

5th Grade OAS/PASS Companion Guide

Purpose of the Companion Guide

This companion guide was created during the 2014 convening by educators from Mid-Del, Broken Arrow, Sallisaw, Glenpool, Ada, and Oklahoma City. The convening was an effort to bring educators from across the state together to create resources they thought would be useful for teachers in the coming year. This companion guide was created to provide teachers with:

- Clarification on grade level content standards
- A broad pacing schedule based on the blueprints for testing
- Vertical alignment for the grade levels above and below
- Resources specific to grade level content standards

Table of Contents

One-Page 5th Grade PASS standards

Process Standards

These process standards are the same for Grades K-5 and give students a consistent definition of mathematics to help foster a positive attitude toward their own mathematical abilities. The process standards are a list of skills needed to perform math in any area and promote active involvement, deeper understanding, and conceptual understanding as opposed to content standards that focus on individual topics that need to be learned at a grade level.

- One-Page Process Standards
- Planning and Delivery

Major Concept Vertical Alignment and Pacing Guide

These tools were created during the convening of educators in the summer 2014 to give teachers a broad overview and idea of a timeline. Teachers are encouraged to tweak the timeline to fit the curriculum they are using in their classrooms.

Major Concepts and “I can” statements with Sample Math Tasks

The major concepts are defined in PASS at the beginning of each grade level. The educators at the convening blended them and the highest ranked concepts on the testing blueprints to determine the most important concepts in each grade level as a focus for this document. They took each statement and hunted sample math tasks or lessons to be used as a possible starting point for teachers. There will be/is a page dedicated on okmathteachers.com that will be a running list of these resources and others people will/have added as the year continues. We have tagged these with both PASS and CCSS codes in an effort to help teachers be able to use the millions of shared resources. Teachers need to use their discretion in implementing strategies and activities.

Resources

Comprehensive Reviewed Lesson Banks (Links on OKMathTeachers.com page)
Oklahoma Teachers’ Collection (Links on OKMathTeachers.com page)

How/Where to send Feedback

OSDE Emails/phones
Google Survey?

5th Grade Math | Priority Academic Student Skills

Standard 1: Algebraic Reasoning: Patterns and Relationships - The student will use algebraic methods to describe patterns and solve problems in a variety of contexts.

- 5.1.1** Describe rules that produce patterns found in tables, graphs, and models, and use variables (e.g., boxes, letters, pawns, number cubes, or other symbols) to solve problems or to describe general rules in algebraic expression or equation form.
- 5.1.2** Use algebraic problem-solving techniques (e.g., use a balance to model an equation and show how subtracting a number from one side requires subtracting the same amount from the other side) to solve problems.
- 5.1.3** Recognize and apply the associative property of multiplication.
(e.g., $6 \cdot (2 \cdot 3) = (6 \cdot 2) \cdot 3$)

Standard 2: Number Sense and Operation The student will use numbers and number relationships to acquire basic facts. The student will estimate and compute with whole numbers, fractions, and decimals.

5.2.1 Number Sense

- 5.2.1a** Apply the concept of place value of whole numbers through hundred millions (9 digits) and model, read, and write decimal numbers through the thousandths
- 5.2.1b** Represent with models the connection between fractions and decimals, compare and order fractions and decimals, and be able to convert from one representation to the other to solve problems.
(e.g., use 10x10 grids, base 10 blocks).
- 5.2.1c** Identify and compare integers using real world situations. (e.g., owing money, temperature, or measuring elevations above and below sea level).
- 5.2.1d** * Identify and apply factors, multiples, prime, and composite numbers in a variety of problem-solving situations (e.g., build rectangular arrays for numbers 1-100 and classify as prime or composite, use common factors to add fractions).

5.2.2 Number Operations

- 5.2.2a** Estimate, add, or subtract decimal numbers with same and different place values to solve problems (e.g., $3.72 + 1.4$, $\$4.56 - \2.12).
- 5.2.2b** Estimate add, or subtract fractions (including mixed numbers) to solve problems using a variety of methods (e.g., use fraction strips, use area models, find a common denominator).
- 5.2.2c** Estimate and find the quotient (with and without remainders) with two-digit divisors and a two- or three-digit dividend to solve application problems.

Standard 3: Geometry - The student will apply geometric properties and relationships.

- 5.3.1** Compare and contrast the basic characteristics of circle and polygons (triangles, quadrilaterals, pentagons, hexagons, heptagons, octagons).
- 5.3.2** Classify angles (e.g., acute, right, obtuse, straight).

Standard 4: The student use appropriate units of measure to solve problems in a variety of contexts.

