Math and the Common Core

Common Core Drive By

- The Common Core State Standards for Mathematics are comprised of 2 sets of standards.
  - The Standards for Mathematical Content
  - The Standards for Mathematical Practice

Critical Areas of Focus for Mathematics Grades K - 2

Kindergarten	Grade 1	Grade 2
Develop the concept of number with respect to: Counting Sequences Counting to tell the number of objects Represening quantities	Develop place value understanding with two-digit numbers and properties of operations to deepen student's understanding of whole number relationships	Expand student's understanding of place value, addition, and subtraction
Introduce addition and subtraction of whole numbers and model simple joining and separating situations with objects	Apply previous experiences with counting to develop a rich understanding of additon and subtraction	Apply understanding of addition and subtraction to solve problems
Build basic geometric concepts by using the student's physical world to identify and describe shapes	Reason about the attributes of and compose and decompose geometric shapes and develop an understanding of linear measurement	Lay the foundation for geometric concepts such as area and volume and develop an understanding for the need for standard units of linear measurement

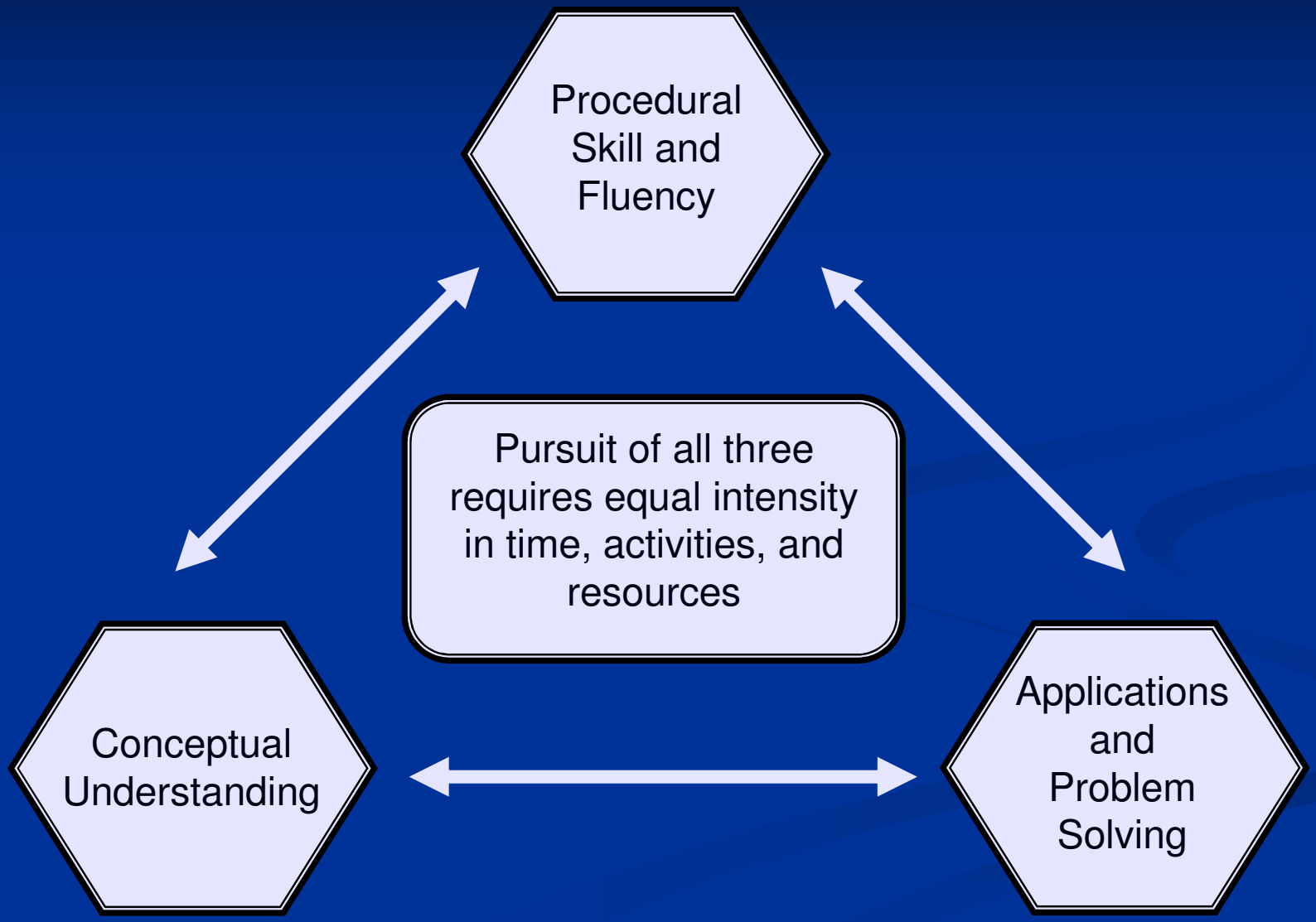
Critical Areas of Focus for Mathematics Grades 3 - 5

