

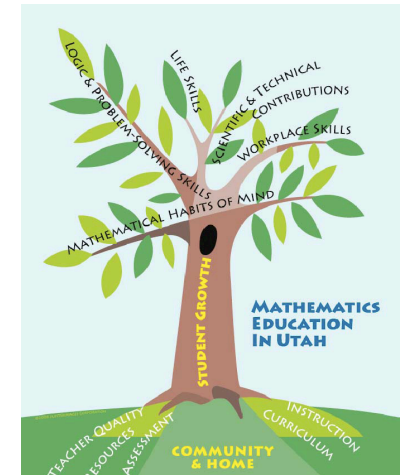


JORDAN SCHOOL DISTRICT Curriculum & Staff Development

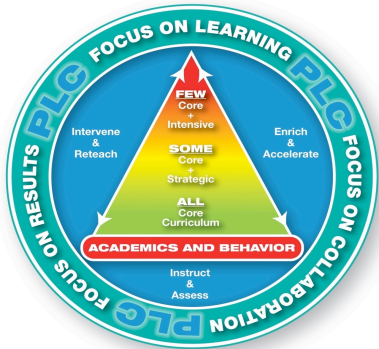
Elementary Mathematics

The Jordan School District Mathematics Team supports the Utah State Office of Education Mathematics mission:

The mission of mathematics education in Utah is to promote student growth and learning in mathematics in order to prepare students to thrive and contribute in the global economy of the 21st century.



JORDAN SCHOOL DISTRICT MULTI-TIERED PLC SUPPORT SYSTEM



The Mathematics Team also supports the Jordan School District Curriculum Department mission:

The Curriculum and Staff Development Department exists to provide support and professional development for administrators, teachers, and the school community in evidence-based best practices through a collaborative, interdisciplinary, and unified approach for increased student achievement and organizational effectiveness.

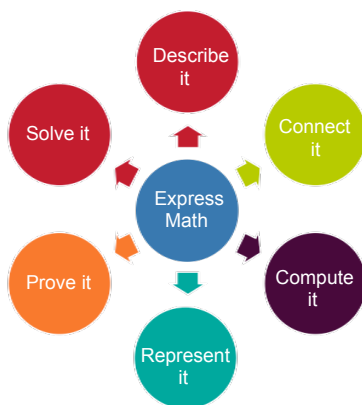
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Jordan School District Scope and Sequence

Math Expressions



Allowing students differentiated ways of accessing and expressing mathematics increases engagement and successful acquisition of concepts and skills. Students **describe** mathematics, **connect it** to other subjects within and outside of mathematics, **compute** answers with and without technology, **represent** mathematics in multiple ways, **solve** problems, and **prove** mathematical conjectures. (USOE, 2010, *Utah's 3-Tier Model of Mathematics Instruction*)

Scope and Sequence Format

- Overview: This page identifies the mathematical content to be studied in each block. It serves as a year-at-a-glance up to the CRT's.
- Benchmark
 - Instructional Support
This page contains models, illustrations, and explanations specific to the content of a Benchmark. It is intended to be a resource for explaining key mathematical ideas. The instructional methods presented provide tools students can use to demonstrate and communicate their mathematical ideas and understanding.
 - Blocks
In most cases, the core content of a block page has been selected based on connections that can be made between content standards. Though blocks can be taught in any order, the sequence presented provides a coherent flow to mathematics instruction throughout the year. There are three columns and one footer-row on a block page.
 - ⇒ Core Content is stated in the first column. This is the Utah State Elementary Mathematics Core Curriculum that must be taught. Words/phrases that appear with ~~strike-out~~ indicate that that topic is not a focus for that block.
 - ⇒ Teaching Strategies are listed in the middle column. It consists of a few teaching strategies aligned to core content. It is recommended that teachers use their own effective teaching strategies in addition to those provided.
 - ⇒ Resources are listed in the last column. It is **NOT** a checklist for instruction. Teach the **Core**, not the resources. It is also NOT an all-inclusive list. (Not all Utah Core content is covered in the district-adopted resources.) It is recommended that teachers use good resources.
 - ⇒ The footer-row identifies Core and additional vocabulary. Core vocabulary *must* be taught; additional vocabulary can help scaffold student understanding. This row also identifies the specific assessment that is available for that block.

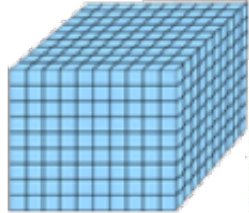
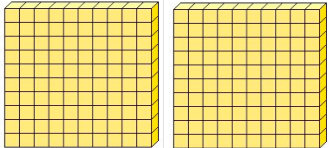
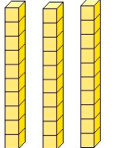

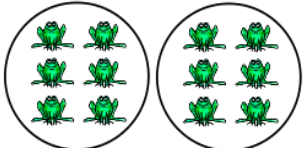

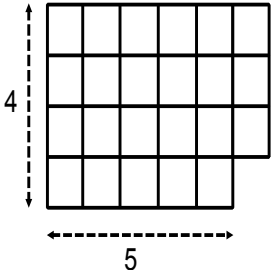
Assessments

- Pre-Assessment: These tests are specific to grade-level content. They can be used as an annual pre- and post-test. They are intended to provide immediate feedback regarding students' aptitude and existing knowledge of the mathematics of that grade.
- Block: These are 1) specific to the block content, and 2) intended to be used as formative assessments that provide immediate feedback that can be used for tiered-interventions for individual students. Item-analysis can also identify concepts for which the whole-class needs a re-teaching lesson. Block assessments can be administered in a variety of ways (e.g., whole-class at end of block; a few problems per day; small-group). Block assessments are also intended to provide opportunity to explicitly teach test-taking strategies.
- Benchmark: These are 1) cumulative for *that specific* Benchmark, 2) summative in that scores are reported to the district and content from that Benchmark will not be repeated on subsequent Benchmarks, and 3) formative in that continued interventions should take place for students not mastering content.
- CRT Review: These are cumulative items that can be used to review content and/or test-taking strategies before the CRT. Best practices recommend that the items be reviewed in smaller amounts (e.g., 5-7 problems per day) over several weeks.