5.4.1 Measurement

- 5.4.1a** Compare, estimate, and determine the measurement of angle
- 5.4.1b** Develop and use the formula for perimeter and area of a square and rectangle to solve application problems.
- 5.4.1c** Convert basic measurements of volume, mass and distance within the same system for metric and customary units (e.g., inches to feet, hours to minutes, centimeters to meters).
- 5.4.5 Money:** Money: Determine the correct amount of change when a purchase is made with a twenty dollar bill.

Standard 5: Data Analysis - Convert basic measurements of volume, mass and distance within the same system for metric and customary units (e.g., inches to feet, hours to minutes, centimeters to meters).

5.5.1 Data Analysis

- 5.5.1a** Compare and translate displays of data and justify the selection of the type of table or graph (e.g., charts, tables, bar graphs, pictographs, line graphs, circle graphs, Venn diagrams).
- 5.5.1b** Formulate questions, design investigations, consider samples, and collect, organize, and analyze data using observation, measurement, surveys, or experiments (e.g., how far can 5th graders throw a softball based on where it first hits the ground?).

5.5.2 Probability

- 5.5.2a** Determine the probability of events occurring in familiar contexts or experiments and express probabilities as fractions from zero to one (e.g., find the fractional probability of an event given a biased spinner)
- 5.5.2b** Use the fundamental counting principle on sets with up to four items to determine the number of possible combinations (e.g. create a tree diagrams to see possible combinations).
- 5.5.3 Central Tendency:** Determine the range (spread), mode (most often), and median (middle) of a set of data.

Elementary Math | Process Skills

Process Standard 1: Problems Solving

- 1.1 Use problem-solving approaches (e.g., act out situations, represent problems with drawings and lists, use concrete, pictorial, graphical, oral, written, and/or algebraic models, understand a problem, devise a plan, carry out the plan, look back).
- 1.2 Formulate problems from every day and mathematical situations (e.g., how many forks are needed?, how many students are absent?, how can we share/divide these cookies?, how many different ways can we find to compare these fractions?).
- 1.3 Develop, test, and apply strategies to solve a variety of routine and non-routine problems (e.g., look for patterns, make a table, make a problem simpler, process of elimination, trial and error).
- 1.4 Verify and interpret results with respect to the original problem (e.g., students explain verbally why an answer makes sense, explain in a written format why an answer makes sense, verify the validity of each step taken to obtain a final result).
- 1.5 Distinguish between necessary and irrelevant information in solving problems (e.g., play games and discuss “best” clues, write riddles with sufficient information, identify unnecessary information in written story problems).

Process Standard 2: Communication

- 2.1 Express mathematical ideas coherently and clearly to peers, teachers, and others (e.g., with verbal ideas, models or manipulatives, pictures, or symbols).
- 2.2 Extend mathematical knowledge by considering the thinking and strategies of others (e.g., agree or disagree, rephrase another student’s explanation, analyze another student’s explanation).
- 2.3 Relate manipulatives, pictures, diagrams, and symbols to mathematical ideas.
- 2.4 Represent, discuss, write, and read mathematical ideas and concepts. Start by relating everyday language to mathematical language and symbols and progress toward the use of appropriate terminology (e.g., “add more” becomes “plus”, “repeated addition” becomes “multiplication”, “fair share” becomes “divide”, “balance the equation” becomes “solve the equation”).

Process Standard 3: Reasoning

- 3.1 Explain mathematical situations using patterns and relationships (e.g., identify patterns in situations, represent patterns in a variety of ways, and extend patterns to connect with more general cases).
- 3.2 Demonstrate thinking processes using a variety of age-appropriate materials and reasoning processes (e.g., manipulatives, models, known facts, properties and relationships, inductive [specific to general], deductive [general to specific], spatial, proportional, logical reasoning [“and” “or” “not”] and recursive reasoning).
- 3.3 Make predictions and draw conclusions about mathematical ideas and concepts. Predictions become conjectures and conclusions become more logical as students mature mathematically.

Process Standard 4: Connections

- 4.1 Relate various concrete and pictorial models of concepts and procedures to one another (e.g., use two colors of cubes to represent addition facts for the number 5, relate patterns on a hundreds chart to multiples, use base-10 blocks to represent decimals).
- 4.2 Link concepts to procedures and eventually to symbolic notation (e.g., represent actions like snap, clap, clap with symbols A B B, demonstrate 3×4 with a geometric array, divide a candy bar into 3 equal pieces that represent one piece as $\frac{1}{3}$).
- 4.3 Recognize relationships among different topics within mathematics (e.g., the length of an object can be represented by a number, multiplication facts can be modeled with geometric arrays, can be written as .5 and 50%).
- 4.4 Use mathematical strategies to solve problems that relate to other curriculum areas and the real world (e.g., use a timeline to sequence events, use symmetry in art work, explore fractions in quilt designs and to describe pizza slices).

