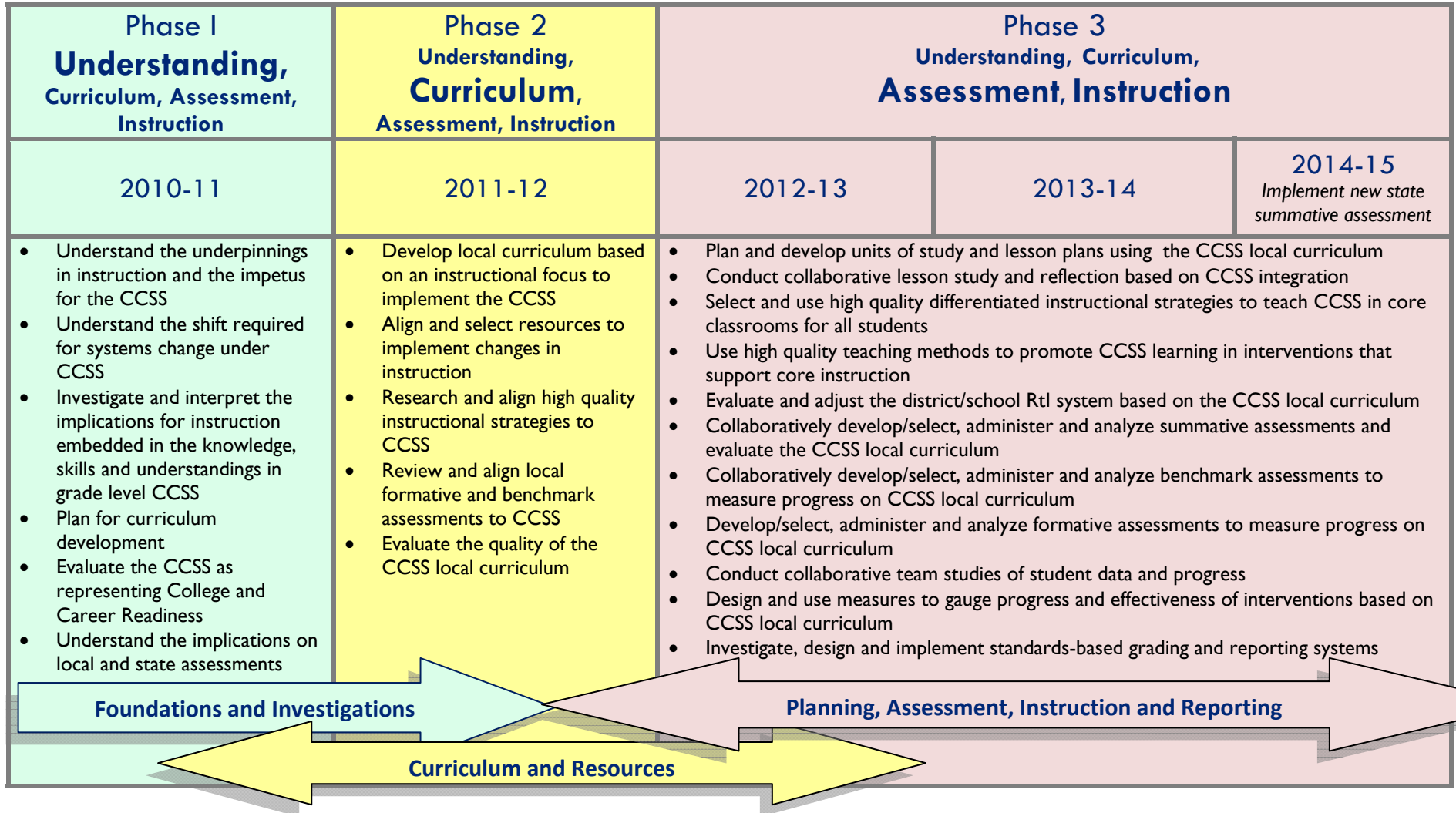


Wisconsin Common Core State Standards (CCSS)
Focusing Instruction to Create Better-Prepared Learners
“The Work of School Districts”
Phase-by-Phase Roll Out

