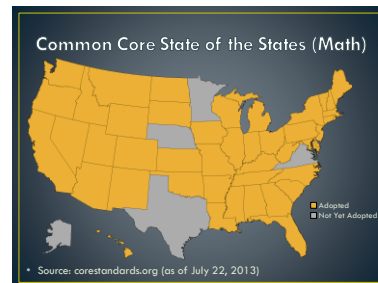


### Solving Real-World Geometry Problems

| High School  | Middle School  | Elementary School  |
|--|--|--|
| <ul style="list-style-type: none"> <li><b>G-GMD.1</b> – Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).</li> <li><b>G-GMD.3</b> – Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.</li> </ul> | <ul style="list-style-type: none"> <li><b>8-G.G.9</b> Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</li> <li><b>7-G.6</b> – Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects.</li> <li><b>6.G.2</b> – Apply the formulas <math>V = lwh</math> and <math>V = bh</math> to find volumes of right rectangular prisms with fractional edge lengths in the context of solving real-world and mathematical problems.</li> </ul> | <ul style="list-style-type: none"> <li><b>1.AG.2</b> – Reason about the operation of multiplication and addition and solve real-world and mathematical problems involving volume.</li> <li><b>4.AG.3</b> – Apply the area and perimeter formulas for rectangles in real world and mathematical problems.</li> <li><b>3.MD.7</b> – Find areas of rectangles by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real-world problems.</li> <li><b>2.MD.1</b> – Measure the length of an object by attaching and counting unit-length strips such as paper, unlined tape.</li> <li><b>1.MD.2</b> – Express the length of an object in whole number of length units.</li> <li><b>1.AG.1</b> – Describe measurable attributes of objects, such as length or weight. Describe several measurable attributes of a single object.</li> </ul> |

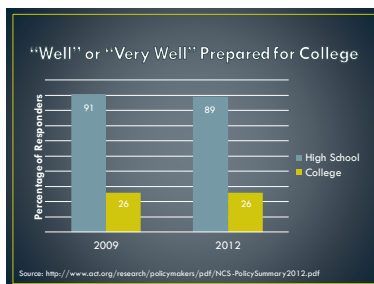
### COMMON CORE STATE STANDARDS FAQ

- What are the Common Core State Standards?
- Where did they come from?
  - National Governors Association (NGA) and the Council of Chief State School Officers (CCSSO).
  - Race to the Top funding
  - “Internationally benchmarked standards and assessments that prepare students for success in college and the work place.”
- Who has adopted them?



### COMMON CORE STATE STANDARDS FAQ

- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
- Why do we need them?
  - What is the purpose of K-12 Ed?
    - College readiness
    - ACT National Curriculum Survey
    - Surveyed 9,937 educators.



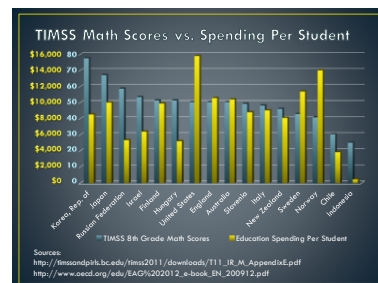
### COMMON CORE STATE STANDARDS FAQ

- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
- Why do we need them?
  - What is the purpose of K-12 Ed?
    - College readiness
    - Career readiness
    - Association of American Colleges and Universities survey
    - Survey over 300 employers with at least 25 employees and many new hires.

Source: [http://www.aacu.org/leap/documents/093\\_EmployerSurvey.pdf](http://www.aacu.org/leap/documents/093_EmployerSurvey.pdf)

### COMMON CORE STATE STANDARDS FAQ

- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
  - What is the purpose of K-12 Ed?
    - International comparison
    - Trends in International Mathematics and Science Study (TIMSS)
    - Surveyed more than 60 countries / city-states
    - Surveyed more than 20,000 US students in over 1,000 schools.