Process Standard 5: Representation

- 5.1 Create and use a variety of representations appropriately and with flexibility to organize, record, and communicate mathematical ideas (e.g., dramatizations, manipulatives, drawings, diagrams, tables, graphs, symbolic representations).
- 5.2 Use representations to model and interpret physical, social, and mathematical situations (e.g., counters, pictures, tally marks, number sentences, geometric models; translate between diagrams, tables, charts, graphs).

Math Process Standard 1: Problem Solving

Sub-Standards	Questions to Develop Mathematical Thinking
<p>1. Use problem-solving approaches (e.g., act out situations, represent problems with drawings and lists, use concrete, pictorial, graphical, oral, written, and/or algebraic models, understand a problem, devise a plan, carry out the plan, look back). CCSS.MATH.PRACTICE.MP1 <i>Make sense of problems and persevere in solving them.</i></p> <p>2. Formulate problems from everyday and mathematical situations (e.g., how many forks are needed?, how many students are absent?, how can we share/divide these cookies?, how many different ways can we find to compare these fractions?). CCSS.MATH.PRACTICE.MP1 <i>Make sense of problems and persevere in solving them.</i></p> <p>3. Develop, test, and apply strategies to solve a variety of routine and non-routine problems (e.g., look for patterns, make a table, make a problem simpler, process of elimination, trial and error). CCSS.MATH.PRACTICE.MP1 <i>Make sense of problems and persevere in solving them.</i></p> <p>4. Verify and interpret results with respect to the original problem (e.g., students explain verbally why an answer makes sense, explain in a written format why an answer makes sense, verify the validity of each step taken to obtain a final result). CCSS.MATH.PRACTICE.MP6 <i>Attend to precision.</i></p> <p>5. Distinguish between necessary and irrelevant information in solving problems (e.g., play games and discuss “best” clues, write riddles with sufficient information, identify unnecessary information in written story problems). CCSS.MATH.PRACTICE.MP2 <i>Reason abstractly and quantitatively.</i></p>	<ul style="list-style-type: none"> ○ How would you describe the problem in your own words? ○ How would you describe what you are trying to find? ○ What information is given in the problem? ○ Describe the relationship between the quantities. ○ Describe what you have already tried. What might you change? ○ Talk me through the steps you’ve used to this point. ○ What steps in the process are you most confident about? ○ What are some other strategies you might try? ○ How might you use one of your previous problems to help you begin? ○ How would you organize...represent...show...? ○ Interpret and make meaning of the problem looking for starting points. ○ Plan a solution instead of jumping to a solution. ○ Monitor the progress and change the approach if necessary. ○ See relationships between various representations. ○ Relate current situations to concepts or skills previously learned and connect mathematical ideas to one another. ○ Students ask themselves, “Does this make sense?” and understand various approaches to solutions.
What does it look like in planning and delivery?	
<p>Tasks: elements to keep in mind when determining learning experiences</p> <ul style="list-style-type: none"> ○ Requires students to engage with conceptual ideas that underlie the procedures to complete the task and develop understanding. ○ The problem focuses students’ attention on a mathematical idea and provides an opportunity to develop and/or use mathematical habits of mind. ○ Could allow for multiple entry points and solutions as well as, multiple representations, such as visual diagrams, manipulatives, symbols, and problem situations. ○ Making connections among multiple representations to develop meaning. ○ Requires students to access relevant knowledge and experiences and make appropriate use of them in working through the task. ○ Requires students to defend and justify their solutions. 	<p>Teacher: actions that further promote mathematical thinking</p> <ul style="list-style-type: none"> ○ Allows students time to initiate a plan; uses question prompts as needed to assist students in developing a pathway. ○ Continually asks students if their plans and solutions make sense. ○ Questions students to see connections to previous solution attempts and/or tasks to make sense of current problem. ○ Consistently asks to defend and justify their solution by comparing solution paths. ○ Differentiates to keep advanced students challenged during work time

Math Practice references included to make it easier for teachers to find resources on the internet pertaining to the teaching and learning of good math practice. Format and some content adapted from LouisianaBelieves.com.