Grade 3	Grade 4	Grade 5
Expand student's understanding of number to include fractions, especially unit fractions	Apply previous experiences with multiplication, division, and place value to develop an understanding of multi-digit factors and multi-digit dividends	Apply student's knowledge of place value and operations on whole numbers to decimal fractions and two-digit divisiors
Develop an understanding of the meaning of and strategies for the operations of multiplication and division making freqeunt connections to the concept of area	Apply previous experiences with addition, subtraction, multiplication, and fraction equivalence to operate on fractions with like denominators and multiplying a fraction by a whole number	Apply previous experiences with operations on fractions to extend to unlike denominators, multiplying two fractions, and using the relationship between multiplication and division to understand ideas surrounding the division of fractions
Reason with shapes and their attributes	Classify geometric figures by specific properties	Develop an understanding of volume

Critical Areas of Focus for Mathematics Grades 6 - 8

Grade 6	Grade 7	Grade 8
Apply previous experiences with multiplication, division, and fractions to develop understanding of rate and ratio as well as completing concepts concerning dividing fractions	Build on previous experiences with ratio to introduce proportional relationships and apply this understanding to scale drawings	Apply previous experiences with linear expressions and equations to extend to systems of equations and use this understanding to represent, analyze, and solve a variety of problems
Expand student's understanding of the number system with the introduction of negative integers and introduce algebraic expressions and equations	Apply student's knowledge of the four basic operations and inverse relationships to rational numbers and solve linear equations	Build on student's experiences with linear equations to introduce the concept of function as a description of a relationship where one quantity is determined by another
Develop statistical thinking	Solve problems with two- and three-dimensional figures, area, surface area, and volume and draw statistical inferences from sample populations	Investigate the geometric concepts of similarity, congruence, and the Pythagorean Theorem

The Common Core State Standards in Mathematics require a balance of:



Common Core Fluency Standards for Mathematics Grades K – 6

All students must achieve these standards by the end of the school year.

Grade K
K.OA5 – Fluently add and subtract within 5.

Grade 1
1.OA.6 – Add and subtract within 20, ***demonstrating fluency for addition and subtraction within 10***.

Grade 2
2.OA.2 - Fluently add and subtract within 20, by the end of Grade 2, know from memory all sums of two one-digit numbers.

Grade 3
3.NBT.2 - Students fluently add and subtract within 1000 using strategies and algorithms based on place value, properties of operations, and/or the relationship between addition and subtraction.
3.OA.7 - Students fluently multiply and divide within 100. By the end of grade 3, they know all products of two one-digit numbers from memory.

Grade 4
4.NBT.4 - Students fluently add and subtract multidigit whole numbers using the standard algorithm.

Grade 5
5.NBT.5 - Students fluently multiply multidigit whole numbers using the standard algorithm

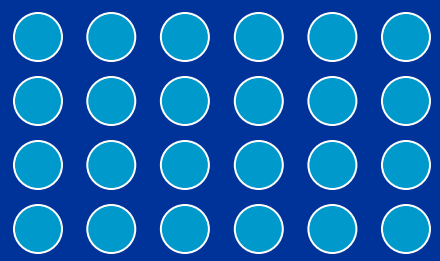
Grade 6
6.NS.2 - Students fluently divide multidigit numbers using the standard algorithm. This is the culminating standard for several years' worth of work with division of whole numbers.
6.NS.3 - Students fluently add, subtract, multiply, and divide multidigit decimals using the standard algorithm for each operation. This is the culminating standard for several years' worth of work relating to the domains of Number and Operations in Base Ten, Operations and Algebraic Thinking, and Number and Operations — Fractions.