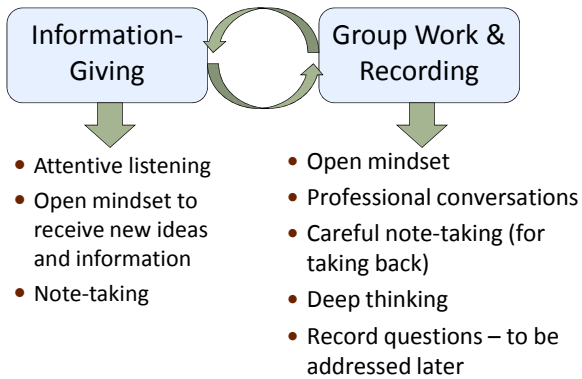


To investigate, you will need ...

1. Print out of the **Mathematics Common Core State Standards**, K-12 (*Appendix A will not be used today*)
2. The *Investigations Guide*
3. Highlighters
4. Pen or pencil
5. Calculator (optional)
6. Tables for group work
7. Timer/timekeeper

7

Ground Rules for Today



8

Now ... for some background information

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Impetus for the Common Core State Standards

- Currently, **every state has its own** set of academic standards, meaning public educated students are learning different content at different rates
- All students must be **prepared to compete** with not only their American peers in the next state, but with students around the world

This initiative will potentially affect 43.5 million students which is about 87% of the student population

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CCSS Evidence Base

Standards from individual high-performing countries and provinces were used to inform content, structure, and language. Writing teams looked for examples of rigor, coherence, and progression.

Mathematics

Belgium (Flemish)
Canada (Alberta)
China
Chinese Taipei
England
Finland
Hong Kong
India
Ireland
Japan
Korea
Singapore

English language arts

Australia
New South Wales
Victoria
Canada
Alberta
British Columbia
Ontario
England
Finland
Hong Kong
Ireland
Singapore

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Development of Common Core Standards

- Joint initiative of:



- Supported by:
 - Achieve
 - ACT
 - College Board

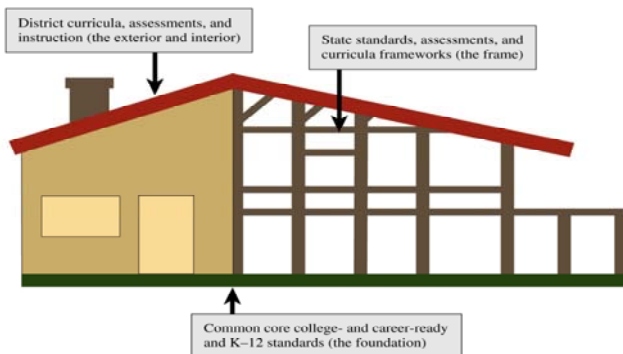
12

Why are common core state standards good for: **students?**

- **College & Career Focus.** It will help prepare students with the knowledge and skills they need to succeed in college and careers
- **Consistent.** Expectations will be consistent for all kids and not dependent on a student's zip code
- **Mobility.** It will help students with transitions between states
- **Student Ownership.** Clearer standards will help students understand what is expected of them and allow for more self-directed learning by students

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A Vision for Implementation



Investigating the the Standards:

CCSS Grade 4 Mathematics

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Learning Progressions

In addition, the “sequence of topics and performances” that is outlined in a body of mathematics standards must also respect what is known about [how students learn](#). As Confrey (2007) points out, developing “sequenced obstacles and challenges for students...absent the insights about [meaning](#) that derive from careful study of learning, would be unfortunate and unwise.”

In recognition of this, the development of these Standards began with [research-based learning progressions](#) detailing what is known today about how students’ mathematical knowledge, skill, and understanding develop over time.” CCSS page 4.

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Activity #1

Focus Area Narratives

Important **descriptions** at the beginning of each grade level.

- Provide the **intent** of the mathematics at each grade.
- Provide 3-4 **critical focus areas** for the grade level .
- Provide a sense of ...
 - the sophistication for mathematical understanding at the grade level.
 - the learning progressions for the grade.
 - extensions from prior standards.
 - what’s important at the grade level.

