Math Leadership Network

NWESD

December 2, 2014

Factors and Multiples

A positive whole number less than 100 has a…

- remainder 2 when it is divided by 3,
- remainder 3 when it is divided by 4,
- and remainder 4 when it is divided by 5.

What is its remainder when it is divided by 7?

Make a prediction.

Explain your strategy to group. Decide as group who had the most efficient strategy and why you believe it was most efficient.

Group Discussions ?

- Interventions
- Digital Library
- SBAC Training
- Item Specs

Number Talks

- Ruth Parker: Jan 28-29
- NWESD from 8:30-3:30 PM
- 12 clock hours
- $225 in cost

Implications of the Task

Discuss in grade bands:

What patterns do you see in the students' work?

What evidence do you have to support your answer?

What common misconceptions did you notice?

What experiences in mathematics do we need to provide our students?

Focusing on Student Learning

Record your students scores in Content and Claim 3.

What were common themes around the mathematical content and practices that you noticed?

What are the implications for your math instructional practices?

Implications of the Task

What did you learn from the analyzing student work protocol about upcoming instruction?

What part of the process was the most difficult to accomplish? Why?

What mathematics do students need to experience?

Extension of work with Math Practice 3

MP3: Construct viable arguments and critique the reasoning of others.

Choose a task from Illustrative Mathematics at your grade level.

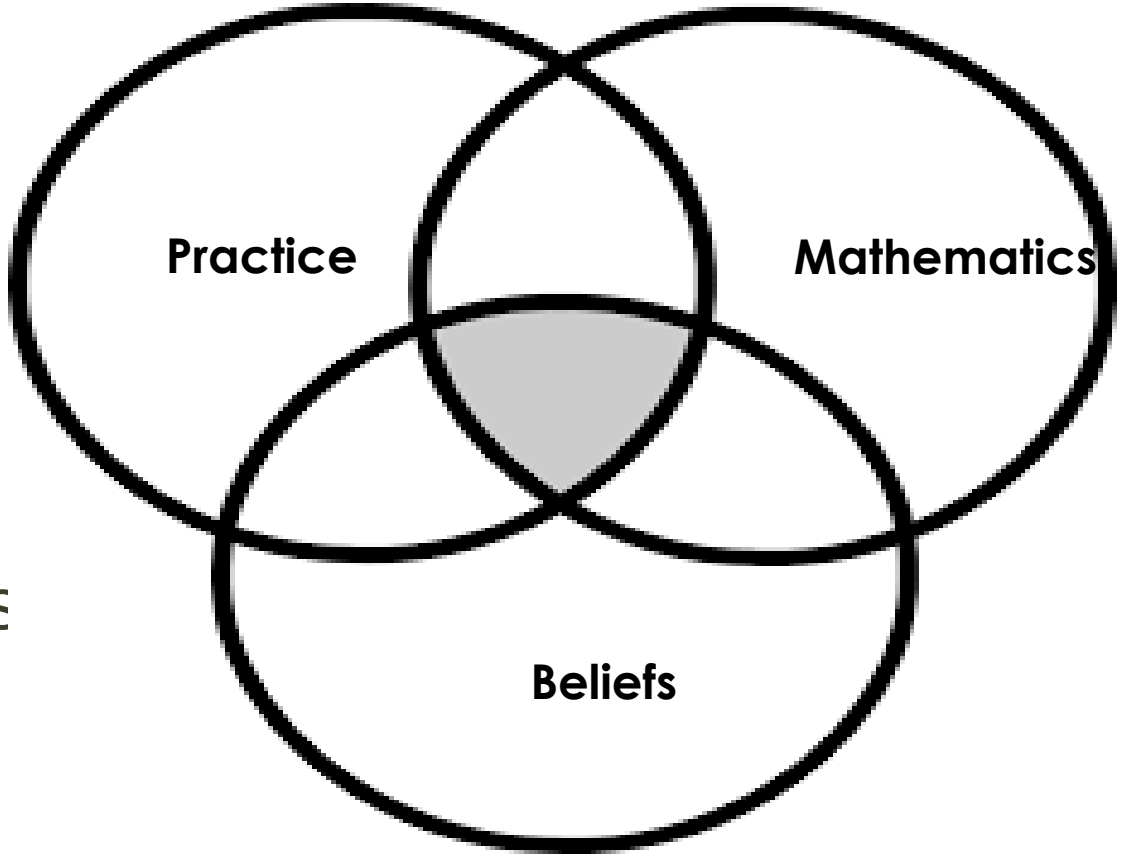
How does the task you chose and teacher's actions contribute to student access of MP3?