Fourth Grade Scope and Sequence Overview

Block	Content Focus
1	<p style="text-align: center;">Graphing, Grids & Facts Coordinate Grids and Regions & Basic Multiplication and Division</p> <p><i>Students begin the year collecting, organizing, and displaying data. They learn to locate and give coordinates in the first quadrant of a coordinate grid, and then apply coordinate graphing to regions on a Utah map. Students also build on Third Grade knowledge of multiplication and division facts moving toward quick recall.</i></p>
2	<p style="text-align: center;">Number Relationships Place Value, Comparing and Ordering Whole Numbers, and Number Facts</p> <p><i>Students represent and analyze relationships among whole numbers through millions. Students continue to work on quick recall of basic multiplication and division facts. (The approximate teaching time for Block 2 is two weeks providing more time for teaching Block 3.)</i></p>
3	<p style="text-align: center;">Multiplication and Division & Algebra Multiplication and Division & Algebraic Equations and Inequalities</p> <p><i>Students build on basic multiplication facts by modeling and illustrating the meaning of multiplication using one- by two-digit factors. They solve multiplication story problems using prescribed methods. They begin their work in division by establishing a relationship between multiplication and division. They use algebraic expressions, symbols, and properties to solve mathematical equations and inequalities.</i></p>
4	<p style="text-align: center;">Numbers and Operations & Algebra More Multiplication and Division & Patterns</p> <p><i>Students continue to build on multiplication and division and learn to multiply two-digits by two-digits and divide a three-digit dividend by a one-digit divisor. They continue to solve multiplication and division story problems using prescribed methods. Students analyze patterns and determine rules for growing patterns.</i></p>
5	<p style="text-align: center;">Fractions and Decimals Expressing Parts of a Whole</p> <p><i>Students represent, order, and compare numbers to hundredths. Students identify and generate equivalent fractions.</i></p>
6	<p style="text-align: center;">Numbers and Operations & Algebra Even More Multiplication and Division & Algebraic Properties</p> <p><i>Students build on their knowledge of multiplication and division and multiply up to a three-digit factor by a two-digit factor and continue to divide up to a three-digit dividend by a one-digit divisor. Introduce the distributive property. (Approximated teaching time for Block 6 is two weeks, to provide more time for teaching Block 5.)</i></p>
7	<p style="text-align: center;">Numbers and Operations Performing Operations with Simple Fractions and Decimals</p> <p><i>Students extend their knowledge of fractions and decimals by solving problems, which involve adding and subtracting decimals and fractions with like and unlike denominators.</i></p>
8	<p style="text-align: center;">Geometry & Measurement Attributes of Two-Dimensional Geometric Shapes, Transformations, Measuring Angles, Perimeter & Area</p> <p><i>Students identify and describe various attributes of two-dimensional shape. Then they apply transformations and connect those transformations to fractional parts of a shape. They learn to use a protractor and identify benchmark angles. Additionally, they connect arrays to the development of area and perimeter.</i></p>
9	<p style="text-align: center;">Measurement & Probability Relationships of Measurements, Area & Probability</p> <p><i>Students learn to describe the relationship among units of measure for length, capacity, and weight. They connect their knowledge of area to the development of area formulas for triangles and parallelograms. Students also conduct experiments and predict outcomes.</i></p>

Grade 4 ~ Benchmark 1 ~ Instructional Support

Block 1	Block 2	Block 3															
<p>Graphing, Grids, and Facts Fourth graders start the year off by collecting, organizing, displaying, and analyzing data. This real-world application lays a strong foundation for thinking about the meaning of numbers. They also continue the working with one-digit multiplication and division facts from 3rd Grade. This continues through blocks 2 and 3.</p>	<p>Number Relationships The work of understanding whole numbers, which began in Kindergarten, extends to larger numbers (up to one million) in block 2. Students examine relationships between numbers and represent them using equality/inequality symbols. They are introduced to a new form of representing number: squaring ($2^2 = 2 \times 2$).</p>	<p>Basic Multiplication/Division & Algebra A serious study of multiplication begins in block 3. Understanding multiplication facts builds a foundation for modeling one-digit by two-digit multiplication. Students rely heavily on the commutative, associative, and identity properties of addition and multiplication, and the zero property of multiplication to support their work in multiplication.</p>															
<p>Models for Multiplication can be found on the 3rd Grade Benchmark 2 Instructional Support page.</p>	<p>Models for Division can be found on the 3rd Grade Benchmark 3 Instructional Support page.</p>	<p>Properties for Operations can be found on the 3rd Grade Benchmark 1 & 2 Instructional Support pages.</p>															
<p>Concepts of Number: Fourth Grade students are still solidifying concepts of number, which makes it important to provide meaning and strategies for making sense of larger numbers. A direct correlation should be made between the base-ten image, expanded form, and standard form of a number. (A small number is used in this example to save space.)</p> <div style="display: flex; align-items: center; justify-content: space-around;"> <div style="text-align: center;">  <p>1 group of 1,000 = 1,000</p> </div> <div style="text-align: center;">  <p>2 groups of 100 = 200</p> </div> <div style="text-align: center;">  <p>3 groups of 10 = 30</p> </div> <div style="text-align: center;">  <p>5 groups of 1 = 5</p> </div> <div style="margin-left: 20px;"> <p>→</p> <table style="border-collapse: collapse;"> <tr><td>1 groups of 1,000</td><td>=</td><td>1,000</td></tr> <tr><td>2 groups of 100</td><td>=</td><td>200</td></tr> <tr><td>3 groups of 10</td><td>=</td><td>30</td></tr> <tr><td>5 groups of 1</td><td>=</td><td>+ 5</td></tr> <tr><td></td><td></td><td style="border-top: 1px solid black;">1,235</td></tr> </table> </div> <div style="margin-left: 20px;"> <p>→ One purpose of expanded form is to visibly retain the value of the digits, which are often hidden in standard form.</p> </div> </div>			1 groups of 1,000	=	1,000	2 groups of 100	=	200	3 groups of 10	=	30	5 groups of 1	=	+ 5			1,235
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<p>Relationship between Multiplication and Division: Multiplication can be thought of as repeated addition of the same size sets to create a total. (One factor tells the number of groups and the other tells the number in each group.) Division can be thought of as beginning with a total and breaking it into equal sized groups. Students should recognize multiplication as counting by multiples and division as breaking a number apart by factors. Both perspectives can be seen in the frog image below. This holds true even when dividing numbers with remainders (Quotient-Remainder Theorem). For more information, see the 3rd Grade Benchmark 3 Instructional Support Document.</p>																	
<div style="display: flex; justify-content: space-around;"> <div style="text-align: center;">  <p>$2 \times 6 = 12$ $12 \div 2 = 6$</p> </div> <div style="text-align: center;">  <p>$6 \times 2 = 12$ $12 \div 6 = 2$</p> </div> </div>	 <p style="margin-top: 10px;">The Quotient-Remainder Theorem says that a division problem can be represented as a multiplication sentence, even with remainders.</p> <p>$23 = (4 \times 5) + 3$, or $23 \div 4 = 5 \text{ r } 3$</p>	<p>Dividing by Zero is Not Possible: Dividing by zero is not against a math rule. It just means that there is no answer that makes sense.</p> <p><i>Case 1:</i> If $10 \div 0$ were equal to some number, it would be the missing factor in $___ \times 0 = 10$ ("how many groups of size 0 make 10?"). There is no such number. Thus $10 \div 0$ does not specify a number.</p> <p><i>Case 2:</i> $0 \div 0$ is not possible for another reason. Solving $0 \div 0 = _____$ is the same as solving $0 = 0 \times _____$. But any number fits in this blank. Thus the division expression $0 \div 0$ does not represent one particular number, as all other division expressions do. In the first case division by zero does not specify any number, while in the second case it specifies every number. (<i>Elementary Math for Teachers</i>)</p>															


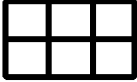
Grade 4 ~ Block 1 ~ Graphing, Grids, and Facts

