

## CHAPTER 3

# Content & Planning

*Nearly three-quarters of U.S. fourth graders report liking mathematics (Silver, Strutchens, and Zawojewski 1997). They find it practical and believe that what they are learning is important. If the mathematics studied in grades 3–5 is interesting and understandable, the increasingly sophisticated mathematical ideas at this level can maintain students' engagement and enthusiasm. But if their learning becomes a process of simply mimicking and memorizing, they can soon begin to lose interest. Instruction at this level must be active and intellectually stimulating and must help students make sense of mathematics.*

NCTM, 2000

---

## Mathematical Themes for Fourth Grade















The National Council of Teacher of Mathematics defines three central mathematical themes for the 3–5 grade band: multiplicative reasoning, equivalence, and computational fluency. All three play a major role in fourth grade.

### Multiplicative Reasoning

As students move into the intermediate grades, they need to shift from the additive reasoning they developed during their primary years to multiplicative reasoning. Multiplicative reasoning involves more than the ability to multiply and divide, beginning with the understanding that our base ten number system has a multiplicative structure. For instance, the number 4,275 is really  $(4 \times 1000) + (2 \times 100) + (7 \times 10) + (5 \times 1)$  as well as one collection of 4,275 objects. Although it is certainly possible to find the answer to  $7 \times 39$  by adding 39 seven times (or 7 thirty-nine times), repeated addition becomes increasingly tedious and time-consuming, especially once students move beyond the basics. In fourth grade, students will make the connection between place value and multiplication and develop efficient strategies for multiplying double- and triple-digit numbers by single-digit numbers.

The development of multiplicative reasoning is also required for fourth graders to make progress in strands other than computation. For example, multiplicative reasoning enables students to find the area of 2-dimensional shapes and the volume of 3-dimensional solids efficiently and effectively. Students also employ multiplicative reasoning when searching for generalized patterns that will provide the foundations for proportional reasoning in the middle grades. T-charts, like the one on the record sheet that accompanies the February calendar pattern, are a good way to organize information to show how

two variable quantities are related. Well into fourth grade, many students extend this kind of pattern using additive reasoning, figuring out the difference between each number and adding on to create each new element in the sequence. Although this is an accurate way to complete the table or make predictions about upcoming calendar markers, it is not as efficient as using multiplicative reasoning, because when they use multiplicative reasoning, students can determine the output number for any date without computing the intermediary output numbers.

February						
Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday
		1 	2 	3 	4 	5 
		4 	7 	10 	13 	16 
6 	7 					
19 	22 					

February Calendar Record Sheet		
Input Number	Output Number	Observations & Predictions
1	4	Maybe it'll add 3 each time.
2	7	Now it added 5, not 3.
3	10	It added 7 this time.
4	13	Every new number on the Out side is 3 more than the one before.
5	16	Tomorrow it will be 10, and the day after, it will be 22. It's always 3 more.
6	19	It goes up by 1 on the In number and by 3 on the Out number.
7	22	The Out number is way more than double the In number. It's more like 3 times the In number.

**Keith** *What will the output number be on the 10th? Well, let's see. The pattern is adding 3 each day, so  $22 + 3 = 25$ , and  $25 + 3 = 28$ , that's the 9th. And  $28 + 3 = 31$ , so the output number on the 10th will be 31. (additive reasoning)*

**Maria** *I think the output number on the 10th will be 31 because each day, the output number is 3 times the date plus 1. Look at the 4th. The output number is  $3 \times 4 + 1$ . And on the 7th, it's  $3 \times 7 + 1$ . It works that way every day. (multiplicative reasoning)*

### Equivalence

Students' ability to recognize, create, and use equivalent representations of numbers and geometric objects should also increase in fourth grade. Examining equivalence helps students develop efficient strategies for computing and solving problems. For example, students who can see  $24$  as  $20 + 4$ ,  $25 - 1$ , and  $2 \times 12$  have several different options for calculating  $7 \times 24$ , all of which are at least as efficient as the traditional algorithm for double-by single-digit multiplication.

**Students**  *$7 \times 24$ ? That's easy. It's just  $(7 \times 20) + (7 \times 4)$ . That's  $140 + 28 = 168$ .*

*I thought of it like 7 quarters. I know that 7 quarters is \$1.75, but I have to subtract off 1 group of 7 because we're only doing  $7 \times 24$ . So it's 168. Here's another way. 24 is twice 12, and I know that  $7 \times 12 = 84$ . So twice 84 is 168.*

As fourth graders develop fraction and decimal sense, equivalence plays a vital role in helping them understand the connection between the common fractions and decimals. For example, given a wide variety of experiences, students will come to think of  $\frac{1}{2}$  in many ways, including half an hour, or 30 minutes out of 60; half an inch; a 2-out-of-4 or 50-50 chance to pull a red tile out of a bag that contains 2 red and 2 green tile; or half a dollar, which is 0.50.

### Computational Fluency

Computational fluency refers to having efficient, accurate, and generalized methods for computing that are based on well-understood properties and number relationships. When students' computational fluency is based on a solid grasp of number properties and relationships, they view algorithms as tools for solving problems rather than the goal of mathematics study. Students who are computationally fluent perform calculations mentally or use paper-and-pencil sketches, numbers, or algorithms depending on the problem. Computational fluency is enhanced by students' use of estimation strategies to judge the reasonableness of their solutions.

