Common Core Standards: Implementation of Content and Practices in the Mathematics Classroom

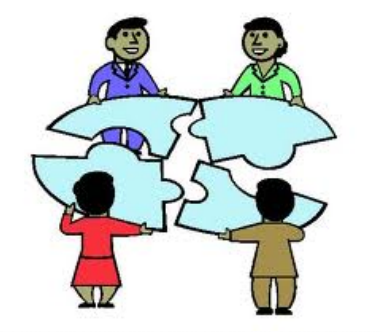
Presented by the Rhode Island Department of Education

Workshop Goals:

- To develop a common understanding of integrating the CCSS and other related documents when making decisions about teaching, learning, and assessment.

- To explore the Standards of Mathematical Practice with specific connections to content and rigor.

Group Norms:



- Understand that those who work, learn.
- Phrase questions for the benefit of everyone.
- Challenge ideas, not people.
- Share talk time equitably.
- Recognize that everyone has an expertise.

Where are we now?

- Choose the car that best represents your transition to the CCSS in mathematics.

Activate and Connect:

- What do you know about the CCSS for mathematics?
- What is one question that you have about the CCSS for mathematics?

The Common Core State Standards are made up of two corresponding and connected sets of standards:

- **STANDARDS FOR MATHEMATICAL PRACTICES**

  A set of 8 standards that describe habits of mind used by a mathematically expert student. They are the processes and proficiencies that are important in mathematics education.

- **STANDARDS FOR MATHEMATICAL CONTENT**

  Define what students should understand and be able to do in their study of mathematics. They stress balancing procedure and conceptual understanding of key ideas.

Math CCSS – Treasure Hunt

What are the 8 Standards for Mathematical Practice?
1.
2.
3.
4.
5.
6.
7.
8.

List the page #

What is found at the beginning of each grade level ~~and Conceptual Category?~~

What is an „Ah ha" you have about the K-8 Standards?

An „Oh No!"?

Look at the Domains in the following grade levels:
Kindergarten – Third Grade -
Sixth Grade – High School –
Discuss your findings with your group.

Find a footnote at your grade level.

Interpret what it means.

Look over "How to Read the Grade Level Standards." What is the Common Core equivalent to the Rhode Island Standards?

Content Area

__Mathematics__

Strand

__Domain__

Stem

__Cluster Heading

List the Domains in your grade level:

Find Tables 1 & 2 in the Glossary.
What is their purpose?

Who should use these?

CCSS Grade Level Study

- WHOLE GROUP:
  - Read the introduction and overview for your grade level.
  - Discuss the key ideas contained on these pages.