Core Content	Teaching Strategies	Resources
<p>Standard 5: Students will interpret and organize collected data to make predictions, answer questions, and describe basic concepts of probability.</p> <p><u>Objective 1:</u> Collect, organize, and display data to answer questions.</p> <p>5.1.a. Identify a question that can be answered by collecting data.</p> <p>5.1.b. Collect, read, and interpret data from tables, graphs, charts, surveys, and observations.</p> <p>5.1.c. Represent data using frequency tables, bar graphs, line plots, and stem and leaf plots.</p> <p>5.1.d. Identify and distinguish between clusters and outliers of a data set.</p>	<p>~Collect and graph daily high and low temperatures for at least a week. Represent that data graphically. Make weather predictions based on data collected.</p> <p>~Graph the weather for the different regions of Utah. Distinguish outliers and clusters in data.</p>	<p>2008 SFAW Diamond Edition</p> <p>3-5 Make a Table</p> <p>4-7 Line Plots</p> <p>4-7 Outliers</p> <p>4-8 Bar Graphs</p> <p>4-10 Line Graphs</p> <p>4-11 Make a Graph</p> <p>4-13 Data from Surveys</p> <p>4-14 Misleading Graphs</p> <p>5-4 Stem & Leaf Plot</p> <p>Core Academy</p> <p>CA 4th, 2004 "Getting a Grip on Graphs" 4-3 through 4-7</p> <p>CA 3rd, 2007, "Collecting Data" 5-3 through 5-10</p>
<p>Standard 3: Students will understand attributes and properties of plane geometric objects and spatial relationships.</p> <p><u>Objective 2:</u> Specify locations using grids and maps.</p> <p>3.2.a. Locate coordinates in the first quadrant of a coordinate grid.</p> <p>3.2.b. Give the coordinates in the first quadrant of a coordinate grid.</p> <p>3.2.c. Locate regions on a map of Utah.</p> <p>3.2.d. Give the regions of a position on a map of Utah.</p>	<p>~Overlay a coordinate grid over a region map of Utah. Use it to identify coordinates for geographic features (cities, parks, regions).</p>	<p>2008 SFAW Diamond Edition</p> <p>4-9 Graphing Ordered Pairs</p> <p>Core Academy</p> <p>CA 4th, 2004 "Mapping It Out" 7-15 through 7-28 (this works well with the new Utah Atlas).</p> <p>CA 4th, 2004 "Fly on the Ceiling" 8-17 through 8-21</p> <p>CA 3rd, 2007, "Collecting Data" 5-3 through 5-10</p>
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 5:</u> Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.5.a. Demonstrate quick recall of basic multiplication and division facts.</p>	<p>~Recognize that if students understand the commutative property ($4 \times 5 = 5 \times 4$), they only have to learn half of the multiplication facts.</p> <p>~Develop use of strategies for finding unknown facts. (See benchmark pages in 3rd and 4th grade.)</p>	<p>2008 SFAW Diamond Edition</p> <p>3-1 Meaning of Multiplication</p> <p>3-6 thru 3-8</p> <p>3-6 Meaning of Division</p> <p>Core Academy</p> <p>CA 5th 2003 "Inquiry-Sums-Product Games"</p>

Core Vocabulary: data, frequency table, bar graph, line plot, stem and leaf plot, cluster, outlier, line graph, coordinate, first quadrant
Additional Vocabulary: outcome, event

Assessment:
Block 1

Grade 4 ~ Block 2 ~ Number Relationships

Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 1:</u> Demonstrate multiple ways to represent whole numbers and decimals, from hundredths to one million, and fractions.</p> <p>1.1.a. Read and write numbers in standard and expanded form.</p> <p>1.1.b. Demonstrate multiple ways to represent whole numbers and decimals by using models and symbolic representations (e.g., 36 is the same as the square of six, three dozen, or 9×4).</p> <p>1.1.c. Identify the place and the value of a given digit in a six-digit numeral, including decimals to hundredths, and round to the nearest tenth.</p> <p>1.1.f. Identify and represent square numbers using models and symbols.</p> <hr/> <p><u>Objective 2:</u> Analyze relationships among whole numbers, commonly used fractions, and decimals to hundredths.</p> <p>1.2.a. Compare the relative size of numbers (e.g., 475 is comparable to 500; 475 is small compared to 10,000 but large compared to 98).</p> <p>1.2.b. Order whole numbers up to six digits, simple fractions, and decimals using a variety of methods (e.g., number line, fraction pieces) and use the symbols $<$, $>$, and $=$ to record the relationships.</p> <hr/> <p><u>Objective 5:</u> Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.5.a. Demonstrate quick recall of basic multiplication and division facts.</p> <p>The approximate teaching time for Block 2 is two weeks, leaving more time for Block 3 instruction.</p>	<p>~Students should be given ample opportunity to create multiple representations of number through number lines, base ten blocks, pictures, money, and in symbolic form. This should extend to comparing numbers.</p> <p>~Students should recognize that square numbers in array form create a square. Non-square numbers create a rectangle.</p> <div style="text-align: center;">  $2 \times 2 = 2^2$ </div> <div style="text-align: center;">  3×2 </div> <hr/> <p>~Explicitly teach how the times table chart works to show the relationship between a numbers factors and product.</p> <p>~Work on patterns of multiplication: 0, 1, 2, 5, 9</p>	<p>2008 SFAW Diamond Edition</p> <p>1-1 Numbers in the Thousands 1-2 Understanding Greater Numbers 1-3 Place Value Patterns 1-7 The Size of Numbers</p> <p>Core Academy</p> <p>CA 4th, 2004 "The Long & Short of It" 4-4 through 4-21 CA 4th 2007 "A Bear Family" 4-10 through 4-13 CA 4th 2005 "How Much is a Million" 5-3 through 5-8</p> <hr/> <p>2008 SFAW Diamond Edition</p> <p>1-5 Comparing and Ordering Numbers</p> <p>Core Academy</p> <p>CA 4th, 2006 "Getting to Know You" 6-3 through 6-18 CA 4th, 2006 "Dominos at Play" 6-17 through 6-26 CA 4th, 2003 "Rock & Roll" 8-12 through 8-18</p> <hr/> <p>2008 SFAW Diamond Edition</p> <p>3-2 Patterns in Multiplying by 0, 1, 2, 5, 9</p>
<p>Core Vocabulary: standard form, expanded form, $<$, $>$, $=$, \neq, array, multiple, inequality, square number</p> <p>Additional Vocabulary: compare, numeral</p>		<p>Assessment: Block 2</p>