In fourth grade, the emphasis is on computational fluency with multiplication facts to  $12 \times 12$ . *Bridges* uses the four-pronged approach described below to help develop students' fluency with those multiplication facts.

1. First, you'll provide conceptual instruction that focuses on strategies, an understanding of the operation of multiplication, and the patterns among the facts. This instruction occurs in Unit One and in the September–December Computational Fluency Workouts, as well as many Problem Solving Workouts.
2. The conceptual instruction is followed by opportunities to practice strategies and build speed and fluency with the facts. This practice most often takes the form of games and is also included in the September–December Computational Fluency Workouts.
3. Third, you'll assess students to guide further instruction, using un-graded timed checkups called Quick Facts in the Number Corner Computational Fluency Workouts, as well as more conceptually oriented and problem-solving-related assessments in the units and Number Corner. While we do not advocate timed drill, it is only through timed checkups that teachers can assess whether students have the speed that is an essential component of computational fluency.
4. Finally, you'll support students in their areas of need with further instruction and practice informed by the assessments. Guidance is provided about which Support Activities to use with students who need further practice with specific groups of multiplication facts.

---

## Mathematical Themes Across the Content Strands

All three themes—multiplicative reasoning, equivalence, and computational fluency—increase in complexity throughout the 3–5 grade band and reappear in each of the five content strands: number and operations, algebraic thinking, geometry, measurement, and data analysis and probability. Your students will have an opportunity to construct an understanding of the following concepts and skills in the five content strands through a variety of models and experiences. The descriptions below are meant as a guide: not all of your students will master each and every concept and skill by the end of the year, and your state standards and benchmarks will provide more specific guidance about your community's expectations for fourth graders' mathematical learning.

### Computation & Number

By the end of fourth grade, most children will have a very firm understanding of addition, subtraction, multiplication, and division, as well as a grasp of the relationships between the four operations. They will have mastered their multiplication facts and developed efficient strategies for quickly determining their division facts. They will be efficient and accurate at multiplying 2- and 3-digit numbers by 1-digit numbers, and well on their way to understanding the process of division beyond the basics as well. By the end of the year, fourth graders will have worked fairly extensively with fractions and decimals to hundredths and be able to read, interpret, and model both using various concrete models, including money. They will have explored addition and subtraction of both fractions and decimals, and come to understand some of the connections between the two kinds of numbers.

### Algebraic Thinking

By the end of the year, fourth graders will be able to describe, extend, and make conjectures and generalizations about numeric and geometric patterns. They will extend number patterns that involve adding or multiplying a single-digit number such as 3, 6, 9, 12 (add 3 to generate each new number) or 2, 6, 18, 54 (multiply by 3 to generate each new number), and will also begin to work with sequences such as the triangular (1, 3, 6, 10, 15) and square numbers (1, 4, 9, 16, 25). Given a specific rule, they will create or complete a table of values; given a table of values, they will generate the rule to explain how each number relates to its partner. Students will use patterns to make predictions and solve problems; translate situations into tables, charts, and graphs, as well as numerical expressions and equations; and start to explore variables.

### Geometry

Although fourth graders are still inclined to describe and compare 2- and 3-dimensional shapes in terms of their attributes and properties, they will

begin to make informal deductions about shapes as well. When looking at a rectangle, most second graders will be able to explain that it has 4 corners, 4 straight sides, and 2 pairs of equal sides. Some third graders and many fourth graders might say that the rectangle is a quadrilateral with 2 sets of parallel sides and 4 right angles (90 degrees each). With guidance and support, some fourth graders will be moving in the direction of being able to say that a square is a rectangle because it has 4 right angles and the definition of a rectangle is a quadrilateral with 4 right angles. By the end of fourth grade, students will have had enough spatial experiences to combine and subdivide 2- and 3-dimensional shapes with confidence, predict and describe or show the results of transformations (flips, slides, and turns), and understand the connection between transformations and congruence. They will also be able to locate and identify coordinates on grids, maps, and other charts.

### **Measurement**

Fourth graders will select the most appropriate tool and unit (U.S. customary or metric) to measure length, weight or mass, capacity (volume), and time. They will make reasonable estimates for the object being measured and carry out basic conversions between familiar units. They will also be able to find the area and perimeter of rectangles, and will have had experiences finding the surface area and volume of rectangular solids.

### **Data Analysis & Probability**

Fourth graders will read and interpret a wide variety of graphs, including line plots, scatter plots, pictographs, and bar, line, and pie or circle graphs. They will draw conclusions and make predictions based on these graphic displays. They will find the mode (most common value), range, median, and mean of a data set. By the end of the year, fourth graders will be able to collect data and present it on a graph, choosing an appropriate scale and labeling the graph accurately. Fourth graders are also expected to move beyond the magical beliefs about probability held by younger students toward the understanding that likely and unlikely outcomes depend on initial conditions, at least in the long run. Students should be able to list the possible outcomes of a given situation such as flipping a coin, rolling a die, or spinning a spinner, and state the probability of a particular outcome in numerical terms. They should also begin to understand the effect of sample size.