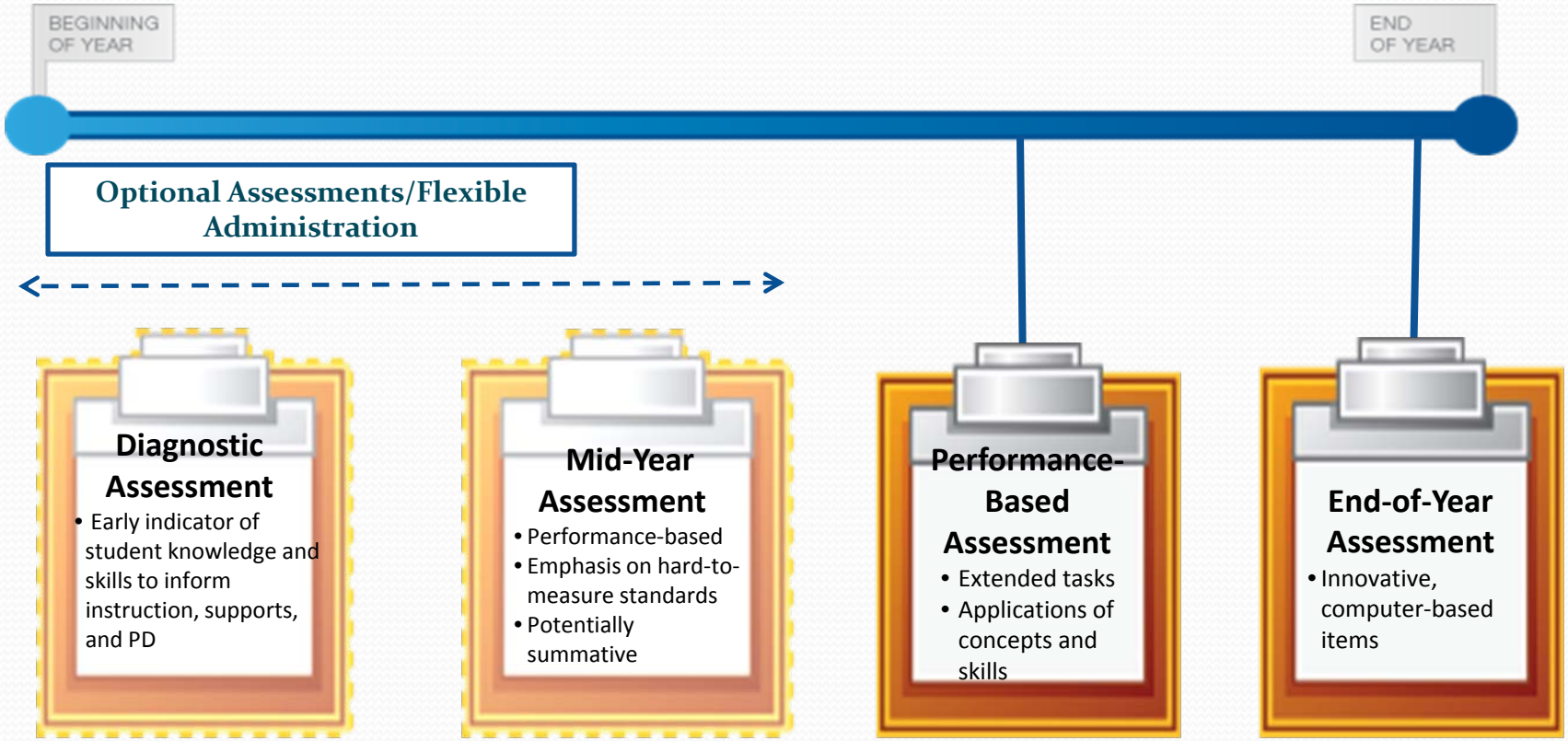
PARCC: Goal #1: Create High Quality Assessments

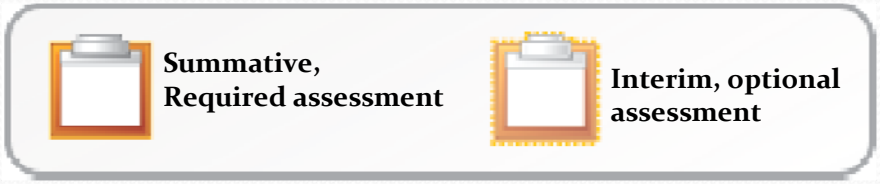
The PARCC assessments will allow us to make important claims about students' mathematical knowledge and skills.

Specifically, whether students:

- Have mastered knowledge and skills in highlighted domains (e.g. domain of highest importance for a particular grade level – number/ fractions in grade 4; proportional reasoning and ratios in grade 6)
- Have attained overall proficiency in mathematics

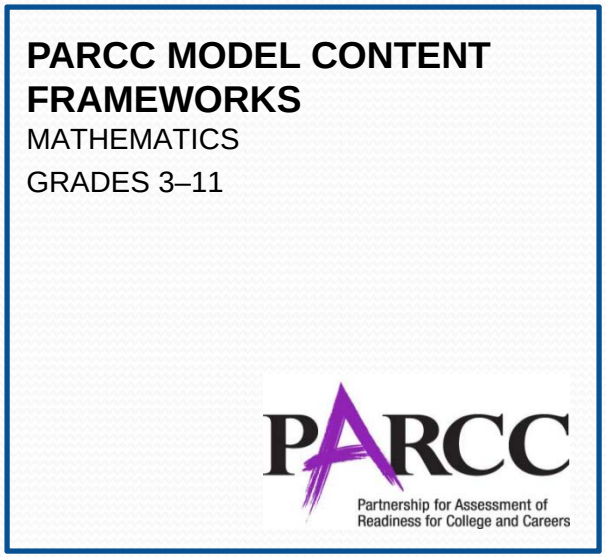
PARCC Assessment Design Mathematics, Grades 3-11





PARCC = Partnership for Assessment of Readiness for College and Careers

- Find and highlight the major clusters for your grade level.