**COMMON CORE STATE STANDARDS FAQ**

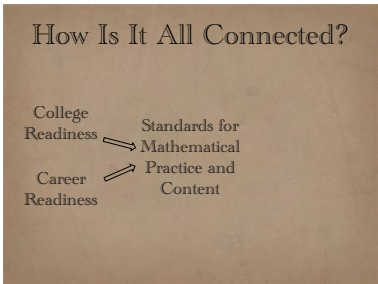
- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
- Why do we need them?
  - What is the purpose of K-12 Ed?
  - International comparison
  - Standardized across the nation
    - Resources
    - Students

**COMMON CORE STATE STANDARDS FAQ**

- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
- Why do we need them?
- What does the research say?
  - A World of Difference article

**COMMON CORE STATE STANDARDS FAQ**

- What are the Common Core State Standards?
- Where did they come from?
- Who has adopted them?
- Why do we need them?
- What does the research say?
- What make up the Common Core State Standards?
  - Practice Standards
  - Content Standards



### Standards for Mathematical Practice

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.

| Model     | Interior Dimensions |                            |                        |                         |                           |                       |                           |                            |                        |                            | Exterior     |             |
|-----------|---------------------|----------------------------|------------------------|-------------------------|---------------------------|-----------------------|---------------------------|----------------------------|------------------------|----------------------------|--------------|-------------|
|           | Max. display height | Front (display view) (in.) | Front (top view) (in.) | Front (back view) (in.) | Side (display view) (in.) | Side (top view) (in.) | Side (display view) (in.) | Depth (display view) (in.) | Depth (top view) (in.) | Depth (display view) (in.) | Length (in.) | Width (in.) |
| Acura ILX | 5                   | 58                         | 47                     | 23                      | 50                        | 27.5                  | 15                        | NA                         | NA                     | NA                         | 179          | 71          |
| Acura RLX | 5                   | 58.5                       | NA                     | NA                      | 57                        | NA                    | NA                        | NA                         | NA                     | NA                         | 196          | 74          |
| Acura TL  | 5                   | 58                         | 42                     | 3.5                     | 55.5                      | 28.5                  | 3                         | NA                         | NA                     | NA                         | 184          | 74          |
| Acura TLX | 5                   | 56.5                       | 45.5                   | 3.5                     | 54.5                      | 28.5                  | 3                         | NA                         | NA                     | NA                         | 186          | 73          |
| Audi A4   | 5                   | 58                         | 41.5                   | 3.5                     | 54                        | 28.5                  | 3                         | NA                         | NA                     | NA                         | 185          | 72          |
| Audi A6   | 5                   | 58                         | 44                     | 4                       | 53                        | 29                    | 3                         | NA                         | NA                     | NA                         | 191          | 74          |

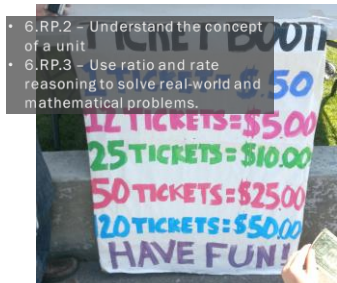


### SMP Breakdown

- On your poster:
  - Explain your Standard for Mathematical Practice in your own words
  - List why it was or was not demonstrated in the money pile problem.
- Be prepared to share.

### Connection to CCSS ELA

- Reading 7 - Integrate and evaluate content presented in diverse media and formats, including visually and quantitatively, as well as in words.
- Writing 1 - Write arguments to support claims in an analysis of substantive topics or texts using valid reasoning and relevant and sufficient evidence.
- Speaking & Listening 4 - Present information, findings, and supporting evidence such that listeners can follow the line of reasoning.

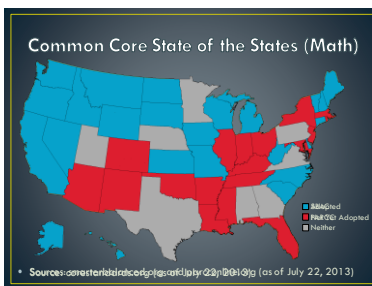
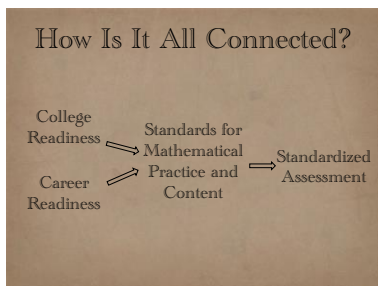


- 6.RP.2 – Understand the concept of a unit
- 6.RP.3 – Use ratio and rate reasoning to solve real-world and mathematical problems.

### The Reality

- What does “best” mean?
  - 120 tickets for \$50 is “best” because you get the most tickets
  - 1 ticket for \$0.50 is “best” because you spend the least amount of money
- “What do you need to know to solve the problem?”
  - How many tickets will we use?
  - How long will we be staying there?
  - How many people are we going with?
  - How many tickets do the rides cost?
- Once they started working, they had no idea what to do.
  - They didn’t realize that they could buy multiple sets of tickets.