CORRELATIONS TO NCTM STANDARDS										
	Content Standards					Process Standards				
	NUMBER & OPERATIONS	ALGEBRA	GEOMETRY	MEASUREMENT	DATA ANALYSIS & PROBABILITY	PROBLEM SOLVING	REASONING & PROOF	COMMUNICATION	CONNECTIONS	REPRESENTATION
▼ 1–2 Lessons ◆ 3–4 Lessons ○ 5–9 Lessons □ 10+ Lessons										
<b>Units</b>										
<b>Unit One</b> Multiplication & Division Models	□	◆	○	□		□	□	□	◆	□
<b>Unit Two</b> Place Value & Multiplication with Larger Numbers	□	◆	▼	□	○	□	□	□	○	□
<b>Unit Three</b> Fractions & Division	□		▼	□		□	□	□	○	□
<b>Unit Four</b> Geometry & Measurement	▼	○	□	□		□	□	□	◆	□
<b>Unit Five</b> Probability & Data Analysis	○		▼	▼	□	□	□	□	◆	□
<b>Unit Six</b> Fractions & Decimals	□			▼		□	□	□	○	□
<b>Unit Seven</b> Algebraic Thinking	▼	□	○		□	□	□	□	◆	□
<b>Unit Eight</b> Wingspans: Measurement & Data Analysis	□	◆	◆	□	□	□	□	□	□	□
<b>Number Corner</b>										
August & September	○	□		▼		◆	▼	○	◆	◆
October	○	◆		◆		◆	◆	○	◆	◆
November	○	◆	▼	◆		◆	◆	○	▼	▼
December	○	▼		▼		◆	◆	○	▼	▼
January	◆	▼		◆	▼	◆	◆	○	▼	◆
February	◆	◆			▼	◆	◆	○	▼	▼
March	◆	◆		▼	▼	◆	◆	○	◆	◆
April	◆	◆	▼	▼		◆	◆	○	▼	▼
May & June	◆	▼	▼	▼	▼	◆	◆	○	◆	◆

## An Overview of the Mathematics in Fourth Grade *Bridges*

In order to help students reach the mathematical goals laid out in this chapter by the end of fourth grade, *Bridges* offers a clearly articulated program that begins in kindergarten, continues through first, second, and third grades, and moves into fourth with common models, teaching strategies, and objectives. The major mathematical concepts are covered in seven units, while an eighth thematic unit called Wingspans provides an opportunity for students to extend and refine their understandings of measurement and data analysis in the context of a scientific investigation of birds. Each unit introduction includes a chart showing the major skills addressed in the unit. The chart also specifies whether those skills are introduced, developed, or taught for mastery within that unit, as well as information about the other units and months of Number Corner in which those skills are addressed.

Multiplication & Division Models Unit One

---

**Skills Across the Grade Levels**

The table below shows the major skills and concepts addressed in Unit One. It is meant to provide a quick snapshot of the expectations for students' progress during this unit, as well as information about how these topics are addressed in Bridges Grades 3 and elsewhere in Grade 4. The Fourth Grade Math Skills and Concepts Tracking Chart (Getting Started Appendix 1.16–1.24) provides more detailed information about where each skill or concept is taught and assessed in Grade 4. The Competencies & Experiences chart in Getting Started (Appendix 1.7–1.12) provides more information about how the skills and concepts in each content strand are addressed through the grade levels.

MAJOR SKILL/CONCEPTS ADDRESSED IN UNIT ONE	GRADE 3	GRADE 4	ELSEWHERE IN GRADE 4
Identifying 2-D geometric shapes	M	E	Unit Four November & April Number Corner
Describing and comparing 2-D geometric shapes	D	D	Unit Four November & April Number Corner
Relating the area and dimensions of a rectangle to area models for multiplication and division	I	D	Units Two, Three & Six
Demonstrating an understanding of the processes of multiplication and division	I	D	Units Two & Three October–May Number Corner
Knowing and fluently using multiplication facts through 12's	I	D	Unit Two October–March Number Corner
Applying the commutative and associative properties to simplify calculations with whole numbers	I	D	Units Two & Three
Applying the distributive property to simplify calculations with whole numbers	I	I	Units Two & Three
Developing efficient methods of determining factors of whole numbers	I	D	Unit Three September–February Number Corner
Identifying numbers as prime or composite	I	D	March Number Corner
Developing strategies for finding the perimeter of a rectangle	D	D	Unit Two January & April Number Corner
Developing strategies for finding the area of a rectangle	D	D	Units Two & Six January & April Number Corner
Drawing a labeled sketch or diagram to represent a story problem or mathematical situation	D	D	All Units All Number Corner Problem Solving Workouts

I – Skill or concept is introduced or re-introduced.  
 D – Skill or concept is developed.  
 M – Skill or concept is expected to be mastered.  
 E – Skill or concept is extended to higher levels.  
 N/A – Skill or concept is not addressed.