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Activity #1

Grade Level Intent

Mathematics | Grade 4

In Grade 4, instructional time should focus on three critical areas: (1) developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends; (2) developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers; (3) understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry.

(1) Students generalize their understanding of place value to 1000,000; understanding the relative sizes of numbers in each place. They apply their understanding of models for multiplication (equal-sized groups, arrays, area models), place value, and properties of operations, in particular the distributive property, as they develop, discuss, and use efficient, accurate, and generalizable methods to compute products of multi-digit whole numbers. Depending on the numbers and the context, they select and accurately apply appropriate methods to estimate or mentally calculate products. They develop fluency with efficient procedures for multiplying whole numbers; understand and explain why the procedures work based on place value and properties of operations; and use them to solve problems. Students apply their understanding of models for division, place value, properties of operations, and the relationship of division to multiplication as they develop, discuss, and use efficient, accurate, and generalizable procedures to find quotients involving multi-digit dividends. They select

Grade 4 Narrative

Open your CCSS Mathematics Standards Documents – turn to page 27 for grade 4.

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Activity #1: Investigating Grade Level Intent

Task:

- **Note** the descriptions of critical focus areas described on page 27 for grade 4.
- **Divide** the grade level focus areas among table partners and read the descriptions.
- Use the organizers provided to **note** what you discover and think about the 4th grade standard's intent.
- **Discuss your thinking** with your table partners about all of the critical focus areas.
- Watch the **Timer** to close this activity when the time is up.

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Activity #1

Investigating the Grade Level Intent

Task:

- Note the descriptions of critical focus areas described on page 27 for grade 4.
- Divide the grade level focus areas among table partners and read the descriptions.
- Use the organizers below to note what you discover and think about the 4th grade standard's intent.
- Discuss your thinking with your table partners about all of the critical focus areas.

4th Grade Critical Area 1: developing understanding and fluency with multi-digit multiplication, and developing understanding of dividing to find quotients involving multi-digit dividends

INTENT:

4th Grade Critical Area 2: developing an understanding of fraction equivalence, addition and subtraction of fractions with like denominators, and multiplication of fractions by whole numbers

INTENT:

4th Grade Critical Area 3: understanding that geometric figures can be analyzed and classified based on their properties, such as having parallel sides, perpendicular sides, particular angle measures, and symmetry

INTENT:

Activity #2

Investigating the Content Standards' Structure

Task:

- Go to page 5 of the Mathematics Standards to review the components of the content standards structure.
- See the standards provided in the table below.
- Scavenger Hunt for each standard, find all the elements (Cluster, Domain and Grade/Conceptual Category), and note them in the table below.

Standard	Cluster	Domain	Grade
<p>Compare two fractions with different numerators and different denominators, e.g., by creating common denominators or numerators, or by comparing to a benchmark fraction such as $\frac{1}{2}$. Recognize that comparisons are valid only when the two fractions refer to the same whole. Record the results of comparisons with symbols $>$, $=$, or $<$, and justify the conclusions, e.g., by using a visual fraction model.</p>			
<p>Make a line plot to display a data set of measurements in fractions of a unit ($\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$). Solve problems involving addition and subtraction of fractions by using information presented in line plots. <i>For example, from a line plot find and interpret the difference in length between the longest and shortest specimens in an insect collection.</i></p>			
<p>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.</p>			

Standards for Mathematical Practices

“The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students.”

CCSS page 6

Standards for Mathematical Practices

1. *Make sense of problems and persevere in solving them*
2. *Reason abstractly and quantitatively*
3. *Construct viable arguments & 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*

Refer to Page 6 in the standards

The Practices, continued

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).

Activity #3: Investigating the Practices

Task:

- Read the problem provided. Determine the **important mathematics necessary** for the problem.
- List the **key grade level content standard(s)** for the sample problem.
- Choose **two mathematical practices**: 1)Sense-making and Persevering, 2)Abstract & Quantitative Reasoning, 3)Constructing Arguments & Critiquing, 4)Modeling, 5)Using Tools Strategically, 6)Attending to Precision, 7)Recognizing & Using Structure, and 8)Looking for and Expressing Regularity in Repeated Reasoning.
- When completing the sample problem, consider how students might demonstrate the chosen Mathematical Practices at **Rudimentary and Sophisticated stages** of development.
- Describe **characteristics in students' thinking and actions** that you might observe for each practice in the chart provided.
- Watch the **Timer** to close this activity when the time is up.