Math Process Standard 2: Communication

Math Process Standard 2: Communication	
Sub-Standards	Questions to Develop Mathematical Thinking
<p>1. Express mathematical ideas coherently and clearly to peers, teachers, and others (e.g., with verbal ideas, models or manipulatives, pictures, or symbols). CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.</p> <p>2. Extend mathematical knowledge by considering the thinking and strategies of others (e.g., agree or disagree, rephrase another student’s explanation, analyze another student’s explanation). CCSS.MATH.PRACTICE.MP3 Construct viable arguments and critique the reasoning of others.</p> <p>3. Relate manipulatives, pictures, diagrams, and symbols to mathematical ideas. CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.</p> <p>4. Represent, discuss, write, and read mathematical ideas and concepts. Start by relating everyday language to mathematical language and symbols and progress toward the use of appropriate terminology (e.g., “add more” becomes “plus”, “repeated addition” becomes “multiplication”, “fair share” becomes “divide”, “balance the equation” becomes “solve the equation”). CCSS.MATH.PRACTICE.MP4 Model with mathematics.</p>	<ul style="list-style-type: none"> ○ What do the numbers used in the problem represent? ○ What is the relationship of the quantities? ○ What properties might we use to find a solution? ○ What information do you have? ○ What do you know that is not stated in the problem? ○ Understand the meaning of quantities and are flexible in the use of operations and their properties. ○ Calculate efficiently and accurately.
What does it look like in planning and delivery?	
<p>Tasks: elements to keep in mind when determining learning experiences</p> <ul style="list-style-type: none"> ○ Apply general mathematical rules to specific situations. ○ Create mathematical ideas using models, manipulatives, pictures, or symbols to express mastery. ○ Determine patterns and structures. ○ Create a logical representation of the problem. ○ Justify their conclusions, explain them to others and respond to the arguments of others. ○ Listen to the arguments of others and ask useful questions to determine if an argument makes sense. ○ Embeds discussion and communication of reasoning and justification with others. ○ Requires students to provide evidence to explain their thinking beyond merely using computational skills to find a solution. ○ Requires students to use precise vocabulary (in written and verbal responses) when communicating mathematical ideas. 	<p>Teacher: actions that further promote mathematical thinking</p> <ul style="list-style-type: none"> ○ Asks students about the appropriateness of the model chosen. ○ Assists students in seeing and making connections among models. ○ Demonstrates and provides students experiences with the use of various math tools. A variety of tools are within the classroom learning environment and readily available. ○ Allows students to choose appropriate learning tools and questions students as to why they chose the tools they used to solve the problem. ○ Asks student to explain their mathematical thinking with the chosen tool. ○ Asks students to explore other options when some tools are not available. ○ Consistently demands and models precision in communication and in mathematical solutions. (Uses and models correct content terminology). ○ Expects students to use precise mathematical vocabulary during mathematical conversations. (Identifies incomplete responses and asks students to revise their response). ○ Questions students to identify symbols, quantities, and units in a clear manner

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Math Process Standard 3: Reasoning

Sub-Standards	Questions to Develop Mathematical Thinking
<p>1. Explain mathematical situations using patterns and relationships (e.g., identify patterns in situations, represent patterns in a variety of ways, extend patterns to connect with more general cases). CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.</p> <p>2. Demonstrate thinking processes using a variety of age-appropriate materials and reasoning processes (e.g., manipulatives, models, known facts, properties and relationships, inductive [specific to general], deductive [general to specific], spatial, proportional, logical reasoning [“and” “or” “not”] and recursive reasoning). CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.</p> <p>3. Make predictions and draw conclusions about mathematical ideas and concepts. Predictions become conjectures and conclusions become more logical as students mature mathematically. CCSS.MATH.PRACTICE.MP2 Reason abstractly and quantitatively.</p>	<ul style="list-style-type: none"> ○ What do the numbers used in the problem represent? ○ How did you decide in this task that you needed to use...? Could you have used another operation or property to solve this task? Why or why not? ○ What mathematical evidence supports your solution? ○ How can you be sure that...? / How could you prove that...? Will it still work if...? ○ How did you decide to try that strategy? ○ How did you test whether your approach worked? ○ How did you decide what the problem was asking you to find? (What was unknown?) ○ Did you try a method that did not work? Why didn't it work? Would it ever work? ○ Why or why not? ○ What is the same and what is different about...? ○ What approach are you considering trying first? ○ What estimate did you make for the solution? ○ In this situation would it be helpful to use a graph..., number line..., ruler..., diagram..., calculator..., manipulative? ○ Why was it helpful to use ____? ○ What can using a _____ show us that _____ may not? ○ In what situations might it be more informative or helpful to use...? ○ How did you know your solution was reasonable? ○ What patterns do you find in...? ○ How do you know if something is a pattern?

What does it look like in planning and delivery?