While the units are organized by theme or concept, the Number Corner workouts change each month. Each month's workouts are carefully designed to complement the work students are doing in the units, providing both a preview and a review of important skills and concepts that need to be developed over a long period of time. For example, the Calendar Grid Workout in October features a base four counting pattern that foreshadows the place value work students will do in Unit Two, while the March Calendar Grid pattern revisits the work students did with fractions in Unit Three to help extend their understandings of equivalent fractions. The Number Line and Calendar Collector Workouts in the winter and spring offer instruction in rounding, frac-

tions, and decimals, topics addressed in Units Three and Five that take more time and experience to develop than can be offered in one or two units.

The Computational Fluency and Problem Solving Workouts offer enough consistent practice with the basic multiplication and division facts, as well as multi-digit computation, to make it possible for teachers to delve into lengthy units on geometry, probability, and algebraic thinking without worrying that some of their students will lose their computational skills in the process. The Problem Solving Workout offers students the opportunity to generate and use a number of specific problem solving strategies that are certainly touched upon in some of the units but not made quite as explicit. The lessons in both the *Bridges* units and Number Corner are essential and together help students and teachers meet the expectations for fourth grade mathematics described on the previous pages. The chart below provides a brief summary of mathematical content through the year in both the *Bridges* Units and Number Corner.

BRIEF OVERVIEW OF YEARLONG CONTENT	
Units	Number Corner Workouts
<b>Teachers Guide, Volume One</b> Unit One: Multiplication & Division Models Unit Two: Place Value & Multiplication with Larger Numbers	<ul style="list-style-type: none"> <li>analyzing and extending patterns</li> <li>developing place value concepts including rounding</li> <li>performing geometric transformations (flips, slides, and turns)</li> </ul>
<b>Teachers Guide, Volume Two</b> Unit Three: Fractions & Division Unit Four: Geometry & Measurement	<ul style="list-style-type: none"> <li>figuring elapsed time</li> <li>exploring the concept of functions</li> <li>locating and identifying coordinates on a map</li> <li>measuring length, area, perimeter and liquid capacity</li> </ul>
<b>Teachers Guide, Volume Three</b> Unit Five: Probability & Data Analysis Unit Six: Fractions & Decimals	<ul style="list-style-type: none"> <li>collecting data and interpreting graphs</li> <li>conducting and interpreting probability experiments</li> </ul>
<b>Teachers Guide, Volume Four</b> Unit Seven: Algebraic Thinking Unit Eight: Wingspans: Measurement & Data Analysis	<ul style="list-style-type: none"> <li>developing fluency with basic multiplication and division facts</li> <li>performing multi-digit computations in the context of story problems</li> <li>estimating</li> <li>working with money and making change</li> <li>developing problem solving strategies that can be used in many situations</li> <li>understanding fractions and decimals</li> </ul>

The Grade 4 Yearlong Content Synopsis Chart on the following pages provide a far more detailed synopsis of the mathematical content of all eight units, including the Problems & Investigations, Work Places, assessments, and Home Connections. In addition, the chart gives a brief synopsis of the mathematical topics covered in the months of Number Corner—including the workouts, assessments, and Support Activities—that correspond to each unit.