Activity #3

Investigating the Standards for Mathematical Practice

Task (4th grade):

- Read the problem at right. Determine the important mathematics necessary for this problem.
- List the key 4th grade content standard(s) for the sample problem:
- Choose two mathematical practices: **1)Sense-making and Persevering, 2)Abstract & Quantitative Reasoning, 3)Constructing Arguments & Critiquing, 4)Modeling, 5)Using Tools Strategically, 6)Attending to Precision, 7)Recognizing & Using Structure, and 8)Looking for and Expressing Regularity in Repeated Reasoning.**
- When completing the sample problem, consider how students might demonstrate the chosen Mathematical Practices at **Rudimentary** and **Sophisticated** stages of development.
- Describe characteristics in students' thinking and actions that you might observe for each practice in the chart below.

Sample 4th grade Mathematics Problem:

Support your answer to the following questions with a sketch:

- How many fifths are there in a whole?
- How many thirds are there in $2\frac{1}{3}$?
- How many $\frac{2}{5}$ are there in 4?

How could the problems above be represented as multiplication and addition problems (number sentences)?

Important Mathematics Necessary for this Problem		Key 4 th Grade Content Standard(s) for this Problem
Standard for Mathematical Practice	Characteristics of Rudimentary Practice Mathematical Practices <i>(What might students be thinking and doing?)</i>	Characteristics of Sophisticated Practice Mathematical Practices <i>(What might students be thinking and doing?)</i>
Practice #1:		
Practice #2:		

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Activity # 4

Investigating the Domains

Task:

- Note the domains for 4th grade start on page 29 of the standards document. Domain by domain, read the cluster headings and complete the next steps.
- Use the organizer below to note key words, phrases and skills that are important to the development of the concepts within each domain and cluster heading. Circle any words, phrases or skills that are unfamiliar.
- Write the number of standards that correspond to each cluster heading in the boxes provided.
- Discuss your thinking with your table partners about all of the Domain observations.

	Domains				
	Operations & Algebraic Thinking	Number & Operations in Base Ten	Number & Operations— Fractions	Measurement & Data	Geometry
<p><u>Cluster Headings:</u></p> <p>Concepts and Skills being developed</p>	<input type="checkbox"/> Use the four operations with whole numbers to solve problems <input type="checkbox"/> Gain familiarity with factors and multiples <input type="checkbox"/> Generate and analyze patterns	<input type="checkbox"/> Generalize place value understanding for multi-digit whole numbers <input type="checkbox"/> Use place value understanding and properties of operations to perform multi-digit arithmetic	<input type="checkbox"/> Extend understanding of fraction equivalence and ordering <input type="checkbox"/> Build fractions from unit fractions by applying and extending previous understandings of operations on whole numbers <input type="checkbox"/> Understand decimal notation for fractions, and compare decimal fractions	<input type="checkbox"/> Solve problems involving measurement and conversion of measurements from a larger unit to a smaller unit <input type="checkbox"/> Represent and interpret data <input type="checkbox"/> Geometric measurement: understand concepts of angle and measure angles	<input type="checkbox"/> Draw and identify lines and angles, and classify shapes by properties of their lines and angles
<p><u>Building Understanding:</u></p> <p>Key words, phrases and skills in the standards that support development of the concept(s)</p>					

Activity #5

Investigating Mathematical Understanding

Task:

- Read the paragraph “Understanding mathematics” on page 4 of the standards.
- Discuss the approach of these standards toward developing mathematical understanding.
- Discuss the differences between a student who can use a mnemonic device and one who can explain where the mnemonic comes from.
- Discuss ...
 - What is “mathematical understanding” in your view?
 - How would you describe the relationship between procedural skill and mathematical understanding?
- Note your thoughts in the chart below.

Mnemonic is a word meaning memory **device**. The word mnemonic (pronounced nee.MON.ik) is used (1) as a noun meaning a device, such as a formula or rhyme, that helps a person remember something or (2) as an adjective meaning aiding memory.