Tasks: elements to keep in mind when determining learning experiences	Teacher: actions that further promote mathematical thinking
<ul style="list-style-type: none"> ○ Is structured to bring out multiple representations, approaches, or error analysis. ○ Embeds discussion and communication of reasoning and justification with others. ○ Requires students to provide evidence to explain their thinking beyond merely using computational skills to find a solution. ○ Expects students to give feedback and ask questions of others' solutions. ○ Requires multiple learning tools. (Tools may include: manipulatives (concrete models), calculator, measurement tools, graphs, diagrams, spreadsheets, statistical software, etc.) ○ Requires students to determine and use appropriate tools to solve problems. ○ Present several opportunities to reveal patterns or repetition in thinking so generalizations can be made. ○ Requires students to see patterns or relationships in order to develop a mathematical rule. 	<ul style="list-style-type: none"> ○ Encourages students to use proven mathematical understandings, (definitions, properties, conventions, theorems, etc.), to support their reasoning. ○ Questions students so they can tell the difference between assumptions and logical conjectures. ○ Asks questions that require students to justify their solution. ○ Prompts students to respectfully evaluate peer arguments when solutions are shared. ○ Asks students to compare and contrast various solution methods. ○ Creates various instructional opportunities for students to engage in mathematical discussions (whole group, small group, partners, etc.). ○ Expects students to interpret, model, and connect multiple representations. ○ Asks students to explain the meaning of the symbols in the problem and in their solution. ○ Expects students to give meaning to all quantities in the task. ○ Questions students so that understanding of the relationships between the quantities and/or the symbols in the problem and the solution are fully understood. ○ Asks students about the appropriateness of the model chosen. ○ Asks student to explain their mathematical thinking with the chosen tool. ○ Asks students to explore other options when some tools are not available.

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Math Process Standard 4: Connections

Sub-Standards	Questions to Develop Mathematical Thinking
<p>1. Relate various concrete and pictorial models of concepts and procedures to one another (e.g., use two colors of cubes to represent addition facts for the number 5, relate patterns on a hundreds chart to multiples, use base-10 blocks to represent decimals). CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.</p> <p>2. Link concepts to procedures and eventually to symbolic notation (e.g., represent actions like snap, clap, clap with symbols A B B, demonstrate 3 4 with a geometric array, divide a candy bar into 3 equal pieces that represent one piece as 1/3). CCSS.MATH.PRACTICE.MP8 Look for and express regularity in repeated reasoning.</p> <p>3. Recognize relationships among different topics within mathematics (e.g., the length of an object can be represented by a number, multiplication facts can be modeled with geometric arrays, can be written as .5 and 50%). CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.</p> <p>4. Use mathematical strategies to solve problems that relate to other curriculum areas and the real world (e.g., use a timeline to sequence events, use symmetry in art work, explore fractions in quilt designs and to describe pizza slices). CCSS.MATH.PRACTICE.MP4 Model with mathematics.</p>	<ul style="list-style-type: none"> ○ What do the numbers used in the problem represent? ○ What is the relationship of the quantities? ○ How is _____ related to _____? ○ What is the relationship between _____ and _____? ○ What does _____ mean to you? (e.g. symbol, quantity, diagram) ○ What properties might we use to find a solution? ○ What observations do you make about...? ○ What ideas have we learned before that were useful in solving this problem? ○ What are some other problems that are similar to this one? ○ In what ways does this problem connect to other mathematical concepts? ○ Make sense of quantities and their relationships. ○ Look for the overall structure and patterns in mathematics. ○ Apply the math students know to solve problems in everyday life.
What does it look like in planning and delivery?	
Tasks: elements to keep in mind when determining learning experiences	Teacher: actions that further promote mathematical thinking
<ul style="list-style-type: none"> ○ Consistently expects students to convert situations into symbols in order to solve the problem and then requires students to explain the solution within a meaningful situation. ○ Contains relevant, realistic content. ○ Requires students to look for the structure within mathematics in order to solve the problem. (i.e. – decomposing numbers by place value, working with properties, etc.). 	<ul style="list-style-type: none"> ○ Assists students in seeing and making connections among models. ○ Give students opportunity to evaluate the appropriateness of the model. ○ Expects students to explain the overall structure of the problem and the big math idea used to solve the problem. ○ Encourages students to connect task to prior concepts and tasks. ○ Asks what math relationships or patterns can be used to assist in making sense of the problem. ○ Asks for predictions about solutions at midpoints throughout the solution process and encourages students to monitor each other’s intermediate results. ○ Questions students to assist them in creating generalizations based on repetition in thinking and procedures.

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Math Process Standard 5: Representation