CCSS/PARCC Grade Level Study

- WHOLE GROUP:
  - Discuss the connections you see between the CCSS introduction and overview and the major clusters identified in the PARCC document.
- INDIVIDUALLY:
  - Compare your current math curriculum with the content in these two documents.
  - Record your findings on the organizer:
    - What is similar?
    - What is different?

Instructional Focus

- Post your findings on your grade level chart:

What curricular areas should be emphasized?	What curricular areas should be de-emphasized?

Learning Progressions: Examining the Content

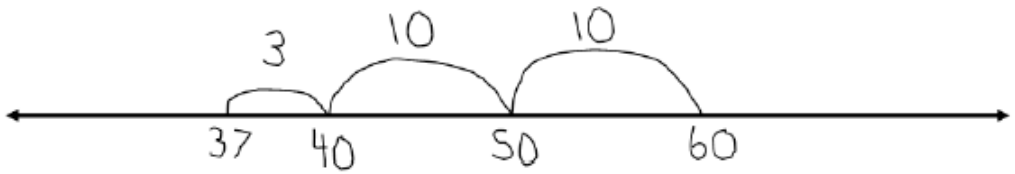
- Narrative documents
- Describe the development of a topic across a number of grade levels
- Informed by research on children's cognitive development
- Linked to the logical structure of mathematics
- Useful in organizing curriculum and informing instruction

Example of a Shift in Instructional Focus: Number Line Use in CCSS

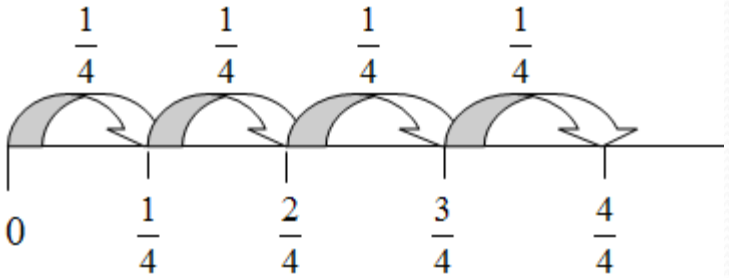
1st Grade: Add based on knowledge of place value & properties

I used a number line. I started at 37. Then I broke up 23 into 20 and 3 in my head. Next, I jumped 3 to get to 40. I then jumped 10 to get to 50 and 10 more to get to 60. So, there are 60 people on the playground.

37 + 23 =



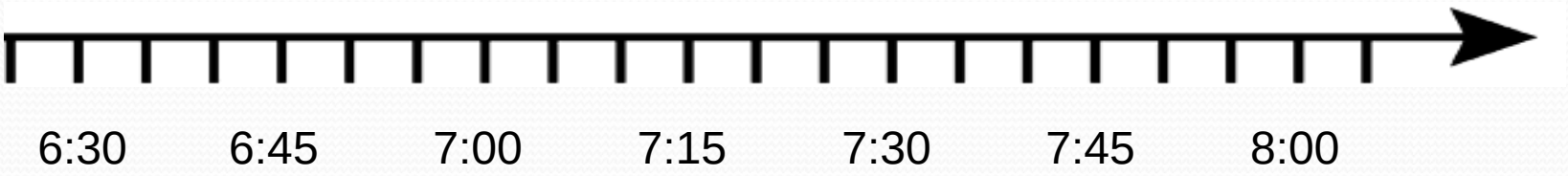
3rd Grade: Understanding unit fractions



Example: Number Line Use in CCSS

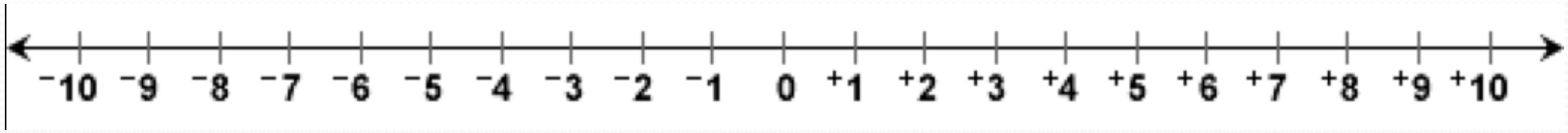
4th Grade: Solve word problems involving intervals of time

At 7:00 a.m. Candace wakes up to go to school. It takes her 8 minutes to shower, 9 minutes to get dressed and 17 minutes to eat breakfast. How many minutes does she have until the bus comes at 8:00 a.m.?



