |
| 3. Gives correct answer: **7** | | 1 | |
| Gives a correct explanation such as:<br>If she walks 6 laps she will raise 6 x $3 = $18,<br>so she will have to walk another lap to raise at least $20. | | 2 | |
| *Partial credit*<br>See work such as: 20 ÷ 3 = 6<br>or 6 x 3 = 18 | | (1) | 3 |
| | **Total Points** | | **9** |

# CCSS-M Assessments (Claim 4)

- View the *Robot Maker* Task.
- What skills will students need in order to complete the task?

# Resources for Parents

- www.cde.ca.gov
- www.pta.org/4446.htm
- www.achievethecore.org
- http://www.cgcs.org/Domain/36
- www.smarterbalanced.org

Adapted from EngageNY.org and Oregon Dept. of Education

"The mind is not a vessel to be filled but a fire to be kindled."

- On Listening to Lectures (Plutarch)

# Closing Discussion

- What strategies did we discuss today that you think you might use with your children?
- What other information would be helpful to you?
- What other questions do you have?


Adapted from EngageNY.org and Oregon Dept. of Education