Sub-Standards	Questions to Develop Mathematical Thinking
<p>1. Create and use a variety of representations appropriately and with flexibility to organize, record, and communicate mathematical ideas (e.g., dramatizations, manipulatives, drawings, diagrams, tables, graphs, symbolic representations). CCSS.MATH.PRACTICE.MP7 Look for and make use of structure.</p> <p>2. Use representations to model and interpret physical, social, and mathematical situations (e.g., counters, pictures, tally marks, number sentences, geometric models; translate between diagrams, tables, charts, graphs). CCSS.MATH.PRACTICE.MP5 Use appropriate tools strategically.</p>	<ul style="list-style-type: none"> ○ What do the numbers used in the problem represent? ○ What number model could you construct to represent the problem? ○ What are some ways to represent the quantities? ○ Would it help to create a diagram, graph, table, ...? ○ What are some ways to visually represent...? ○ What mathematical tools could we use to visualize and represent the situation? ○ Create a logical representation of the problem. ○ Justify conclusions with mathematical ideas. ○ Represent mathematics to describe a situation either with an equation or a diagram and interpret the results of a mathematical situation. ○ Use mathematical models for visualizing and analyzing information
What does it look like in planning and delivery?	
<p>Tasks: elements to keep in mind when determining learning experiences</p> <ul style="list-style-type: none"> ○ Is structured to bring out multiple representations, approaches, or error analysis. ○ Expects students to use symbols appropriately. ○ Requires multiple learning tools. (Tools may include: manipulatives (concrete models), calculator, measurement tools, graphs, diagrams, spreadsheets, statistical software, etc.) ○ Requires students to determine and use appropriate tools to solve problems. ○ Requires students to demonstrate fluency in mental computations. 	<p>Teacher: actions that further promote mathematical thinking</p> <ul style="list-style-type: none"> ○ Demonstrates and provides student's experiences with the use of various mathematical models. ○ Questions students to justify their choice of model and the thinking behind the model. ○ Expects students to interpret, model, and connect multiple representations. ○ Asks students to explain the meaning of the symbols in the problem and in their solution. ○ Expects students to give meaning to all quantities in the task. ○ Questions students so that understanding of the relationships between the quantities and/or the symbols in the problem and the solution are fully understood

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Major Concepts for 5th Grade

The Major Concepts are defined in PASS, however the educators at the convening used the testing blueprints to determine if some needed to be added. While these are the heaviest weighted standards for the assessment, **they are not all of the standards**. For a complete list of standards, refer to the first page of this document.

1. Develop an understanding of and fluency with division of whole numbers.

Blueprint of Testing - 16% (Number Operations)

Student Performance:

- I can estimate and find the quotient with and without remainders.
- I can find whole number quotients using a variety of strategies.
- I can easily and accurately divide whole numbers.

2. Develop an understanding of and fluency with addition and subtraction of fractions and decimals.

Blueprint of Testing - 32% (Number Sense and Number Operations)

Student Performance:

Number Sense

- I can read, write, and model numbers through the thousandths place value.
- I can convert between fractions and decimal forms of a number.
- I can identify integers in real world situations.

Number Operations

- I can add and subtract decimal numbers with the same or different place values.
- I can use a variety of methods to add and subtract fractions, including improper fractions.

3. Algebraic Reasoning: Recognize patterns and their associated rules and develop basic algebraic strategies for solving problems with variables.

Blueprint of Testing - 26% (Algebraic Reasoning)

Student Performance:

- I can use rules to create patterns.
- I can use the order of operations to solve problems.
- I can apply the multiplication properties to solve problems.
- I can use algebraic problem-solving techniques to solve problems.

Vertical Alignment of Learning Goals 3rd through 5th Grades

Major concepts, defined by grade level in PASS, aligned with 3 rd Grade blueprint			
3 rd Grade	4 th Grade	Blueprint 4 th Grade	5 th Grade
Develop an understanding of fractional parts and fraction equivalence.	Develop quick recall of multiplication facts and related division facts (fact families) and fluency with whole number multiplication.	20% 4.2.2 Number Operations	Develop an understanding of and fluency with division of whole numbers
Develop an understanding of multiplication and division and acquire strategies for basic multiplication facts and related division facts (fact families).	Develop an understanding of decimals and their connection to fractions.	16% 4.2.1 Number Sense	Develop an understanding of and fluency with addition and subtraction of fractions and decimals.
Apply the concepts of time, money, temperature, and measurement to real life situations.	Use Customary and Metric Measurement Systems to solve application problems and an understanding of area and acquire strategies for finding area of two-dimensional shapes.	10% 4.1 Measurement	
Describe and analyze various properties of two- and three-dimensional shapes.	Develop an understanding of geometric properties and relationships of shapes.	18%	
			Algebraic Reasoning: Recognize patterns and their associated rules and develop basic algebraic strategies for solving problems with variables.

Vertical Alignment of Blueprints 3rd through 6th Grades

This chart shows the vertical alignment of the OCCT Math Blueprints from 3rd through 6th grade. It was designed so you have an at-a-glance look at the progression of major concepts in each grade level as well as the percentage of the test which will be made up of that concept.