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT ONE / 21 SESSIONS</b>	<b>AUGUST &amp; SEPTEMBER NUMBER CORNER</b>
<b>Unit One: Multiplication &amp; Division Models</b>	<b>August &amp; September Workouts</b>
<p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>describing and comparing 2-D shapes</li> <li>area and perimeter</li> <li>developing the area model for multiplication and division</li> <li>multiplication and division story problems</li> <li>reviewing and developing strategies for learning basic multiplication facts</li> <li>prime, composite, and square numbers</li> </ul> <p><b>Work Places</b></p> <p><b>1A Arrays to 100</b> developing fluency with basic multiplication facts; applying the commutative, associative, and distributive properties</p> <p><b>1B Spinning Around Multiplication</b> strategies for basic multiplication facts</p> <p><b>Assessments</b> Unit One Pre-Assessment, part 1 (Session 2) Unit One Pre-Assessment, part 2 (Session 7) Unit One Post-Assessment (Session 21) Individual Interview (Session 7) Work Samples: Sessions 4, 8, 10</p> <p><b>Home Connections</b></p> <p><b>1 Shape Connections</b> describing and comparing 2-D shapes</p> <p><b>2 Measuring with the Blue Rhombus</b> area and multiplication</p> <p><b>3 Tetragrams &amp; Pattern Block Areas</b> spatial problem solving, area, and multiplication</p> <p><b>4 Models for Multiplication</b> posing multiplication story problems</p> <p><b>5 The Rectangular Area Model &amp; Area Conversions</b> using the area model to solve multiplication problems; multiplication and division</p> <p><b>6 Factors of 48</b> primes, composites, factors</p> <p><b>7 Solving Multiplication Facts Book</b> reviewing and developing efficient strategies to solve basic multiplication facts</p> <p><b>8 Multiplying by 8 &amp; 9</b> developing efficient strategies to multiply by 8 and 9</p> <p><b>9 Multiplication Facts</b> multiplication fact practice through <math>10 \times 10</math></p> <p><b>10 Perimeter of 20</b> area and perimeter</p>	<p><b>Calendar Grid</b> place value and multiplying by 10 and 11</p> <p><b>Calendar Collector</b> centimeters, decimeters, and meters; fractions</p> <p><b>Problem Solving</b> expanded notation, place value, comparing ancient and modern numeration systems</p> <p><b>Number Line</b> identifying multiples of 2 and 3 and practicing multiplication facts through <math>6 \times 6</math></p> <p><b>Assessment</b> Baseline (optional) basic addition, subtraction, and multiplication facts; adding and subtracting 2- and 3-digit numbers with regrouping; identifying place value of digits in whole numbers; multiplying and dividing 2- and 3-digit numbers; evaluating a situation that involves probability; reading and interpreting a tally chart</p> <p><b>Support Activities</b></p> <p><b>1 Spinning Around Subtraction</b> strategies for basic subtraction facts</p> <p><b>2 More or Less Place Value</b> expanded notation</p> <p><b>3 Make 100</b> 2-digit addition</p> <p><b>4 Race to 100 &amp; Back</b> 2-digit addition and subtraction</p> <p><b>5 Count Down 400</b> 2- and 3-digit subtraction</p> <p><b>6 More or Less Addition</b> multi-digit addition</p> <p><b>7 More or Less Subtraction</b> multi-digit subtraction</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT TWO / 21 SESSIONS</b>	<b>OCTOBER &amp; NOVEMBER NUMBER CORNER</b>
<b>Unit Two: Place Value &amp; Multiplication with Larger Numbers</b>	<b>October Workouts</b>
<p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>exploring the multiplicative nature of place value in base four and base ten</li> <li>measuring length and area in metric units</li> <li>using the area model, as well as landmark numbers, to explore 2-by-1- and 2-by-2-digit multiplication</li> <li>developing efficient strategies for 2-by-1-digit multiplication</li> <li>posing and solving story problems for all four operations</li> </ul> <p><b>Work Places</b></p> <p><b>2A Moolah on My Mind</b> money, 2-by-1-digit multiplication</p> <p><b>2B More or Less Multiplication</b> multiplying 1-by-2-digit numbers</p> <p><b>2C Optional Challenge: Four 4's</b> adding, subtracting, multiplying, and dividing</p> <p><b>Assessments</b> Unit Two Pre- and Post-Assessments (Sessions 5 and 21) Work Samples: Sessions 14, 19</p> <p><b>Home Connections</b></p> <p><b>11 Explore Fours</b> cups, quarts, and gallons; multiplication facts</p> <p><b>12 Measuring in Centimeters</b> estimating and measuring length in metric units</p> <p><b>13 Multiplying by Ten</b> practicing strategies for multiplying by 10</p> <p><b>14 Spin &amp; Multiply</b> using the area model to multiply 2-by-1-digit numbers</p> <p><b>15 Coins &amp; Arrays</b> 2-by-1-digit multiplication</p> <p><b>16 Design a Floor Pattern</b> 2-by-1-digit multiplication</p> <p><b>17 Which Operation?</b> representing story problems with equations</p> <p><b>18 Moolah on My Mind</b> money, 2-by-1-digit multiplication</p>	<p><b>Calendar Grid</b> understanding regrouping in the context of base four</p> <p><b>Calendar Collector</b> cups, quarts, and gallons; fractions</p> <p><b>Computational Fluency</b> reviewing and developing efficient strategies for multiplying by 2, 3, 4, and 5; exploring related division facts</p> <p><b>Problem Solving</b> multi-digit addition and subtraction story problems</p> <p><b>Number Line</b> identifying multiples of 2, 3, and 4 and practicing multiplication facts through <math>9 \times 6</math></p> <p><b>Assessment</b> Number Corner Checkup 1 basic addition, subtraction, and multiplication facts; adding and subtracting 2- and 3-digit numbers with regrouping; identifying place value of digits in whole numbers; carrying out simple unit conversions in the metric system; selecting the most appropriate unit of measure; counting and computing with money; telling time to the minute; determining elapsed time</p> <p><b>Support Activities</b></p> <p><b>8 Three Turns to Win</b> addition of money amounts to \$5</p> <p><b>9 Finish with Ten Dollars</b> addition and subtraction of money amounts to \$10</p> <p><b>10 An Hour or Bust to the Minute</b> telling time to the minute</p> <p><b>11 Get Me to the Bus on Time</b> calculating elapsed time</p> <p style="text-align: center;"><b>November Workouts</b></p> <p><b>Calendar Grid</b> predicting and describing the results of performing flips, slides, and turns</p> <p><b>Calendar Collector</b> inches, feet, and yards; fractions</p> <p><b>Computational Fluency</b> reviewing and developing efficient strategies for multiplying by 6, 8, and 9; exploring related division facts</p> <p><b>Problem Solving</b> multiplication and division story problems</p> <p><b>Number Line</b> identifying multiples of 5 and 6 and rounding to the nearest 10</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT THREE / 20 SESSIONS</b>	<b>DECEMBER NUMBER CORNER</b>