Grade 4 ~ Block 3 ~ Basic Multiplication/Division & Algebra

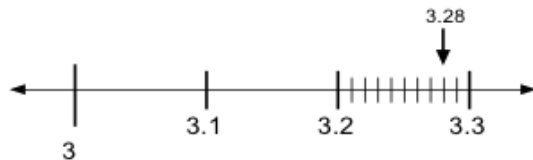
Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p>Objective 3: Model and illustrate meanings of multiplication and division of whole numbers and the addition and subtraction of fractions.</p> <p>1.3.a. Model multiplication (e.g., equal-sized groups, rectangular arrays, area models, equal intervals on the number line), place value, and properties of operations to represent multiplication of a one- or two-digit factor by a two-digit factor and connect the representation to an algorithm.</p> <p>1.3.b. Use rectangular arrays to interpret factoring (e.g., find all rectangular arrays of 36 tiles and relate the dimensions of the arrays to factors of 36).</p> <p>1.3.c. Demonstrate the mathematical relationship between multiplication and division (e.g., $3 \times \square = 12$ is the same as $12 \div 3 = \square$ and $\square = 4$.) and use that relationship to explain that division by zero is not possible.</p> <hr/> <p>Objective 4: Solve problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.4.a. Use estimation, mental math, paper and pencil, and calculators to perform mathematical calculations and identify when to use each one appropriately.</p> <p>1.4.b. Select appropriate methods to solve a single operation problem and estimate computational results or calculate them directly, depending on the context and numbers involved in a problem.</p> <p>1.4.c. Write a story problem that relates to a given multiplication or division equation, and select and write a number sentence to solve a problem related to the environment.</p> <hr/> <p>Objective 5: Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.5.a. Demonstrate quick recall of basic multiplication and division facts.</p>	<p>~Arrays are a significant method for representing multiplication regardless of the number of factors.</p> <p>-----</p> <p>~Use block tests as a tool for teaching problem solving techniques.</p> <p>-----</p> <p>~Create meaning for difficult multiplication and division facts through models and drawings. Link that back to the times table chart.</p> <p>~Work on patterns of multiplication: 10, 11, 12</p> <p>-----</p> <p>~ Use a variety of shapes or letters to represent an unknown quantity in an expression.</p> <p>~Place counters in a balance scale to demonstrate equality or inequality in an equation.</p> <p>~Demonstrate the commutative property by discussing the word "commute" as commuting from home to school and then back home again. (Same distance either way.)</p>	<p>2008 SFAW Diamond Edition 5-4 Using Arrays to Multiply 5-5 Multiplying Two-Digit by One-Digit Numbers</p> <p>Core Academy CA 4th 2003, "Square Numbers" 7-6 through 7-8 CA 4th, 2003 "Multi-Digit Multiplication" 7-8 through 7-14</p> <p>-----</p> <p>2008 SFAW Diamond Edition 3-3 Using Known Facts to Find Unknown Facts 3-4 Multiplying by 10, 11, 12</p> <p>-----</p> <p>2008 SFAW Diamond Edition 12-1 Inequalities in a number line 12-2 Word to Equations 12-3 Equations & Graphs</p>
<p>Standard 2: Use algebraic expressions, symbols, and properties of the operations to represent, simplify, and solve mathematical equations and inequalities.</p> <p>Objective 2: Use algebraic expressions, symbols, and properties of the operations to represent, simplify, and solve mathematical equations and inequalities.</p> <p>2.2.a. Use the order of operations to evaluate, simplify, and compare mathematical expressions involving the four operations, parentheses, and the symbols <, >, and = (e.g., $2x(4 - 1) + 3$; of the two quantities $7 - (3 - 2)$ or $(7 - 3) - 2$, which is greater?).</p> <p>2.2.b. Express single-operation problem situations as equations and solve the equation.</p> <p>2.2.c. Recognize that a symbol represents the same number throughout an equation or expression (e.g., $\Delta + \Delta = 8$; thus, $\Delta = 4$).</p> <p>2.2.d. Describe and use the commutative, associative, distributive, and identity properties of addition and multiplication, and the zero property of multiplication.</p>		<p>Core Academy CA 3rd, 2003, "Pattern Search" 8-1 through 8-6 CA 4th, 2003 "Equations" 7-9 through 7-15 CA 4th 2003, "Messy Cookies" 8-6 through 8-8 CA 4th 2003, "Equivalent Equations" 8-3 through 8-5 CA 4th, 2004 " That's Not Fair" 6-15 through 6-18 CA 4th 2008, "Socks & Shoes" 7-3 through 7-8 CA 4th 2008, "Property Posters" 7-9 through 7-14 CA 4th 2008 "Order of Operations Treasure Hunt" 7-15 through 7-22 CA 4th, 2006 "Following the Order" 7-16 through 7-26</p>
<p>Core Vocabulary: multiple, factor, product, order of operations, parenthesis, equation, expression, associative property, commutative property, zero property of multiplication, dividend, divisor, quotient, estimate</p> <p>Additional Vocabulary: identity property</p>		<p>Assessment: Block 3 Benchmark 1 (reported)</p>

Grade 4 ~ Benchmark 2 ~ Instructional Support

Block 4	Block 5	Block 6
<p>More Multiplication and Division & Patterns</p> <p>The complexity is increased with multiplication and division for students as they apply their understanding of these two operations to more complex numbers situations (multiply two-digits by two-digits and divide a three-digit dividend by a one-digit divisor). The use of story problems and modeling provides an avenue for making sense of this complexity. Students also analyze growing patterns through graphs, tables, and rules.</p> <p>The approximate teaching time for Block 4 is two weeks providing more time for teaching Blocks 5 & 6.</p>	<p>Expressing Parts of a Whole</p> <p>Students begin the work of representing, ordering, and comparing parts of a whole in decimal form to hundredths. This is directly correlated to their work with fractions by comparing models, pictures, and symbols. Students are not operating with fractions or decimals in this block. They are making connections between the two forms of representing parts of a whole.</p>	<p>Even More Multiplication and Division & The Distributive Property</p> <p>Students build on their knowledge of multiplication and division and multiply up to a three-digit factor by a two-digit factor and continue to divide up to a three-digit dividend by a one-digit divisor. The distributive property is formally introduced as a tool for solving multi-digit multiplication problems.</p>

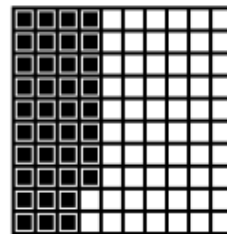
Decimal Models

Measurement Model (number line, metric units)
 (Decimals specify points on a number line by repeatedly subdividing intervals into tenths – ‘dec’ means tenth. The unlimited number of subdivisions is called the Density Property.)



3.28

Area Model (hundreds square)



0.38

Set Model (pennies, dimes, dollar)



(one dollar = 1.00)



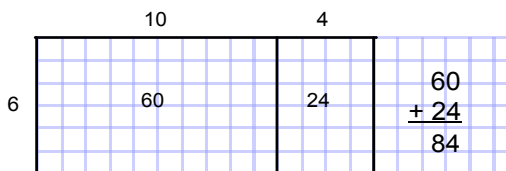
(one dime = 0.1)



(one penny = 0.01)

\$1.11

Using Arrays to Teach the Distributive Property



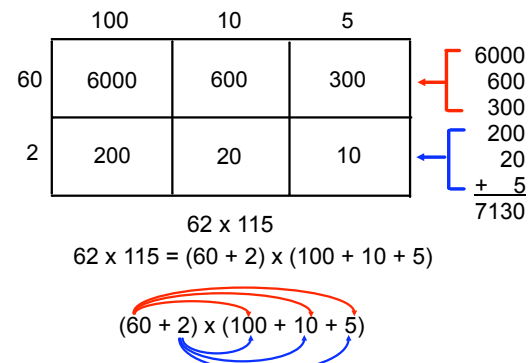
$6 \times 14 = 6 \times (10 + 4)$ *Break up the 14 into 10 + 4

$$\begin{aligned} &6 \times (10 + 4) \\ &(6 \times 10) + (6 \times 4) \\ &60 + 24 = 84 \end{aligned}$$



Arrays can be created for 3-digit by 2-digit multiplication problems using base-ten blocks (or on graph paper). Students should understand that

- ~the blocks maintain the value of the number in expanded form, and
- ~after the number is expanded, all parts of one factor should be multiplied by all parts of the other factor.