Approach to Understanding

Difference Between Using a Mnemonic and Explaining It

What is “mathematical understanding?”

Relationship between procedural skill and mathematical understanding

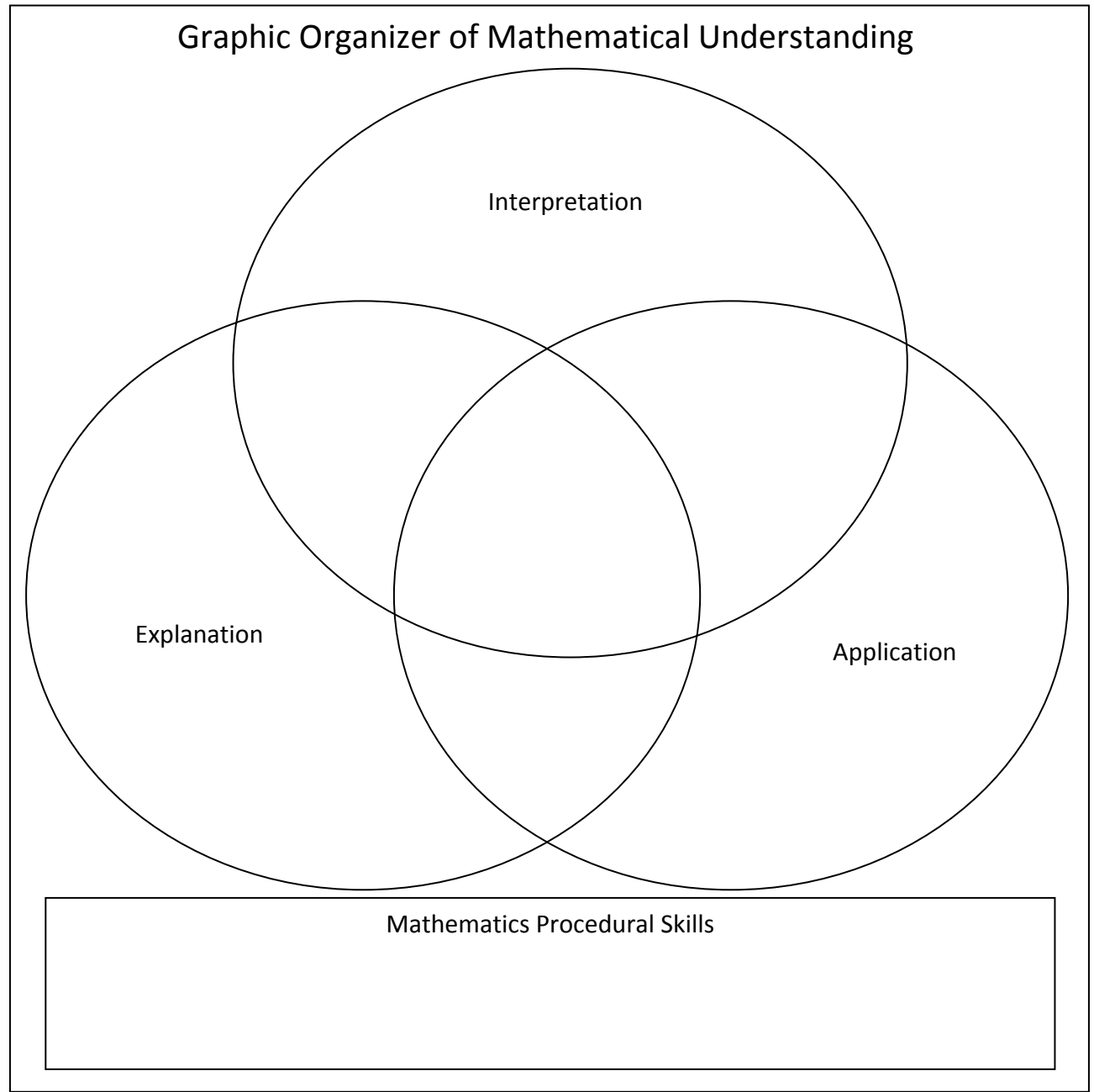
Activity # 6
Investigating the Expectations
of Understanding

Task

4th Grade investigation

- Highlight the verbs/verb phrases for each standard in the grade level.
- Write the verb phrases in the Graphic Organizer at right according to three facets of understanding – interpretation, explanation, application and procedural skills.
- Discuss the expectations for student understanding in these standards.