<p><b>Unit Three: Fractions &amp; Division</b></p> <p><b>Problems &amp; investigations</b></p> <ul style="list-style-type: none"> <li>recognizing, modeling, ordering, and comparing fractions</li> <li>understanding fractions as equal parts of a unit whole, parts of a set, length, area, and time</li> <li>exploring equivalent fractions</li> <li>exploring division with and without remainders</li> <li>solving division story problems</li> </ul> <p><b>Work Places</b></p> <p><b>3A Dozens of Eggs</b> modeling, recognizing, and adding common fractions</p> <p><b>3B Fractions of a Foot Scavenger Hunt</b> estimating and measuring length in inches; using fractions of a foot</p> <p><b>3C Colored Tile Fractions</b> modeling, recognizing, and comparing common fractions; exploring equivalent fractions</p> <p><b>3D Remainders Win</b> division with and without remainders</p> <p><b>3E Line 'Em Up!</b> 2-digit by 1-digit division, with and without remainders</p> <p><b>Assessment</b> Unit Three Pre- and Post-Assessments (Sessions 2 and 20) Work Samples: Sessions 13, 18</p> <p><b>Home Connections</b></p> <p><b>19 Doubles &amp; Halves</b> area, perimeter, multiplication facts</p> <p><b>20 Comparing Fractions of a Foot</b> identifying and comparing common fractions</p> <p><b>21 Modeling Egg Carton Fractions</b> modeling and comparing fractions, exploring equivalent fractions</p> <p><b>21 Eggsplorations</b> comparing fractions, exploring equivalent fractions</p> <p><b>23 Clock Fractions</b> modeling and comparing fractions</p> <p><b>24 Fractions in the Kitchen</b> measuring capacity, exploring fractions as division</p> <p><b>25 Fractions of a Foot Scavenger Hunt</b> estimating and measuring length in inches; using fractions of a foot</p> <p><b>26 Remainders Win</b> dividing up to <math>144 \div 12</math> with and without remainders</p> <p><b>27 Fraction Stories</b> fraction and division story problems</p>	<p><b>December Workouts</b></p> <p><b>Calendar Grid</b> describing, extending, and making verbal generalizations about number patterns to make predictions and solve problems</p> <p><b>Calendar Collector</b> money: fractions and decimals</p> <p><b>Computational Fluency</b> reviewing and developing efficient strategies for multiplying by 10, 11, and 12; exploring related division facts</p> <p><b>Problem Solving</b> computational estimation</p> <p><b>Number Line</b> rounding whole numbers to the nearest 10 and the nearest 100</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT FOUR / 21 SESSIONS</b>	<b>JANUARY NUMBER CORNER</b>
<p><b>Unit Four: Geometry &amp; Measurement</b></p> <p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>describing and comparing 2- and 3-dimensional shapes</li> <li>reflective and rotational symmetry</li> <li>congruence</li> <li>translations—flips, slides, and turns</li> <li>angles</li> <li>area, surface area, and volume measured in metric units</li> <li>coordinate geometry</li> </ul> <p><b>Work Places</b></p> <p><b>4A Missouri Squares</b> coordinate grids, congruent quadrilaterals</p> <p><b>4B Area Bingo</b> finding the area of triangles and rectangles</p> <p><b>4C Mosaic Game</b> building figures with line and rotational symmetry</p> <p><b>4D Many Faces</b> 3-dimensional shapes, congruence</p> <p><b>Assessments</b> Unit Four Pre- and Post-Assessments (Sessions 3 and 21) Work Samples: Sessions 5, 7, 8, 16, 18</p> <p><b>Home Connections</b></p> <p><b>28 Origami</b> modeling and describing 2-D figures</p> <p><b>29 Clock Making Puzzle</b> identifying right, acute, and obtuse angles; telling time</p> <p><b>30 Drawing 2-Dimensional Figures</b> drawing and labeling line segments, angles, polygons, and parallel, perpendicular, and intersecting lines</p> <p><b>31 Plotting Points</b> locating coordinates of points on a grid; identifying lines of symmetry, naming polygons, recognizing congruent shapes, and identifying different kinds of angles</p> <p><b>32 3-Dimensional Shapes</b> describing 3-D shapes</p> <p><b>33 Mirror, Mirror</b> performing reflections of polygons on a grid</p> <p><b>34 Net Work</b> exploring nets for 3-D shapes</p> <p><b>35 Letter Symmetry</b> line and rotational symmetry</p>	<p><b>January Workouts</b></p> <p><b>Calendar Grid</b> determining elapsed time; converting from minutes to hours and hours to days; fractions</p> <p><b>Calendar Collector</b> conducting a probability experiment; constructing, reading, and interpreting a bar graph</p> <p><b>Computational Fluency</b> practicing multiplication facts through <math>12 \times 12</math></p> <p><b>Problem Solving</b> using estimation and rounding strategies to add, subtract, multiply, and divide</p> <p><b>Number Line</b> finding multiples of 7; rounding to the nearest 1,000</p> <p><b>Assessment</b> Number Corner Checkup 2 basic multiplication facts, adding and subtracting 2- and 3-digit numbers with regrouping, multiplying and dividing 2-digit by 1-digit numbers, rounding, carrying out simple unit conversions in the U.S. customary system, finding the area and perimeter of a rectangle, determining elapsed time, recognizing equivalent forms of common fractions and decimals to hundredths</p> <p><b>Support Activities</b></p> <p><b>12 Spinning Around Multiplication</b> strategies for basic multiplication</p> <p><b>13 Array Challenge</b> understanding multiplication; practicing facts through <math>6 \times 6</math></p> <p><b>14 Multiplication Challenge</b> understanding multiplication; practicing facts through <math>8 \times 8</math></p> <p><b>15 Spinning for Arrays</b> using arrays to practice multiplication facts through <math>9 \times 6</math></p> <p><b>16 Product Bingo</b> multiplication facts practice</p> <p><b>17 What's Missing? Bingo</b> multiplication and division facts practice</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT FIVE / 18 SESSIONS</b>	<b>FEBRUARY NUMBER CORNER</b>
<b>Unit Five: Probability &amp; Data Analysis</b>	<b>February Workouts</b>