Open arrays need not be proportional once the concept is understood, and they can be created to multiply numbers of any size.

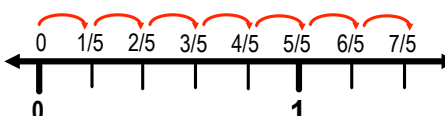
$$(60 + 2) \times (100 + 10 + 5)$$

Grade 4 ~ Benchmark 2 ~ Instructional Support *Continued*

Block 4	Block 5	Block 6
<p>More Multiplication and Division & Patterns The complexity is increased with multiplication and division for students as they apply their understanding of these two operations to more complex numbers situations (multiply two-digits by two-digits and divide a three-digit dividend by a one-digit divisor). The use of story problems and modeling provides an avenue for making sense of this complexity. Students also analyze growing patterns through graphs, tables, and rules. The approximate teaching time for Block 4 is two weeks providing more time for teaching Blocks 5 and 6.</p>	<p>Expressing Parts of a Whole Students begin the work of representing, ordering, and comparing parts of a whole in decimal form to hundredths. This is directly correlated to their work with fractions by comparing models, pictures, and symbols. Students are not operating with fractions or decimals in this block. They are making connections between the two forms of representing parts of a whole.</p>	<p>Even More Multiplication and Division & The Distributive Property Students build on their knowledge of multiplication and division and multiply up to a three-digit factor by a two-digit factor and continue to divide up to a three-digit dividend by a one-digit divisor. The distributive property is formally introduced as a tool for solving multi-digit multiplication problems.</p>

Key Ideas About Fractions

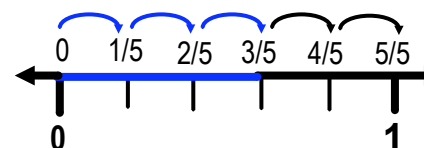
- A fraction can be viewed as a point on a number line, just like whole numbers.



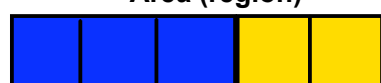
- Fractional pieces can be counted, or iterated, as in 1/5, 2/5, 3/5 (one fourth, two fourths, three fourths), etc.
- A fraction is a single number, not two numbers.
- A fraction contains two parts:

Numerator	Tells the number of fractional units
Denominator	Names the fractional unit by saying how many fractional units it takes to make a whole
- Fractional pieces must be the same size if they are the same unit.


Fraction Models



Measurement (Length)
3 out of 5 hops are blue, 3/5




Area (region)
3 out of 5 sections are blue, 3/5



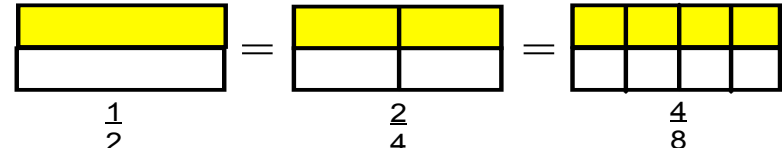
Set
3 out of 5 stars are blue, 3/5

Equivalent Fractions

Fraction Strips (a concrete approach): Fold paper strip in half and color one side, then continue with folds as shown.



Subdivided Areas (a pictorial approach)



Students who understand subdivided areas are ready to rename fractions using standard notation. ⇒

Numbers

$$\frac{1}{2} = \frac{\square}{4}$$

$$\frac{2}{4} = \frac{4}{\square}$$

Parker, et al., p.134-135

Grade 4 ~ Block 4 ~ More Multiplication/Division & Patterns

Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 3:</u> Model and illustrate meanings of multiplication and division of whole numbers and the addition and subtraction of fractions.</p> <p>1.3.a. Model multiplication (e.g., equal-sized groups, rectangular arrays, area models, equal intervals on the number line), place value, and properties of operations to represent multiplication of a one- or two-digit factor by a two-digit factor and connect the representation to an algorithm.</p> <p>1.3.d. Represent division of a three-digit dividend by a one-digit divisor, including whole number remainders, using a variety of methods (e.g. rectangular arrays, manipulatives, pictures), and connect the representation to an algorithm.</p> <hr/> <p><u>Objective 4:</u> Solve problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.4.a. Use estimation, mental math, paper and pencil, and calculators to perform mathematical calculations and identify when to use each one appropriately.</p> <p>1.4.b. Select appropriate methods to solve a single operation problem and estimate computational results or calculate them directly, depending on the context and numbers involved in a problem.</p> <p>1.4.c. Write a story problem that relates to a given multiplication or division equation, and select and write a number sentence to solve a problem related to the environment.</p> <hr/> <p>Standard 2: Students will use patterns and relations to represent mathematical problems and number relationships.</p> <p><u>Objective 1:</u> Identify, analyze, and determine rules for describing numerical patterns involving operations and non-numerical growing patterns.</p> <p>2.1.a. Analyze growing patterns using objects, pictures, numbers, and tables to determine a rule for the pattern.</p> <p>2.1.b. Recognize, represent, and extend simple patterns involving multiples and other number patterns (e.g., square numbers) using objects, pictures, numbers, and tables.</p> <p>2.1.c. Identify simple relationships in real-life contexts and use mathematical operations to describe the pattern (e.g., the number of legs on a given number of chairs may be determined by counting by fours or by multiplying the number of chairs by 4).</p> <p>The approximate teaching time for Block 4 is two weeks, leaving more time for Blocks 5 and 6 instruction.</p>	<p>~Refer to 3rd Grade Benchmark 2 for Models for Multiplication. These models continue to work with the magnitude of the numbers indicated in this block.</p> <p>~Use lattice strategy for multi-digit multiplication. For example, see teachermathshare.wikispaces.com.</p> <hr/> <p>~Actively teach problem solving strategies.</p> <p>~Students should create their own story problems based on things they see in their environment. When done in this format, they should progress from concrete (real world objects) → pictorial (transfer image a paper-pencil product) → abstract (connect algorithm to pictorial image).</p> <hr/> <p>~Ensure that students see the connection between the objects in a pattern and pictures they create of the pattern. They should also be able to see where the numbers in a table or graph correlate to the objects and pictures.</p>	<p>2008 SFAW Diamond Edition</p> <p>6-3 Using Arrays to Multiply 6-5 Multiplying Two-Digit Numbers 7-3 Dividing with Remainders 7-4 Two Digit Quotients 7-6 Interpreting Remainders 7-7 Dividing Three-Digit Numbers</p> <p>Core Academy</p> <p>CA 4th, 2006 "Iguana Algebra" 7-3 through 7-9 CA 4th, 2003 "Long Division" 7-15 through 7-20</p> <hr/> <p>Core Academy</p> <p>CA 4th, 2003 "Red Walls & Green Doors" 8-9 through 8-10 CA 4th, 2004 "Making Patterns, Create, Analyze & Predict" 6-3 through 6-9 CA 3rd, 2003, "Growing Critters" 8-7 through 8-11</p>
<p>Core Vocabulary: growing pattern Additional Vocabulary: Input/output table</p>	<p>Assessment: Block 4</p>	