	3 rd Grade		4 th Grade			5 th Grade			6 th Grade		
Standard 1: Algebraic Reasoning: Patterns and Relationships	7	14%		7	14%		13	26%		13	26%
1.1. Algebra Patterns	2			3			5			4	
1.2. Equations	2			2			4		1.2. Expressions & Equations	4	
1.2. Number Properties	3			2			4			3	
									1.4. Solving Equations	2	
Standard 2: Number Sense and Operations	20	40%		18	36%		16	32%		15	30%
2.1. Number Sense	10			8			8			5	
2.2. Number Operations	10			10			8			10	
Standard 3: Geometry	7	14%		9	18%		7	14%		8	16%
3.1. Properties of Shapes	3		3.1. Lines	2		3.1. Circles & Polygons	4		3.1. 3-D Figures	2	
3.2. Spatial Reasoning	2		3.2. Angles	2		3.2. Angles	3		3.2. Congruent & Similar Figures	2	
3.3. Coordinate Geometry	2		3.3. Polygons	3					3.3. Coordinate Geometry	4	
			3.4. Transformations	2							
Standard 4: Measurement	9	18%		9	18%		7	14%		7	14%
4.1. Measurement	4			5			5		4.1. Circles	4	
4.2. Time & Temperature	2			2		4.2. Money	2		4.2. Conversions	3	
4.3. Money	2			2							
Standard 5: Data Analysis	7	14%		7	14%		7	14%		7	14%
5.1. Data Analysis	4			2			3			3	
5.2. Probability	4		5.2. Central Tendency	3		5.2. Central Tendency	2		5.2. Central Tendency	2	
			5.3. Probability	2		5.3. Probability	2		5.3. Probability	2	

Sample Pacing/Sequence Guide 3rd through 5th Grade Math PASS Objectives

This chart is intended as a starting point for a more specific pacing guide aligned with your district's school calendar. We recognize that not all districts operate on a 9 month schedule from September to May. This table provides guidance as to the general amount of time to be spent on each strand. It was created to aid in the vertical alignment and progression going through the 3rd through 5th grade Math OCCT using the Math OCCT blueprints as the reference points.

	September	October	November	December	January	February	March	April	May
3rd Grade									
Standard 1: Algebraic Reasoning									
Standard 2: Number Sense and Operations									
Standard 3: Geometry									
Standard 4: Measurement									
Standard 5: Data Analysis									
4th Grade									
Standard 1: Algebraic Reasoning									
Standard 2: Number Sense and Operations									
Standard 3: Geometry									
Standard 4: Measurement									
Standard 5: Data Analysis									
5th Grade									
Standard 1: Algebraic Reasoning									
Standard 2: Number Sense and Operations									
Standard 3: Geometry									
Standard 4: Measurement									
Standard 5: Data Analysis									

	Do not teach at this time
	Strands to be the focus of classroom instruction and assessment
	Strands to be practiced, reviewed and maintained through whole group instruction, centers, small groups, interventions, remediation, etc.

Sample Math Tasks

Number Operations

Major Concept: Develop an understanding of and fluency with division of whole numbers

- **I can estimate and find the quotient with and without remainders.**

Standard: PASS: Grade 5 Standard 2.2c (CCSS: 5.NBT.6)

Math Task: Are These All 365 ÷ 15? Pg 71

Link: https://www.georgiastandards.org/Common-Core/Common%20Core%20Frameworks/CCGPS_Math_5_Unit5Framework.pdf

Synopsis: This is part of a much larger unit. The PDF contains the entire unit from the Georgia website. This activity can be found on page 71. If the link does not work directly, please copy and paste the address into your search bar. In this task, students analyze story problems that demonstrate three different division situations.

- **I can find whole number quotients using a variety of strategies**

Standard: PASS: Grade 5 Standard 2.2c (CCSS: 5.NBT.6)

Math Task: Division Four in a Row

Link:

https://grade5commoncoremath.wikispaces.hcpss.org/file/view/5.NBT.6_DivisionFourinARow.pdf/457259816/5.NBT.6_DivisionFourinARow.pdf

Synopsis: In this task, students practice dividing numbers up to 4-digits by 1 and 2-digit numbers in a game format.

- **I can easily and accurately divide whole numbers.**

Standard: PASS: Grade 5 Standard 2.2c (CCSS: 5.NBT.6)

Math Task: I Have Who Has – Division practice

Link: <http://www.mathwire.com/whohas/whohas.html>

Synopsis: One quick way to include daily practice and motivate students to master these basic facts is through the use of the Who Has? card decks. These decks can be created for virtually any topic and frequent use as both a whole class practice or as a center activity for partners or small groups will provide facts practice in a highly-motivating format.

Number Sense and Operations

Major Concept: Develop an understanding of and fluency with addition and subtraction of fractions and decimals.

- **I can add and subtract decimal numbers with the same or different place values.**

Standard: PASS: Grade 5 Standard 2.2a (CCSS: 5.NBT.7)

Math Task: The Value of Education

Link: <https://www.illustrativemathematics.org/illustrations/1293>

Synopsis: The purpose of this task is for students to add, subtract, multiply, and divide decimal numbers in a real-world context. The weekly income earned by each person in the task is the median weekly income for their education level, but they have been given names to make the task easier to read and also more personal.