<p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>• predicting and representing all possible outcomes in an organized way</li> <li>• predicting the likelihood of a particular outcome</li> <li>• expressing outcomes in verbal and numerical form</li> <li>• collecting, representing, and interpreting data</li> <li>• reading and interpreting bar, circle, and pictographs</li> <li>• exploring range, median, and mode</li> </ul> <p><b>Assessments</b> Unit Five Pre- and Post-Assessments (Sessions 1 and 18) Work Samples: Sessions 4, 11, 15, 17</p> <p><b>Home Connections</b></p> <p><b>36 Charting the Possibilities</b> using a chart to show all possible outcomes of a situation</p> <p><b>37 Tree Diagrams</b> using a tree diagram to show all possible outcomes of an experiment</p> <p><b>38 Organized Lists</b> using an organized list to show all possible outcomes of an experiment</p> <p><b>39 Spinner Game</b> keeping track of experimental results and determining probabilities of various outcomes</p> <p><b>40 Sports Statistics</b> interpreting data in a table and creating a pictograph</p> <p><b>41 Data Distances</b> creating a bar graph, identifying mode, median, and range</p>	<p><b>Calendar Grid</b> describing, extending, and making verbal generalizations about number patterns to make predictions and solve problems; exploring the concept of functions</p> <p><b>Calendar Collector</b> conducting a probability experiment; constructing, reading, and interpreting a bar graph; using multiplication facts fluently</p> <p><b>Computational Fluency</b> practicing multiplication facts through <math>12 \times 12</math></p> <p><b>Problem Solving</b> multiplication and division story problems</p> <p><b>Number Line</b> identifying multiples of 8 and 9</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT SIX / 22 SESSIONS</b>	<b>MARCH NUMBER CORNER</b>
<b>Unit Six: Fractions &amp; Decimals</b>	<b>March Workouts</b>
<p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>developing fraction and decimal sense</li> <li>modeling, reading, and understanding fractions and decimals</li> <li>relating the area model to fractions</li> <li>adding and subtracting whole numbers and decimals</li> <li>locating fractions and decimals on a number line</li> </ul> <p><b>Work Places</b></p> <p><b>6A Decimals More or Less</b> identifying, modeling, and comparing decimal numbers to hundredths</p> <p><b>6B Fractions, Decimals, &amp; Dollars</b> modeling fractions and decimals with money</p> <p><b>Assessments</b> Unit Six Pre- and Post-Assessments (Sessions 1 and 22) Work Samples: Sessions 3, 4, 9, 10, 13, 17</p> <p><b>Home Connections</b></p> <p><b>42 The Relationship between Multiplication &amp; Division</b> using the inverse relationship between multiplication and division</p> <p><b>43 Fraction Relationships</b> comparing fractions</p> <p><b>44 More about Cups, Quarts &amp; Gallons</b> cups, quarts, gallons, fractions</p> <p><b>45 Fractions &amp; Base Four</b> fraction situations and story problems</p> <p><b>46 Decimals Are Fractions</b> connecting decimals and fractions</p> <p><b>47 Money, Fraction, &amp; Decimal Showdown</b> comparing fractions and decimals</p> <p><b>48 Adding Money and Decimals</b> using money to model decimals, adding decimals</p> <p><b>49 Decimal Problems</b> adding and subtracting decimals</p>	<p><b>Calendar Grid</b> equivalent fractions</p> <p><b>Calendar Collector</b> collecting and graphing data; measuring in milliliters; constructing and reading a line graph</p> <p><b>Computational Fluency</b> division with and without remainders</p> <p><b>Problem Solving</b> using and identifying a variety of problem-solving strategies; reading and interpreting graphs and tables; fractions</p> <p><b>Number Line</b> prime numbers; rounding to the nearest tenth</p> <p><b>Assessment</b> Number Corner Checkup 3 basic multiplication and division facts; adding and subtracting 2- and 3-digit numbers with regrouping; multiplying and dividing 2-digit by 1-digit numbers; solving addition, subtraction, and multiplication story problems; selecting an appropriate number to make an equation true; finding the area and perimeter of a rectangle; reading and interpreting a bar graph and a pictograph; predicting the likelihood of an outcome; fractions</p> <p><b>Support Activities</b></p> <p><b>18 More or Less Addition Big Time</b> adding 3-digit numbers with regrouping</p> <p><b>19 More or Less Subtraction Big Time</b> subtracting 3-digit numbers with regrouping</p> <p><b>20 Larger Numbers on a Line</b> adding and subtracting 3-digit numbers with regrouping</p> <p><b>21 Perimeter Showdown</b> calculating the area and perimeter of rectangles</p> <p><b>22 Spin &amp; Multiply</b> multiplying 1- by 2-digit numbers</p> <p><b>23 Remainders Win</b> dividing up to <math>144 \div 12</math> with and without remainders</p> <p><b>24 Fraction Race</b> modeling and comparing fractions</p> <p><b>25 Fraction Bingo</b> modeling and comparing fractions</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT SEVEN / 14 SESSIONS</b>	<b>APRIL NUMBER CORNER</b>
<p><b>Unit Seven: Algebraic Thinking</b></p> <p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>describing and extending patterns</li> <li>making conjectures and generalizations about numeric and geometric patterns</li> <li>graphing patterns; line graphs</li> <li>exploring odd, even, square, and triangular numbers</li> <li>functions</li> <li>exploring the concept of a variable</li> </ul> <p><b>Work Places</b></p> <p><b>7A Odd One Out</b> odd and even numbers, logical reasoning</p> <p><b>7B What's My Rule?</b> creating and extending number patterns</p> <p><b>Assessments</b> Unit Seven Pre- and Post-Assessments (Sessions 4 and 14) Work Samples: Sessions 1, 3, 7, 11, 13</p> <p><b>Home Connections</b></p> <p><b>50 Extending Tile Patterns</b> describing, extending, and generalizing patterns</p> <p><b>51 Describing Patterns</b> describing, extending, and graphing patterns</p> <p><b>52 Squares on a Checkerboard</b> using patterns to solve problems, square numbers</p> <p><b>53 Temperature Graphs</b> reading, interpreting, and constructing line graphs</p> <p><b>54 Toothpick Patterns &amp; Puzzle</b> describing, extending, and generalizing patterns</p>	<p><b>April Workouts</b></p> <p><b>Calendar Grid</b> finding the perimeters of a variety of shapes and understanding the connection between area and perimeter</p> <p><b>Calendar Collector</b> equivalent fractions, mixed numbers, and adding fractions</p> <p><b>Computational Fluency</b> division practice</p> <p><b>Problem Solving</b> multiplication and division story problems, area, perimeter, and fractions</p> <p><b>Number Line</b> modeling, recognizing, and ordering decimals along a number line; adding decimals</p>