Grade 4 ~ Block 5 ~ Expressing Parts of a Whole

Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 1:</u> Demonstrate multiple ways to represent whole numbers and decimals, from hundredths to one million, and fractions.</p> <p>1.1.c. Identify the place and the value of a given digit in a six-digit numeral; including decimals to hundredths, and round to the nearest tenth.</p> <p>1.1.d. Divide regions, lengths, and sets of objects into equal parts using a variety of models and illustrations.</p> <p>1.1.e. Name and write a fraction to represent a portion of a unit whole, length, or set for halves, thirds, fourths, fifths, sixths, eighths, and tenths.</p> <hr/> <p><u>Objective 2:</u> Analyze relationships among whole numbers, commonly used fractions, and decimals to hundredths.</p> <p>1.2.b. Order whole numbers up to six digits, simple fractions, and decimals using a variety of methods (e.g., number line, fraction pieces) and use the symbols <, >, and = to record the relationships.</p> <p>1.2.c. Identify a number that is between two given numbers (e.g., 3.2 is between 3 and 4; find a number between 0.1 and 0.2).</p> <p>1.2.d. Identify equivalences between fractions and decimals by connecting models to symbols.</p> <p>1.2.e. Generate equivalent fractions and simplify fractions using models, pictures, and symbols.</p>	<p>~Decimals and Fractions on a number line represent an infinite amount of numbers. See Density Property.</p> <p>~Use concrete objects such as M&M's for representing fractions as parts of a whole.</p> <p>~Encourage students to make connections between representations by asking questions like, "What is another name for $\frac{1}{2}$?"</p> <p>~Make connection between $\frac{1}{10}$ and .1 as being two names for the same part.</p> <p>~Use place value chart with the decimals separating the whole numbers from the parts.</p>	<p>2008 SFAW Diamond Edition Diagnostic Readiness pg. 498 (C-D) 9-1 Parts of a Region 9-2 Parts of a Set 9-3 Fractions, Lengths and Number Lines 9-4 Estimating (Optional) Page 514 Review (Optional) 11-2 Decimal Place Value</p> <p>Core Academy CA 4th, 2004 "The Long & Short of It" 4-14 through 4-21 CA 4th 2007, "Fraction Fun" 3-3 thru 2-24 CA 3rd, 2007, "Collecting Fun with Fractions" 8-12 through 8-16</p> <hr/> <p>2008 SFAW Diamond Edition 9-6 Equivalent Fractions 9-7 Fractions 9-8 Compare Fractions 9-9 Compare & Order Fractions Page 528 Review (Optional) 11-1 Decimals & Fractions 11-3 Compare & Order Page 634 Review (Optional)</p> <p>Core Academy CA 4th 2008, "Focus on Fractions" 5-3 thru 5-19 CA 4th 2008, "The Power of One" 5-13 thru CA 4th 2008, "Delightfully Different Fractions" 5-20 through 5-40 CA 3rd, 2007, "Collecting Fun with Fractions" 8-12 through 8-16</p>

Core Vocabulary: sixth, eighths, tenths, numerator, denominator
Additional Vocabulary: hundredths

Assessment:
Block 5

Grade 4 ~ Block 6 ~ Even More Multiplication/Division & Algebra

Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 5:</u> Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals.</p> <p>1.5.b. Multiply up to a three-digit factor by a two-digit factor with fluency, using efficient procedures.</p> <p>1.5.c. Divide up to a three-digit dividend by a one-digit divisor with fluency, using efficient procedures</p> <p>-----</p> <p>Standard 2: Use algebraic expressions, symbols, and properties of the operations to represent, simplify, and solve mathematical equations and inequalities.</p> <p>2.2.d. Describe and use the commutative, associative, distributive, and identity properties of addition and multiplication, and the zero property of multiplication.</p>	<p>~Encourage the use of fact families for multi-digit problems.</p> $234 \times 5 = 1,170$ $1,170 \div 5 = 234$ <p>-----</p> <p>~Emphasis should be placed on the distributive property, keeping in mind that students will use other properties in solving problems, too</p>	<p>2008 SFAW Diamond Edition 6-6 Multiplying Greater Numbers</p> <p>-----</p>
<p>Core Vocabulary: distributive property Additional Vocabulary:</p>		<p>Assessment: Block 6 Benchmark 2 (reported)</p>

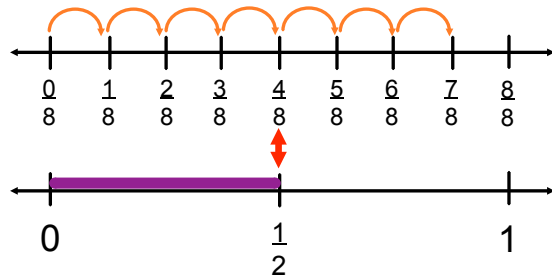
Grade 4 ~ Benchmark 3 ~ Instructional Support

Block 7	Block 8	Block 9
Block 7	Block 8	Block 9
<p><u>Operating with Fractions and Decimals</u> Problem solving and fraction work were purposefully joined together in this block to provide opportunity for students to make sense of adding and subtracting fraction. Models and story context will be useful tools in this process. Students will also add and subtract decimals to the tenths and thousandths.</p>	<p><u>Geometry and Measurement</u> The work of this block focuses on 2-D shapes. Students describe the types of angles and lines within a shape, apply transformations, and learn that angles are measured in degrees. They recognize other measureable attributes of 2-D shape by examining area and perimeter.</p>	<p><u>Measurement and Probability</u> The majority of the measurement work in this block is capacity with customary and metric units. (Some time is spent working with length and weight in metric units.) Work with area from block 8 is extended to include triangles and parallelograms in block 9. Finally, students conduct simple probability experiments and begin learning about likelihood of events in an experiment.</p>

Models for Adding and Subtracting Fractions

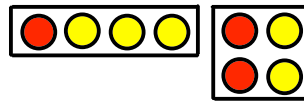
Once we agree on the fractional unit, we count, add, and subtract just like whole numbers using verbal statements such as "1 third + 1 third = 2 thirds". Once this is understood, students can move to the notation: $1/3 + 1/3 = 2/3$. The difficult part for students is not understanding the addition, but learning to recognize that the denominator is only naming the fractional unit. (Elementary Math for Teachers) **All images below also work for subtracting fractions.**

Fraction Bar (Measurement) Models



After two equal sized number lines are lined up and compared, students can see that $1/2$ is equal to $4/8$ and can count (iterate) by eighths.