Knowing vs Understanding

What is the difference between knowing and understanding?

Students know 4 x 6 = 24

Students understand 4 x 6 = 24



6 + 6 + 6 + 6

What does 6 x 5 = ?

Show Grade 3

Shallow testing of place values concepts means that shallow teaching of them is rewarded.

Name: _____

Hundreds, Tens and Ones

a. 234 = _____ hundreds, _____ tens, _____ ones

b. 809 = _____ hundreds, _____ tens, _____ ones

c. 571 = _____ hundreds, _____ tens, _____ ones

d. 160 = _____ hundreds, _____ tens, _____ ones

e. 67 = _____ hundreds, _____ tens, _____ ones

f. _____ = 3 hundreds, 4 tens, 8 ones

g. _____ = 6 hundreds, 0 tens, 2 ones

h. _____ = 0 hundreds, 0 tens, 5 ones

i. _____ = 0 hundreds, 7 tens, 0 ones

j. _____ = 9 hundreds, 9 tens, 9 ones

5) 3 hundreds = _____

6) 106 = __1__ hundred + _____ tens + _____ ones

7) 106 = _____ tens + _____ ones

8) 106 = _____ ones

9) 90 + 300 + 4 = _____

Are these comparisons true or false?

10) 2 hundreds + 3 ones > 5 tens + 9 ones

11) 9 tens + 2 hundreds + 4 ones < 924

Standards of Mathematical Practices

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.

Grouping the practice standards

1. Make sense of problems and persevere in solving them
6. Attend to precision

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

Reasoning and explaining

4. Model with mathematics

5. Use appropriate tools strategically

Modeling and using tools

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Seeing structure and generalizing

Why?

How do you know?

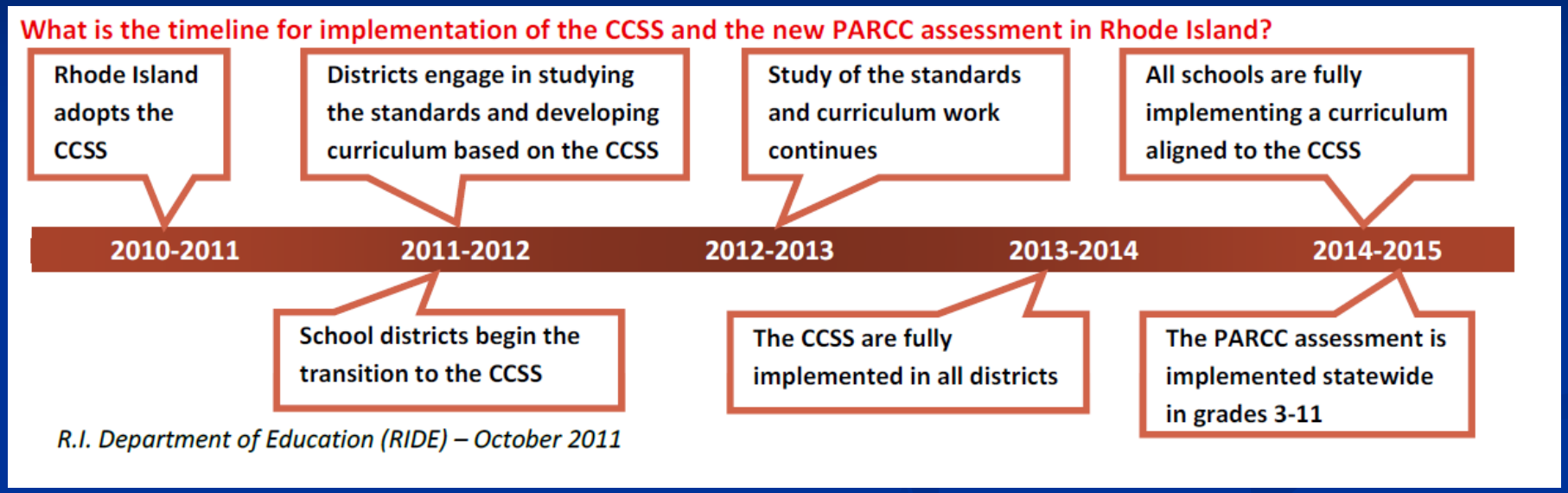
Can you explain?