7th Grade: Addition of integers

- 4 + 10 =



Learning Progressions: Examining the Content

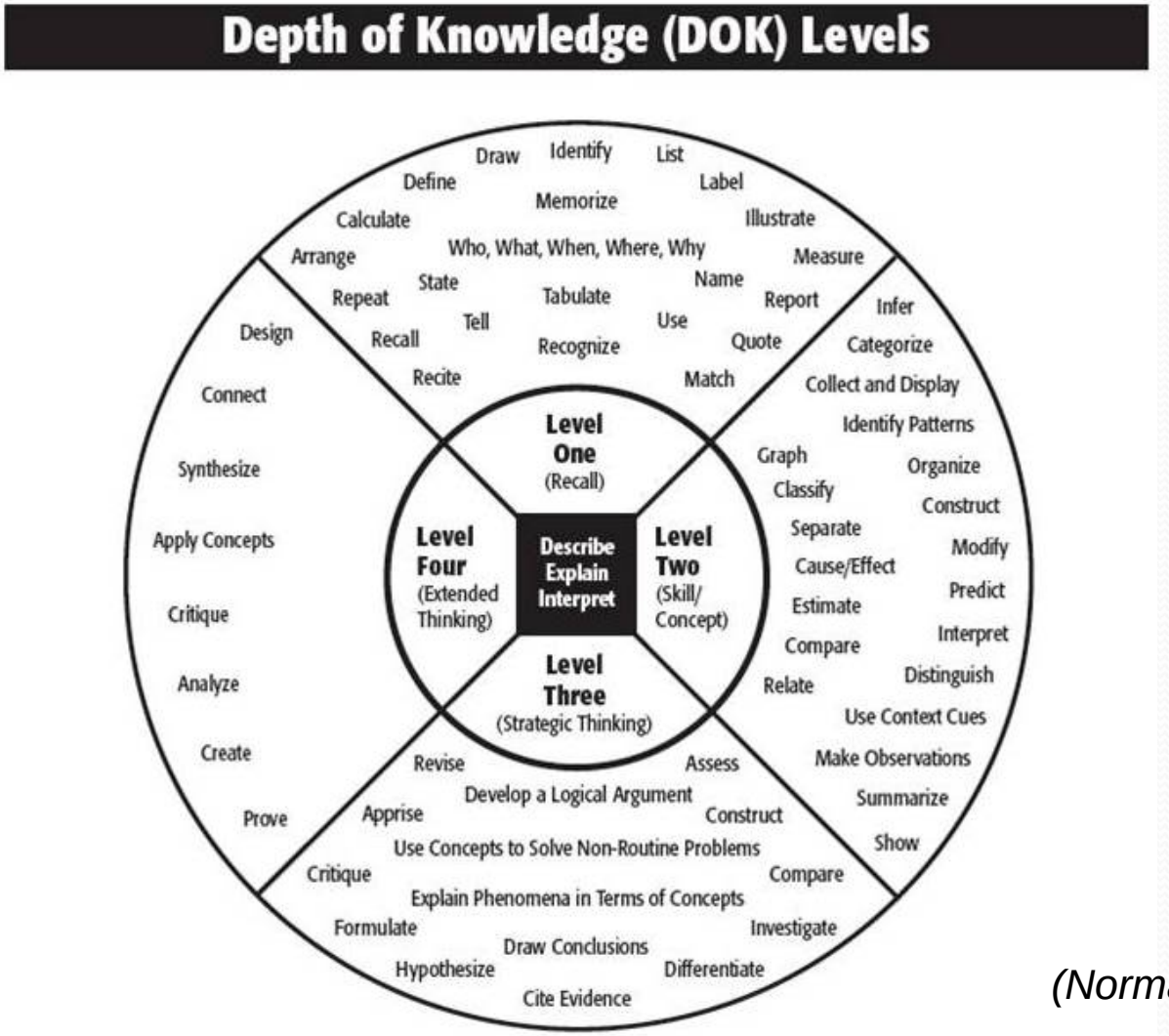
- Read the “Progressions Documents for the Common Core Math Standards” overview pages.
- Locate the information your grade level:
  - Overview section
  - Grade level section
  - References to specific standards