Beliefs

"Teachers' beliefs influence the decisions that they make about the manner in which they teach mathematics… Students' beliefs influence their perception of what it means to learn mathematics and their dispositions toward the subject." (NCTM, 2014)

Productive and Unproductive Beliefs

On a 3x5 card, individually brainstorm **Productive** and **Unproductive Beliefs** teachers have about mathematics.



Principals To Action

Jigsaw the 8 Mathematical Teaching Practices.

With a partner, illustrate for the group what your Teaching Practice looks like in a classroom.

- Name of your practice
- Behaviors an observer would see in a classroom addressing your practice
- Some steps teachers or coaches could take for students so they can access the practice

Next Steps

Choose one of the practices to take back to your building or district.

Share with your reading partner how you will incorporate the practice in your classroom or in your work at buildings or in the district.

Be ready to share how the work went at the next Math Leadership Network, March 12th.

NWESD MSP SURVEY

http://bit.ly/nwesd_msp

LUNCH

Smarter Balanced mathematics assessments were written to address and include the following principles:

- Assessments are part of an integrated system and designed around learning progressions
- Assessments include evidence of student performance on challenging tasks that evaluate Common Core standards of 21st century learning
- Educators involved in development and scoring
- Assessments are structured to continuously improve teaching and learning
- Assessment, reporting, and accountability systems provide useful information on multiple measures that is educative for all stakeholders.

SBAC Claims

Claim 1- Concepts and Procedures
(MP 5, 6, 7 and 8)
Claim 2- Problem Solving
(MP 1, 5, 7 and 8)
Claim 3-Communicate Reasoning
(MP 3 and 6)
Claim 4-Modeling and Data Analysis
(MP 2,4 and 5)

Claim 1 Grades 3-8

Claim 1 Assessment Targets

4.OA.A

4.OA.B

4.OA.C

4.NBT.A

4.NBT.B

Operations and Algebraic Thinking 4.OA

Use the four operations with whole numbers to solve problems.

1. Interpret a multiplication equation as a comparison, e.g., interpret 35 = 5 × 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.[1]
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.

5. Generate a number or shape pattern that follows a given rule. Identify apparent features of the pattern that were not explicit in the rule itself. *For example, given the rule "Add 3" and the starting number 1, generate terms in the resulting sequence and observe that the terms appear to alternate between odd and even numbers. Explain informally why the numbers will continue to alternate in this way.*

Number and Operations in Base Ten[2] 4.NBT

Generalize place value understanding for multi-digit whole numbers.

1. Recognize that in a multi-digit whole number, a digit in one place represents ten times what it represents in the place to its right. *For example, recognize that 700 ÷ 70 = 10 by applying concepts of place value and division.*
2. Read and write multi-digit whole numbers using base-ten numerals, number names, and expanded form. Compare two multi-digit numbers based on meanings of the digits in each place, using >, =, and < symbols to record the results of comparisons.
3. Use place value understanding to round multi-digit whole numbers to any place.

Use place value understanding and properties of operations to perform multi-digit arithmetic.

4. Fluently add and subtract multi-digit whole numbers using the standard algorithm.
5. Multiply a whole number of up to four digits by a one-digit whole number, and multiply two two-digit numbers, using strategies based on place value and the properties of operations. Illustrate and explain the calculation by using equations, rectangular arrays, and/or area models.

A

B

C

D

E

Claim 1

$$4 \times 2 \times \square = 5 \times 2 \times 2 \times 2$$

Target B [m]: Understand properties of multiplication and the relationship between multiplication and division.

Claim 2

- Problems that include a layer of related concepts and standards
- Can be solved using different strategies
- Solution path is not immediately obvious

Claim 2

Example of a short answer task for Claim #2

"Toys for Charity" **(First-year**  **Algebra)**

Phil and Cathy want to raise money for charity. They decide to make and sell wooden toys.
They could make them in two sizes: small and large.

Phil will carve them from wood. A small toy takes 2 hours to carve and a large toy takes 3 hours to carve.
Phil only has a total of 24 hours available for carving.

Cath will decorate them. She only has time to decorate 10 toys.

The small toy will make $8 for charity.
The large toy will make $10 for charity.

They want to make as much money for charity as they can.

How many small and large toys should they make?

How much money will they then make for charity?

For the above example, scaffolding could prompt the student to think about questions like:

1. If they were to make only small toys, how much money would they make for charity?
2. If they were to make 2 small toys, how many large ones could they also make?