### STUDENT WORK SAMPLES



### SMARTER BALANCED ASSESSMENT

- Students in grades 3 through 8 and grade 11 will be assessed.
- Computer adaptive
- Both electronic and human scoring.
- Interim assessments
- Practice tests released on May 29<sup>th</sup>.

### SMARTER BALANCED PROBLEM TYPES

- Selected-response items – Prompt students to select one or more responses from a set of options.

### 3

Look at the figure.

Each square in the figure is 1 square unit.  
 Which equation shows the area of this figure in square units?

Ⓐ  $8 + 6 + 8 + 6 = 28$  square units  
 Ⓑ  $8 + 8 + 8 + 8 + 8 = 40$  square units  
 Ⓒ  $6 + 6 + 6 + 6 + 6 + 6 = 42$  square units  
 Ⓓ  $6 + 6 + 6 + 6 + 6 + 6 + 6 = 48$  square units

Source: <https://sbacpt.tds.airast.org/student/>

### 7

Choose all the shapes that are quadrilaterals.

Source: <https://sbacpt.tds.airast.org/student/>



**1**

The graph of  $y = x^2$  is shown on the grid.

Drag the graph to show  $y = (x - 4)^2 + 2$ .

Source: <https://sbacpt.tds.airast.org/student/>

**SMARTER BALANCED PROBLEM TYPES**

- Selected-response items
- Technology-enhanced items
- Constructed-response items
  - Students produce a text and/or numerical response in order to collect evidence about their knowledge or understanding.

Source: <http://sampleitems.smarterbalanced.org/itempreview/sbac/>

**Look**

**For full credit (2 points):**

- Student reaches the correct conclusion.

**AND**

- Student provides sufficient reasoning to support this conclusion.

**For partial credit (1 point):**

- Student reaches the correct conclusion but does not provide sufficient reasoning to support this conclusion.

**OR**

- Student does not reach the correct conclusion but provides reasoning to support this conclusion that contains a minor conceptual or computation error.

Source: <https://sbacpt.tds.airast.org/student/>

**For full credit (2 points):**

- Student reaches the correct conclusion.

**AND**

- Student provides sufficient reasoning to support this conclusion.

**For partial credit (1 point):**

- Student reaches the correct conclusion but does not provide sufficient reasoning to support this conclusion.

**OR**

- Student does not reach the correct conclusion but provides reasoning to support this conclusion that contains a minor conceptual or computation error.

Source: <https://sbacpt.tds.airast.org/student/>

**SMARTER BALANCED PROBLEM TYPES**

- Selected-response items
- Technology-enhanced items
- Constructed-response items
- Performance tasks
  - Measure a student's ability to integrate knowledge and skills across multiple standards.

Source: <http://sampleitems.smarterbalanced.org/itempreview/sbac/>

**Performance Tasks**

- Elementary School: Planting Tulips
- Middle School: Taking a Field Trip
- High School: Thermometer Crickets

**Smarter Balanced Pilot Test**

- To take the SBAC pilot test, go to: <https://sbacpt.tds.airast.org/student>

**BREAKING DOWN THE CONTENT STANDARDS**

- Domain and Conceptual Categories

**Domain and Conceptual Categories**

|                                       | K | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | HS |
|---------------------------------------|---|---|---|---|---|---|---|---|---|----|
| Counting & Cardinality                |   |   |   |   |   |   |   |   |   |    |
| Number and Operations in Base Ten     |   |   |   |   |   |   |   |   |   |    |
| Ratios and Proportional Relationships |   |   |   |   |   |   |   |   |   |    |
| Number and Operations - Fractions     |   |   |   |   |   |   |   |   |   |    |
| The Number System                     |   |   |   |   |   |   |   |   |   |    |
| Number and Quantity                   |   |   |   |   |   |   |   |   |   |    |
| Operations and Algebraic Thinking     |   |   |   |   |   |   |   |   |   |    |
| Expressions and Equations             |   |   |   |   |   |   |   |   |   |    |
| Algebra                               |   |   |   |   |   |   |   |   |   |    |
| Functions                             |   |   |   |   |   |   |   |   |   |    |
| Geometry                              |   |   |   |   |   |   |   |   |   |    |
| Measurement and Data                  |   |   |   |   |   |   |   |   |   |    |
| Statistics and Probability            |   |   |   |   |   |   |   |   |   |    |
| Statistics & Probability              |   |   |   |   |   |   |   |   |   |    |