Learning Progressions: Examining the Content

- Independently:
  - Read through your assigned standard.
  - Highlight content, concepts, and skills.
  - Record your thinking by completing the *Protocol for Deconstructing a Standard (#1-5)*

- As a group:
  - Share their models and key ideas. (#6)

Exploring Rigor:



(Norman Webb)

http://vimeo.com/20998609

Analyzing Tasks for Rigor:

A

Make true equations. Write one number in every space. Draw a picture if it helps.

1) 1 hundred + 4 tens = _____
2) 4 tens + 1 hundred = _____
3) 14 tens = 10 tens + ___ tens
= __ hundred + 4 tens
= _____
4) 7 ones + 5 hundreds = ____
5)106 =
1 hundred + __ tens + __ones
6) 106 = ___tens + __ones
7) 106 = _____ones
8) 90 + 300 + 4 = _____

Are these comparisons true or false?

9) 2 hundreds + 3 ones >
5 tens + 9 ones
10) 9 tens + 2 hundreds + 4
ones < 924
11) 456 < 5 hundreds

B

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

C

The chart below shows the numbers of visitors at four parks last year.

Park Visitors Last Year

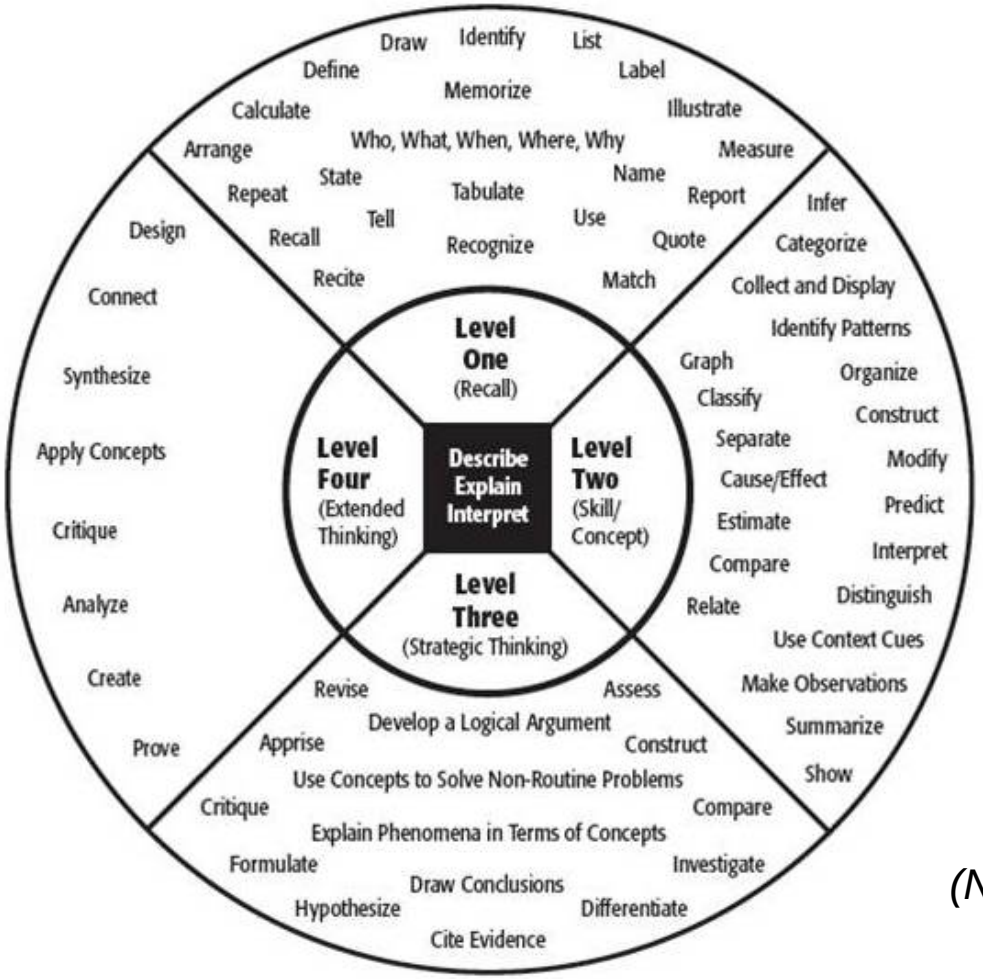
Park	Number
River Park	8346
Oak Park	9103
Lake Park	9088
Green Park	6299

Which park had the most visitors last year?