The PARCC Assessment

The PARCC Partnership will begin field testing the new assessments in the 2012-2013 school year, with full operational administration scheduled to begin in 2014-15. This is an aggressive timeline that will require a strategy that draws on state policymakers, district and school officials, and classroom teachers to ensure a successful and efficient implementation and transition.

2010-11 School Year: Launch and design phase
2011-12 School Year: Development begins
2012-13 School Year: First year pilot/field testing and related research and data collection
2013-14 School Year: Second year pilot/field testing and related research and data collection
2014-15 School Year: Full operational administration of PARCC assessments
Summer 2015: Set achievement levels, including college-ready performance levels

Rhode Island



The 3-8 PARCC assessments will be delivered at each grade level and will be based directly on the Common Core State Standards. The distributed PARCC design includes four components

1. Optional Diagnostic assessments in reading, writing and mathematics.

2. Optional Mid-year assessments in ELA/literacy and mathematics.

3. **Performance-Based Assessment (PBA) Administered after 3rd quarter**

   All students participating in the PARCC assessments will take a performance-based assessment in which they will apply their knowledge to a complex problem and produce a product. It will be administered as close to the end of the school year as possible, and the results will be factored into a student's summative assessment score.

   In mathematics, students will address a range of tasks focusing on application of concepts, skills and understandings. Students will be asked to solve problems involving the key knowledge and skills for their grade-level (as identified by the CCSS); express mathematical reasoning and construct a mathematical argument; and apply concepts to solve model real-world problems.

4. End-of-Year Assessment (EOY) Administered after approximately 90% of the school year.

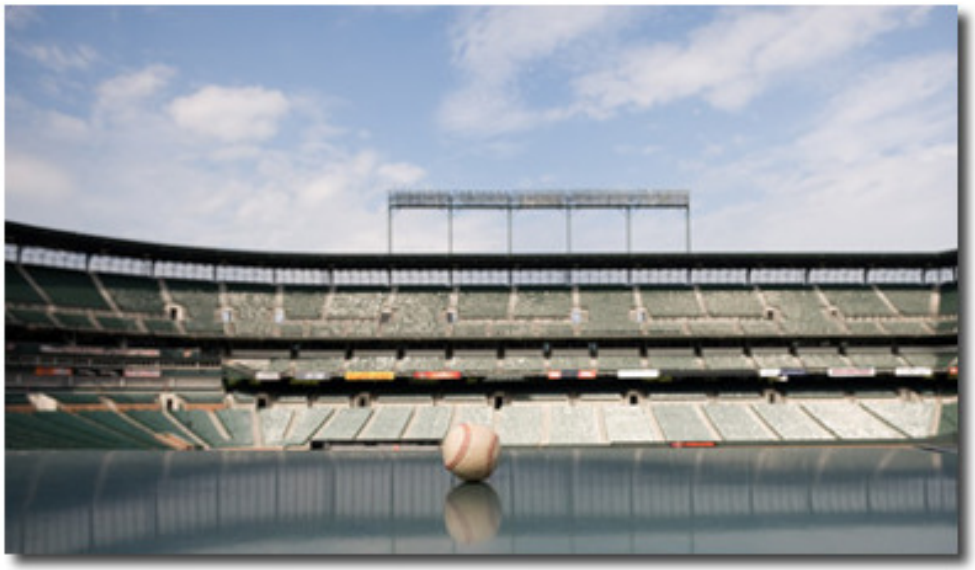
For all grades and subjects, this component will be administered at the end of the school year to all students participating in the PARCC assessments, with the results combined with the performance-based assessment results to produce a student's summative assessment score. The students will respond to computer-based machine-scorable questions to demonstrate their acquired skills and knowledge.

In Grades 3-8, the end-of-year assessments will focus on reading and comprehending complex texts in ELA/literacy. In mathematics, the assessments will focus on demonstrating conceptual understanding of the content of the grade/course, and demonstrating mathematical fluency, when applicable to the grade.