- **I can use a variety of methods to add and subtract fractions, including improper fractions.**

Standard: PASS: Grade 5 Standard 2.2b (CCSS: 4.NF.2)

Math Task: Adding and Subtracting in the Real World with Unit Fractions

Link: <http://www.cpalms.org/Public/PreviewResource/Preview/30103>

Synopsis: Following this lesson, students will be able to repeatedly count and add together unit fractions of the same denominator. Students will also be able to decompose a mixed number or fraction greater than one into fractions of the same denominator to solve word problems.

- **I can read, write, and model numbers through the thousandths place value.**

Standard: PASS: Grade 5 Standard 2.1a (CCSS: 4.NBT.1)

Math Task: Oh Where, Oh Where, Should I Put You?

Link: <http://www.cpalms.org/Public/PreviewResource/Preview/48691>

Synopsis: This highly engaging game is played after the unit on place value has been taught. It is designed to allow the student to think about the placement of a number before writing it down, in order to write the largest and/or smallest number.

- **I can convert between fractions and decimal forms of a number.**

Standard: PASS: Grade 5 Standard 2.1b (CCSS: 4.NF.7)

Math Task: Fractions to Decimals

Link: <http://exchange.smarttech.com/details.html?id=76708f8f-556c-419d-916a-1c81e7148421>

Synopsis: This is a smartboard game students can use as practice. We were stumped to find a math task lesson that used conversions online. If anyone has a math task they have created and would like to share, please email Jennifer Lamb and she will add it here. Thanks!

➤ **I can identify integers in real world situations.**

Standard: PASS: Grade 5 Standard 2.1c (CCSS: 6.NS.5)

Math Task: Positive or Negative, It's All About Shopping!

Link: <http://www.cpalms.org/Public/PreviewResource/Preview/47097>

Synopsis: This lesson introduces students to the concept of negative and positive integers as opposites and as indicators of movement, beginning with elevation and ending with real-world application to money.

Algebraic Reasoning

Major Concept: Recognize patterns and their associated rules and develop basic algebraic strategies for solving problems with variables.

➤ **I can use rules to create patterns.**

Standard: PASS: Grade 5 Standard 1.1 (CCSS: 5.OA.3)

Math Task: Hexagons in a Row

Link: <http://www.insidemathematics.org/common-core-math-tasks/5th-grade/5-2006%20Hexagons%20in%20a%20Row.pdf>

Synopsis: This task challenges a student to use knowledge of number patterns and operations to identify and extend a pattern. A student must be able to describe the changing pattern in ordered pairs using a table. Students must be able to understand the relationship between two variables and relationships between operations to extend the pattern given any part of the relationship. A student must be able to use knowledge of patterns to evaluate and test a conjecture about how a pattern grows. A student must be able to model a problem situation with objects and use representations such as tables and number sentences to draw conclusions. A student must be able to explain and quantify the growth of a numerical pattern.

➤ **I can use the order of operations to solve problems.**

Standards: PASS: Grade 5 Standard 1.1 (CCSS: 5.OA.3)

Math Task: Order of Operations Bing

Link: <http://illuminations.nctm.org/Lesson.aspx?id=2583>

Synopsis: Instead of calling numbers to play Bingo, you call (and write) expressions to be evaluated for the numbers on the Bingo cards. The operations in this lesson are addition, subtraction, multiplication, and division. None of the expressions contain exponents

➤ **I can apply the multiplication properties to solve problems.**

Standards: PASS: Grade 5 Standard 1.3 (CCSS: 3.OA.5)

Math Task: Making the Hard Facts Easy pg. 122

Link: https://www.georgiastandards.org/Common-Core/Common%20Core%20Frameworks/CCGPS_Math_3_Unit2FrameworkSE.pdf

Synopsis: In this task, students will practice the distributive property by using connecting cubes to build arrays of the hard multiplication facts. The students will apply the distributive property to the arrays they build.

➤ **I can use algebraic problem-solving techniques to solve problems.**

Standards: PASS: Grade 5 Standard 1.2 (CCSS: 5.OA.3)

Math Task: Bowling for Numbers

Link: <https://www.illustrativemathematics.org/illustrations/969>

Synopsis: This is part of a much larger unit. The PDF contains the entire unit from the Georgia website. This activity can be found on page 122. If the link does not work directly, please copy and paste the address into your search bar. The purpose of this game is to help students think flexibly about numbers and operations and to record multiple operations using proper notation.

Have students work in groups of 2 - 4. Introduce the game with an example, and then have them play independently. Discussion of "challenging rolls" afterwards can be productive.

Students roll the 4 dice to generate their seed numbers. They then use those 4 numbers to create as many numbers as they can (1 - 10). Scoring is done as in bowling; numbered "pins" are "knocked down" by creating an expression equal to the number.