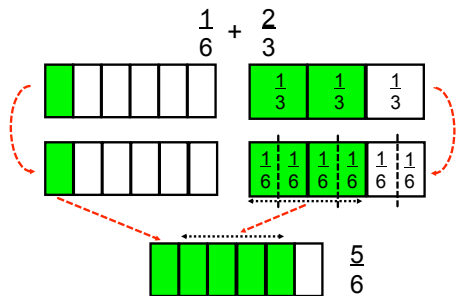
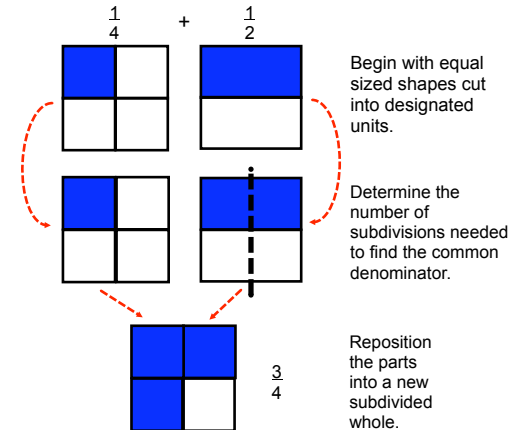
Set Model



$$\frac{1}{4} + \frac{1}{2} = \frac{3}{4}$$

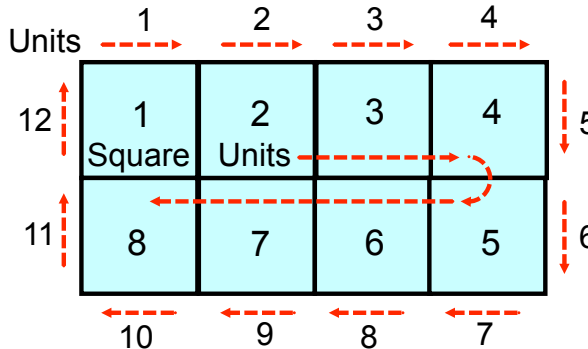
Students should think about how many sets they can add to $1/2$ until they have the same amount in both boxes (finding the common denominator). Sometimes sets will be added to both boxes until a common quantity exists.

Area (Region) Model



Familiarity with unit fractions ($1/3$, $1/4$, etc.) and how many it takes to make a whole will help students know when to subdivide a unit to find a common denominator.

Area and Perimeter



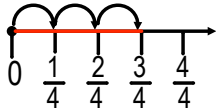
Perimeter is a 1-dimensional measurement to determine the distance around a 2-dimensional shape.

Area is a 2-dimensional measurement to determine the space enclosed in a figure and is written in square units.

All measurements should be completed without gaps or overlaps for accuracy.

This is a challenging topic for many 4th graders and memorizing formulas is not enough to build understanding. Children should have opportunity to develop these ideas through hands-on activities.

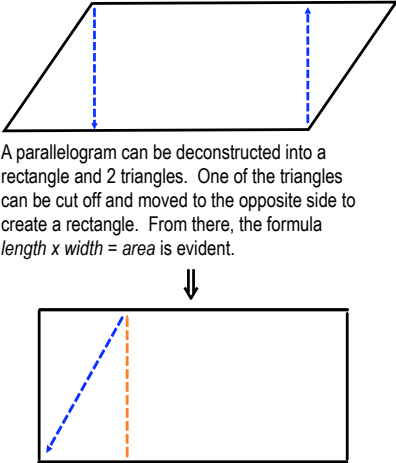
Grade 4 ~ Block 7 ~ Operating with Fractions & Decimals

Core Content	Teaching Strategies	Resources
<p>Standard 1: Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.</p> <p><u>Objective 3:</u> Model and illustrate meanings of multiplication and division of whole numbers and the addition and subtraction of fractions. 1.3.e. Use models to add and subtract simple fractions where one single-digit denominator is 1, 2, or 3 times the other (e.g., $2/4 + 1/4$; $3/4 - 1/8$).</p> <hr/> <p><u>Objective 4:</u> Solve problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals. 1.4.a. Use estimation, mental math, paper and pencil, and calculators to perform mathematical calculations and identify when to use each one appropriately. 1.4.b. Select appropriate methods to solve a single operation problem and estimate computational results or calculate them directly, depending on the context and numbers involved in a problem. subtraction of simple fractions and decimals. 1.4.d. Solve problems involving simple fractions and interpret the meaning of the solution (e.g., A pie has been divided into six pieces and one piece is already gone. How much of the whole pie is there when Mary comes in? If Mary takes two pieces, how much of the whole pie has she taken? How much of the pie is left?)</p> <hr/> <p><u>Objective 5:</u> Compute problems involving multiplication and division of whole numbers and addition and subtraction of simple fractions and decimals. 1.5.d. Add and subtract decimals and simple fractions where one single-digit denominator is 1, 2, or 3 times the other (e. g., $2/4 + 1/4 = 3/4$; $1/3 - 1/6 = 1/6$).</p>	<p>~Lesson 9-3 could be modified to teach adding fractions on a number line. For example, instead of locating a point on the number line as the lesson suggests, students could add like denominator fractions by counting the number of iterations. For example, $1/4 + 2/4$ could be modeled as shown below. The first hop represents adding $1/4$ and the next two hops represent adding $2/4$ arriving at an answer of $3/4$. Subtracting could be handled in a similar manner.</p> 	<p>2008 SFAW Diamond Edition 9-3 Fractions, Lengths, and the Number Line (See Teaching Strategies)</p> <p>5th GRADE TEXT: <i>8-1 Adding and Subtracting Fractions with Like Denominators</i> <i>8-2 Understanding Adding and Subtracting Fractions with Unlike Denominators</i></p> <p>11-4 Decimals and Fractions (Optional Review) 11-6 Using Grids to Add and Subtract Decimals 11-7 Adding and Subtracting Decimals</p> <p>Core Academy CA 4th 2008, "Delightfully Different Fractions" 5-20 through 5-40</p>
<p>Core Vocabulary: sum, difference Additional Vocabulary:</p>		<p>Assessment: Block 7</p>