Types of PARCC Tasks

Task Type	Description of Task Type
I. Tasks assessing *concepts, skills and procedures*	▪ Balance of conceptual understanding, fluency, and application ▪ Can involve any or all mathematical practice standards ▪ Machine scorable including innovative, computer-based formats ▪ Will appear on the End of Year and Performance Based Assessment components
II. Tasks assessing *expressing mathematical reasoning*	▪ Each task calls for written arguments / justifications, critique of reasoning, or precision in mathematical statements (MP.3, 6). ▪ Can involve other mathematical practice standards ▪ May include a mix of machine scored and hand scored responses ▪ Included on the Performance Based Assessment component
III. Tasks assessing *modeling / applications*	▪ Each task calls for modeling/application in a real-world context or scenario (MP.4) ▪ Can involve other mathematical practice standards. ▪ May include a mix of machine scored and hand scored responses ▪ Included on the Performance Based Assessment component

Baseball stadiums have different numbers of seats. Drag the tiles to arrange the stadiums from least to greatest number of seats.



San Francisco Giants' stadium: 41,915 seats	Washington Nationals' stadium: 41,888 seats	San Diego Padres' stadium: 42,445 seats

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Write your answer to the following problem in your answer booklet.

San Francisco Giants' stadium: 41,915 seats	Washington Nationals' stadium: 41,888 seats	San Diego Padres' stadium: 42,445 seats

Compare these statements from two students.

> Jeff said, "I get the same number when I round all three numbers of seats in these stadiums."
>
> Sara said, "When I round them, I get the same number for two of the stadiums but a *different* number for the other stadium."

Can Jeff and Sara both be correct? Explain how you know.

Numbers of stadium seats (grade 4)

Write your answer to the following problem in your answer booklet.

When rounded to the nearest hundred, the number of seats in Aces Baseball Stadium is 9,100.

What is the greatest number of seats that could be in this stadium? Explain how you know.

Students have developed their understanding of place value in previous grades. Fourth graders are expected to generalize this understanding of place value to multi-digit whole numbers. This three-part task calls for students to demonstrate reasoning skills and a deep conceptual knowledge of place value in atypical ways.

This task uses the securely-held content of rounding to assess the Standards for Mathematical Practice—**MP.3**: Construct viable arguments and critique the reasoning of others and **MP.6**: Attend to precision. Because these practices, and not the content, are the focus of the task, it is considered a "practice forward" task.

Part a is designed to allow students an accessible entry into the content, asking them to sequence three large numbers using drag-and-drop technology. This technology enables students to test their ideas about number relationships before submitting their answer electronically.

In **Parts b and c**, students must think deeply about what rounding means in terms of the sizes of numbers and their relationships to one another. Knowing the rules of rounding and place value is not sufficient for students to answer the questions and explain their thinking. **Part b** asks students to critique the work of others (**MP.3**), while **Part c** asks students to justify their conclusions **(MP.3)** and addresses both precise communication and flexible reasoning (**MP.6**).

What do my teachers need to be doing?

Implement the Standards of Mathematical Practice Daily

Why? How do you know? Can you explain?

Be on the lookout for Rich Problems and use them!

9. Which of the following quotients has the greatest value?

A. $0.075 \div 6$ **C.** $0.75 \div 0.06$

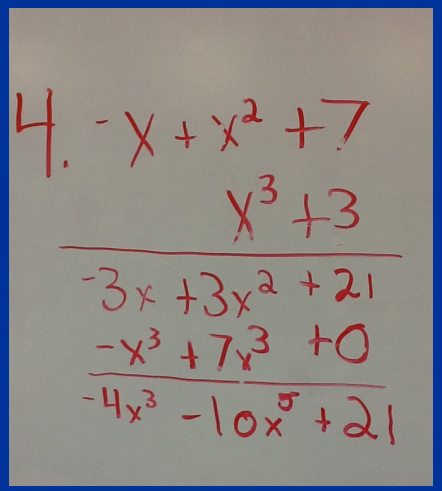
B. $7.5 \div 0.006$ **D.** $0.75 \div 0.6$

13. Is the quotient $4.5 \div 0.9$ greater or less than 4.5? Why?

_____

_____

Use Student Errors as a Teaching Tool



Use the resources on the internet

www.cpsed.net – District's Math Website
www.ride.ri.gov – Learning CCSS

"Implementing Standards of Mathematical Practice for Grade _____"

What can I be doing?

- Perform Walk-Throughs (Invite the math supervisor)
  - Look for the Standards of Mathematical Practices
  - Look for math dialogue.
  - Is the learning conceptual or procedural?
  - Are all the students actively engaged?
- Create the opportunities for "math experts"
  - Teaming
- Create adequate time for math instruction.
  - At least 60 minutes a day.
  - This may be variable for different learners.