Ⓐ River Park
Ⓑ Oak Park
Ⓒ Lake Park
Ⓓ Green Park

Exploring Rigor:

Depth of Knowledge (DOK) Levels



(Norman Webb)

Standards for Mathematical Practice

- Jigsaw the eight practices
  - Read and highlight key points
  - Give an example

- Share & Chart

Common Core State Standards for MATHEMATICS

Mathematics | Standards for Mathematical Practice

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important “processes and proficiencies” with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council’s report *Adding It Up*: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one’s own efficacy).

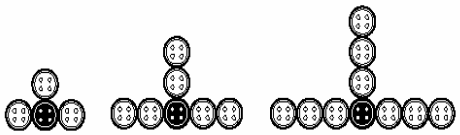
Examining Mathematical Tasks:

- Individually complete your grade level task.
- As a group, identify the key:
  - Standards for Mathematical Content
  - Standards for Mathematical Practice

Buttons

This problem gives you the chance to:
- describe, extend, and make generalizations about a numeric pattern

Gita plays with her grandmother's collection of black and white buttons.
She arranges them in patterns.
Her first 3 patterns are shown below.



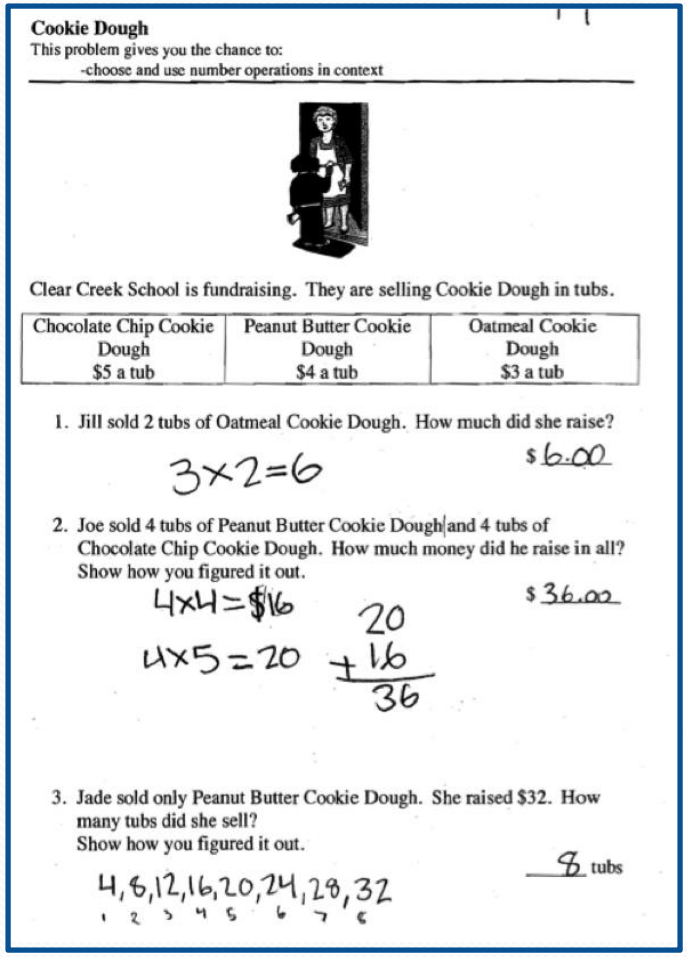
Pattern 1 Pattern 2 Pattern 3 Pattern 4

1. Draw Pattern 4 next to Pattern 3.
2. How many **white** buttons does Gita need for Pattern 5 and Pattern 6?

Pattern 5 _____ Pattern 6 _____

Looking at Student Work

- Analyze and annotate student work as related to the practice and content standards.
- How well does this exemplify rigorous practice?