Grade 4 ~ Block 8 ~ Geometry & Measurement

Core Content	Teaching Strategies	Resources
<p>Standard 3: Students will understand attributes and properties of plane geometric objects and spatial relationships.</p> <p><u>Objective 1:</u> Identify and describe attributes of two-dimensional geometric shapes.</p> <p>3.1.a. Name and describe lines that are parallel, perpendicular, and intersecting.</p> <p>3.1.b. Identify and describe right, acute, obtuse, and straight angles.</p> <p>3.1.c. Identify and describe the radius and diameter of a circle.</p> <p>3.1.d. Identify and describe figures that have line symmetry and rotational symmetry.</p> <p><u>Objective 3:</u> Visualize and identify geometric shapes after applying transformations.</p> <p>3.3.a. Identify a translation, rotation, or a reflection of a geometric shape.</p> <p>3.3.b. Recognize that 90°, 180°, 270°, and 360° are associated, respectively, with $1/4$, $1/2$, $3/4$, and full turns.</p> <p>Standard 4: Students will describe relationships among units of measure, use appropriate measurement tools, and use formulas to find area measurements.</p> <p><u>Objective 1:</u> Describe relationships among units of measure for length, capacity, and weight, and determine measurements of angles using appropriate tools.</p> <p>4.1.d. Recognize that angles are measured in degrees and develop benchmark angles (e.g., 45°, 60°, 120°) using 90° angles to estimate angle measurement.</p> <p>4.1.e. Measure angles using a protractor or angle ruler.</p> <hr/> <p>Standard 3: Students will understand attributes and properties of plane geometric objects and spatial relationships.</p> <p><u>Objective 2:</u> Recognize and describe area as a measurable attribute of two-dimensional shapes and calculate area measurements.</p> <p>4.2.a. Quantify area by finding the total number of same-sized units of area needed to fill the region without gaps or overlaps.</p> <p>4.2.b. Recognize that a square that is 1 unit on a side is the standard unit for measuring area.</p> <p>4.2.c. Develop the area formula for a rectangle and connect it with the area model for multiplication.</p> <p>4.2.f. Determine possible perimeters, in whole units, for a rectangle with a fixed area, and determine possible areas when given a rectangle with a fixed perimeter.</p>	<p>~Take your students on a “geometric hunt” around the school looking for items in the core (e.g. right angles, line and rotational symmetry, etc.)</p> <p>~Use the clock as a benchmark for determining angles.</p> <div data-bbox="1213 443 1398 626" data-label="Image"> </div> <p>If this is a 90° angle, what might a 45° look like?</p> <p>~Provide opportunities for students to use Escher (the artist) tessellations to recognize transformations.</p> <hr/> <p>~Students need hands-on experiences to recognize that area is a 2-D measurement that covers the interior space of a shape without gaps or overlaps. Perimeter is a 1-D measurement that measures the outside edge of a 2-D shape without gaps or overlaps.</p>	<p>2008 SFAW Diamond Edition</p> <p>8-3 Lines, Lines Segments, Rays, and Angles</p> <p>8-5 Circles</p> <p>8-7 Symmetry</p> <p>Core Academy</p> <p>CA 4th 2007, “Angle Assessment” 6-9 through 6-10</p> <p>CA 4th 2003 “Identifying Angles” 9-8 through 9-14</p> <p>CA 4th 2003 “Quadrilateral Characteristics” 9-1 through 9-4</p> <p>CA 4th 2003 “Lines of Symmetry” 9-21 through 9-23</p> <p>CA 4th 2003 “Geometry Hike” 9-35</p> <p>CA 3rd, 2003, “Shapes are Everywhere” 9-15 through 9-20</p> <p>CA 3rd, 2006, “Slides, Flips & Turns” 3-14 through 3-20</p> <p>CA 4th 2007, “Cut Stretch, Fold” 6-11 through 6-18</p> <p>CA 4th 2008, “Angles, Degrees, Protractors, “Oh My” 3-3 thru 3-13</p> <hr/> <p>2008 SFAW Diamond Edition</p> <p>8-10 Perimeter</p> <p>8-11 Area</p>
<p>Core Vocabulary: parallel, perpendicular, intersecting lines, right angle, acute angle, obtuse angle, straight angle, radius, diameter, circle, line symmetry, rotational symmetry, translate, rotate, reflect, degree, transformation, area, perimeter</p> <p>Additional Vocabulary: angle</p>		<p>Assessment: Block 8</p>

Grade 4 ~ Block 9 ~ Measurement & Probability

Core Content	Teaching Strategies	Resources
<p>Standard 4: Students will describe relationships among units of measure, use appropriate measurement tools, and use formulas to find area measurements.</p> <p><u>Objective 1:</u> Describe relationships among units of measure for length, capacity, and weight, and determine measurements of angles using appropriate tools.</p> <p>4.1.a. Describe the relative size among metric units of length (i.e., millimeter, centimeter, meter), between metric units of capacity (i.e., milliliter, liter), and between metric units of weight (i.e., gram, kilogram).</p> <p>4.1.b. Describe the relative size among customary units of capacity (i.e., cup, pint, quart, gallon).</p> <p>4.1.c. Estimate and measure capacity using milliliters, liters, cups, pints, quarts, and gallons, and measure weight using grams and kilograms.</p> <hr/> <p>Standard 4: Students will describe relationships among units of measure, use appropriate measurement tools, and use formulas to find area measurements.</p> <p><u>Objective 2:</u> Recognize and describe area as a measurable attribute of two-dimensional shapes and calculate area measurements.</p> <p>4.2.d. Develop and use the area formula for a right triangle by comparing with the formula for a rectangle (e.g., two of the same right triangles makes a rectangle).</p> <p>4.2.e. Develop, use, and justify the relationships among area formulas of triangles and parallelograms by decomposing and comparing with areas of right triangles and rectangles.</p> <hr/> <p>Standard 5: Students will interpret and organize collected data to make predictions, answer questions, and describe basic concepts of probability.</p> <p><u>Objective 2:</u> Describe and predict simple random outcomes.</p> <p>5.2.a. Describe the results of experiments involving random outcomes as simple ratios (e.g., 4 out of 9, 4/9).</p> <p>5.2.b. Conduct simple probability experiments, with and without replacement, record possible outcomes systematically, and display results in an organized way.</p> <p>5.2.c. Use the results of simple probability experiments, with and without replacement, to describe the likelihood of a specific outcome in the future.</p>	<p>~Measurement as a mathematical topic is focused on using relationships and comparisons. Students will develop a greater understanding of the relationship between measurement units by participating in hands-on activities that allow them to compare and contract those units.</p> <p>-----</p> <p>~The heart of this objective is for students to recognize geometric relationships (through composing and decomposing shapes) and use that information to draw conclusions for finding the area of new shapes.</p> <div style="text-align: center;">  <p>A parallelogram can be deconstructed into a rectangle and 2 triangles. One of the triangles can be cut off and moved to the opposite side to create a rectangle. From there, the formula $length \times width = area$ is evident.</p> </div>	<p>2008 SFAW Diamond Edition</p> <p>10-9 Capacity and Customary Units 11-9 Length and Metric Units 11-10 Capacity and Metric Units 11-11 Mass and Customary Units</p> <p>Core Academy</p> <p>CA 5th, 2003, "Units of Liquid Measurement" 10-43 CA 4th, 2006, "Which Unit to Use" 4-13 through 4-12 CA 4th, 2006, "Fill to Capacity" 4-13 through 4-12 CA 4th, 2006 "Worth the Weight" 4-20 Through 4-2</p> <hr/> <p>Core Academy</p> <p>CA 4th, 2008, "Mountain Man Measurement Rendezvous" 3-14 through 3-23</p> <hr/> <p>2008 SFAW Diamond Edition</p> <p>12-5 Understanding probability 12-6 Listing Outcomes 12-7 Finding Probability</p> <p>Core Academy</p> <p>CA 4th, 2008 "Practice with Probability 4-8 through 4-13</p>
<p>Core Vocabulary: millimeter, centimeter, meter, milliliter, liter, gram, kilogram, cup, pint, quart, gallon, probability</p> <p>Additional Vocabulary: outcome, likelihood</p>		<p>Assessment: Block 9 Benchmark 3 (reported)</p>