Source: <http://www.doe.jhu.edu/element/curriculum/hoursandminutes/standards-common-core-standards>

### BREAKING DOWN THE CONTENT STANDARDS

- Domain and Conceptual Categories
- Reading the Content Standards

**Domain**

↓

Operations and Algebraic Thinking 4.OA

↓

**Cluster**

↓

**Standards**

**Use the four operations with whole numbers to solve problems.**

1. Interpret a multiplication equation as a comparison, e.g., interpret  $35 = 5 \times 7$  as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations.
2. Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.<sup>1</sup>
3. Solve multistep word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding.

**Gain familiarity with factors and multiples.**

4. Find all factor pairs for a whole number in the range 1–100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1–100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1–100 is prime or composite.

**Generate and analyze patterns.**

### BREAKING DOWN THE CONTENT STANDARDS

- Domain and Conceptual Categories
- Understanding the standards

**Illustrative Mathematics**

HOME  
ILLUSTRATIONS  
K-8 STANDARDS  
HIGH SCHOOL STANDARDS  
PRACTICE STANDARDS  
FRACTIONS PROGRESSIONS  
PRACTICES IN K-5 GRADE  
COMMUNITY  
ABOUT US  
TIMES OF USE

**K-8 Standards**  
**High School Standards**  
**Practice Standards**

Illustrative Mathematics provides guidance to states, assessment consortia, policy makers, and curriculum developers in developing the scope and sequence of mathematics content for students. Resources are created, implemented, and refined by the Illustrative Mathematics community. For more information, visit [www.illustrativemathematics.org](http://www.illustrativemathematics.org).

| Geometry                          |  |                                 |  |  |                                       |  |  |           |  |
|-----------------------------------|--|---------------------------------|--|--|---------------------------------------|--|--|-----------|--|
| Measurement and Data              |  |                                 |  |  | Statistics and Probability            |  |  |           |  |
| Number and Operations in Base Ten |  |                                 |  |  | The Number System                     |  |  |           |  |
| Operations and Algebraic Thinking |  |                                 |  |  | Ratios and Proportional Relationships |  |  |           |  |
| Counting and Cardinality          |  | Number and Operations—Fractions |  |  | Expressions and Equations             |  |  | Functions |  |

Show only illustrated standards (7)  
Show standards automatically (7)

| Grade 3                           |  |                                 |  |  |                                       |  |  |           |  |
|-----------------------------------|--|---------------------------------|--|--|---------------------------------------|--|--|-----------|--|
| Measurement and Data              |  |                                 |  |  | Statistics and Probability            |  |  |           |  |
| Number and Operations in Base Ten |  |                                 |  |  | The Number System                     |  |  |           |  |
| Operations and Algebraic Thinking |  |                                 |  |  | Ratios and Proportional Relationships |  |  |           |  |
| Counting and Cardinality          |  | Number and Operations—Fractions |  |  | Expressions and Equations             |  |  | Functions |  |

Show only illustrated standards (7)  
Show standards automatically (7)

**Number and Operations—Fractions**

**Grade 3** 3.NF

- Develop understanding of fractions as numbers**
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  $1/b$ . (see illustrations)
  2. Understand a fraction  $a/b$  as a number on the number line; represent fractions on a number line diagram. (see illustrations)
    - a. Represent a fraction  $1/b$  on a number line diagram by marking the interval from 0 to 1 as the whole and partitioning it into  $b$  equal intervals. Recognize that each part has size  $1/b$  and that the endpoint of the part starting at 0 locates the number  $1/b$  on the number line.
    - b. Represent a fraction  $a/b$  on a number line diagram by marking off  $a$  lengths  $1/b$  from 0. Recognize that the resulting interval has size  $a/b$  and that its

### Content Standards Review

- Read your course standards
  - Introduction
  - Overview
  - Course differences
- Reference standards on [illustrativemathematics.org](http://illustrativemathematics.org)
- Review standards for one or more grade levels above and below

### NEXT STEPS

- Standards for Mathematical Practice
  - Talking and writing about mathematics
- Rigor
  - Application
  - Conceptual understanding
  - Procedural skill and fluency

### Contact

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