Notes on Student Expectations



Activity # 7

Investigating Two Standards

Task

- Write the essence of the standards in student-friendly language, list key vocabulary, and identify the corresponding mathematical practices (from page 6) for this standard.
- Repeat these steps with the other standard provided.
- Discuss your understanding of these standards. What implications do these standards pose for staff professional development?

<p>Grade 4. Measurement & Data</p> <p>5. Recognize angles as geometric shapes that are formed wherever two rays share a common endpoint, and understand concepts of angle measurement:</p> <p>a) An angle is measured with reference to a circle with its center at the common endpoint of the rays, by considering the fraction of the circular arc between the points where the two rays intersect the circle. An angle that turns through $\frac{1}{360}$ of a circle is called a “one-degree angle,” and can be used to measure angles.</p> <p>b) An angle that turns through n one-degree angles is said to have an angle measure of n degrees.</p>	<p>Grade 4. Number & Operations in Base Ten</p> <p>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.</p>	
<p>Student-Friendly Language</p> <p><i>What would you post in your classroom to explain the essence of the standard you are teaching to students?</i></p>	<p>Key Vocabulary Within the Standard</p> <p><i>What key vocabulary is important for students in this standard?</i></p>	<p>Mathematical Practices</p> <p><i>Which practices should students be displaying to meet this standard?</i></p>
<p>4th Grade, Measurement & Data, Standard 5</p>		
<p>4th Grade, Number & Operations in Base Ten, Standard 5</p>		
<p>Implications for Staff Professional Development</p>		

Activity # 8

Investigating Vertical Connections

Task:

- Given the standards in the chart below, find corresponding prior and future standards that focus on the learning progressions one level above or below the given standard (if they exist). Note that you will be looking for standards prior to the given grade level and after the given the grade level.
- Discuss and note these connected standards in the chart below.

Prior Standard	Standard	Future Standard
	<p>4th Grade, Geometry</p> <p>1. Draw points, lines, line segments, rays, angles (right, acute, obtuse), and perpendicular and parallel lines. Identify these in two-dimensional figures.</p>	
	<p>4th Grade, Number & Operations—Fractions</p> <p>4. Apply and extend previous understandings of multiplication to multiply a fraction by a whole number.</p> <p>a. Understand a fraction a/b as a multiple of $1/b$. For example, use a visual fraction model to represent $5/4$ as the product $5 \times (1/4)$, recording the conclusion by the equation $5/4 = 5 \times (1/4)$.</p> <p>b. Understand a multiple of a/b as a multiple of $1/b$, and use this understanding to multiply a fraction by a whole number. For example, use a visual fraction model to express $3 \times (2/5)$ as $6 \times (1/5)$, recognizing this product as $6/5$. (In general, $n \times (a/b) = (n \times a)/b$.)</p>	
	<p>5th Grade, Operations & Algebraic Thinking</p> <p>2. Write simple expressions that record calculations with numbers, and interpret numerical expressions without evaluating them. For example, express the calculation “add 8 and 7, then multiply by 2” as $2 \times (8 + 7)$. Recognize that $3 \times (18932 + 921)$ is three times as large as $18932 + 921$, without having to calculate the indicated sum or product.</p>	

Activity # 9 Determining Implications

Tasks:

- Now that you've started the process of "investigating" the standards, discuss the implications for fellow teachers and staff. Use the chart to note your thoughts.

For Mathematics Teachers. . .	For Special Education Teachers. . .	For ELL Teachers. . .	For Other Mathematics- Related Content Teachers. . .

Activity # 10 Determining Next Steps

- Reflect on the activities completed today. How will you take this process back to your colleagues for investigations at your school/district? Jot your "next steps" in the chart below.

Next Steps for Future Standards Investigations In My School/District			
Task	Timeframe	Resources Needed	Staff Involved