Cookie Dough

This problem gives you the chance to:

-choose and use number operations in context

Clear Creek School is fundraising. They are selling Cookie Dough in tubs.

Chocolate Chip Cookie Dough $5 a tub	Peanut Butter Cookie Dough $4 a tub	Oatmeal Cookie Dough $3 a tub

1. Jill sold 2 tubs of Oatmeal Cookie Dough. How much did she raise?

   3x2=6 $ 6.00

2. Joe sold 4 tubs of Peanut Butter Cookie Dough and 4 tubs of Chocolate Chip Cookie Dough. How much money did he raise in all? Show how you figured it out.

   4x4=$16 $ 36.00

   4x5=20

   20 + 16 = 36

3. Jade sold only Peanut Butter Cookie Dough. She raised $32. How many tubs did she sell? Show how you figured it out.

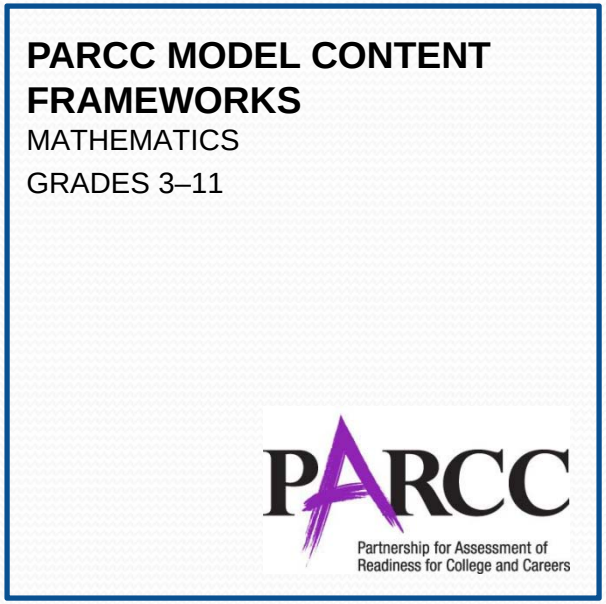
   8 tubs

   4, 8, 12, 16, 20, 24, 28, 32

   1 2 3 4 5 6 7 8

PARCC and the Practices

- Revisit your grade level PARCC document
- Locate the Examples of Opportunities for Connecting Mathematical Content and Mathematical Practices section
- Discuss & Share

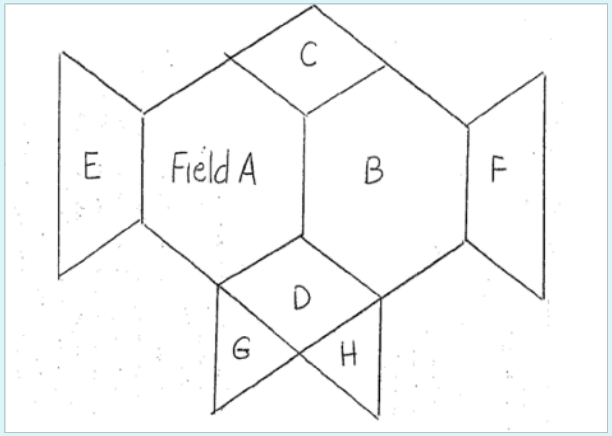


Applying What You've Learned

- Construct a mathematical task to connect:
  - Major content
  - Representation from the learning progression
  - Standard for Mathematical Practice

Farmer Fred

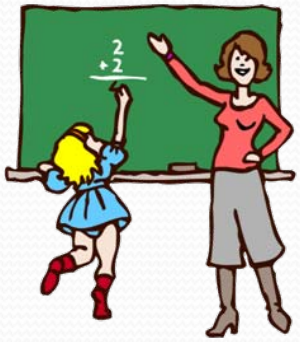
Farmer Fred's fields are worth twelve hundred dollars total. The fields are formed with the same properties as your pattern blocks. Each field's value is based on its size. What fraction of the total value is each field worth? How much is each field worth? Show and explain all of your mathematical thinking.



Reflections and Next Steps

- One thing I've learned

- One thing I will bring back to my classroom



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