Claim 3

- Items will typically present a proposed solution to a problem or the beginning of a generalization and ask students to provide a justification, explanation or a counter-example

- Students will have to demonstrate proficiency and rigor in their reasoning (conceptual understanding, fluency, application)

Claim 3 Task

Example of a standard proof task

Math – Grade 11	Item Type: CR	DOK: (Webb 1- 4) 3

Domain(s): Geometry

Content Cluster(s) and/or Standard(s):

G.CO **Prove** geometric theorems

G.CO.11 **Prove** theorems about parallelograms.

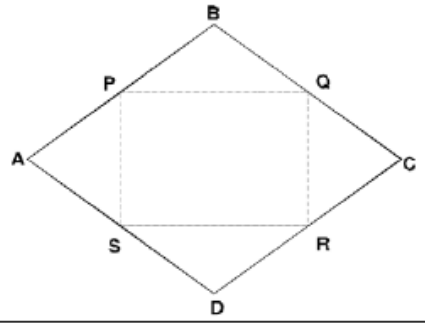
Claim #3 Assessment Targets
Target B: Construct, autonomously, chains of reasoning that will justify or refute propositions or conjectures.

Target C: State logical assumptions being used.

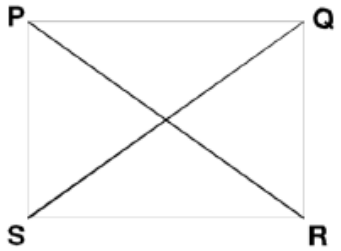
Target F: Base arguments on concrete referents such as objects, drawings, diagrams, and actions.

The Envelope

Unfolded envelope



Folded envelope

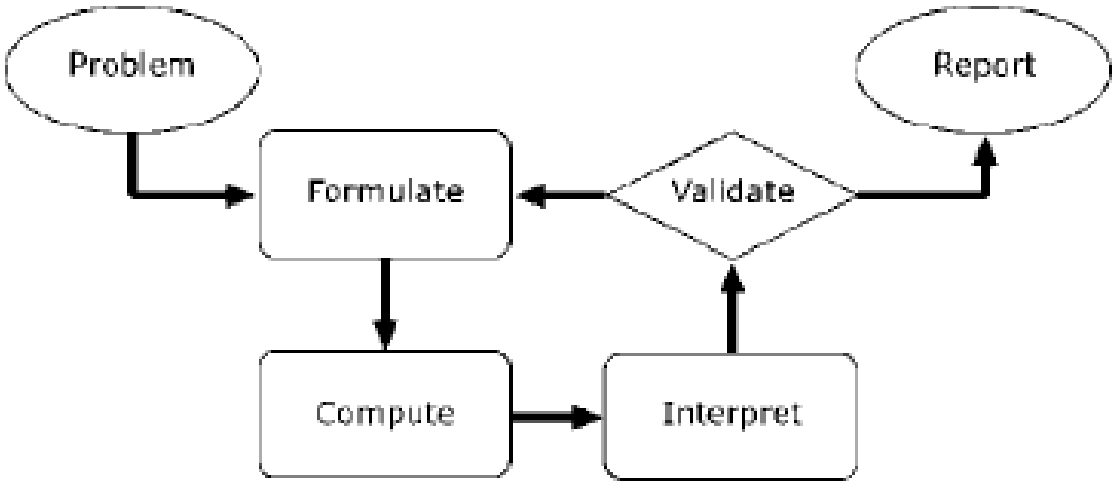


Prove that when the rectangular envelope (PQRS) is unfolded, the shape obtained (ABCD) is a rhombus.

Claim 4

- Application of mathematics in everyday life
- Modeling used to bridge school math with real world math
- Students formulate a model
- Assumptions are made
- Data is selected or estimated

Claim 4



Claim 4 - Performance Tasks

Planning a Class Trip

You and your friends on the Class Activities Committee are charged with deciding where this year's class trip will be. You have a fixed budget for the class and you need to figure out what will be the most fun and affordable option. Your committee members have collected a bunch of brochures from various parks - e.g., Marine World, Great Adventure, and others (see inbox of materials) - which have different admissions costs and are different distances from school. You have also collected information about the costs of meals and buses. Your job is to plan and justify a trip that includes bus fare, admission and possibly rides, as well as lunch, within the fixed budget the class has.

Group Discussions

- Interventions
- Digital Library
- SBAC Training
- Item Specs