<b>GRADE 4 YEARLONG CONTENT SYNOPSIS</b>	
<b>UNIT EIGHT / 19 SESSIONS</b>	<b>MAY &amp; JUNE NUMBER CORNER</b>
<b>Unit Eight: Wingspans: Measurement &amp; Data Analysis</b>	<b>May &amp; June Workouts</b>
<p><b>Problems &amp; Investigations</b></p> <ul style="list-style-type: none"> <li>collecting, representing, and interpreting data</li> <li>exploring mean, median, and mode</li> <li>creating, reading, and interpreting tables, charts, bar graphs and line plots</li> <li>creating and interpreting scatter plots and trend lines</li> <li>measuring weight and length in U.S. customary units; making conversions from one unit to another</li> </ul> <p><b>Assessments</b></p> <p>Unit Eight Pre- and Post-Assessments (Sessions 1 and 19) Work Samples: Sessions 6, 7, 8, 18</p> <p><b>Home Connection</b></p> <p><b>55 Wingspans of Jays &amp; Their Cousins</b> reading and interpreting a table and a line plot; entering information on a line plot</p> <p><b>56 Bird Riddles</b> coordinate graphing</p> <p><b>57 More Bird Riddles</b> coordinate graphing</p>	<p><b>Calendar Grid</b> coordinate graphing and map reading skills</p> <p><b>Calendar Collector</b> multi-digit column addition, reading and constructing tables and graphs, estimation</p> <p><b>Computational Fluency</b> adding, subtracting, multiplying, and dividing using mental strategies</p> <p><b>Problem Solving</b> computation story problems with all four operations</p> <p><b>Number Line</b> reading, ordering, and recognizing equivalent forms of common fractions and decimals; locating fractions and decimals to hundredths on a number line</p> <p><b>Assessment</b> Number Corner Checkup 4 basic multiplication and division facts; adding and subtracting 2- and 3-digit numbers with regrouping; multiplying and dividing 2-digit by 1-digit and 2-digit numbers; finding factors and multiples; reading and ordering whole numbers to 60,000; reading and interpreting a bar graph, pictograph, and circle graph; predicting the likelihood of an outcome; fractions and decimals</p> <p><b>Support Activities</b></p> <p><b>26 Round &amp; Add Tens</b> Rounding 2-digit numbers to the nearest ten and adding 2- and 3-digit numbers</p> <p><b>27 Round &amp; Add Hundreds</b> Rounding 3-digit numbers to the nearest hundred and adding 3- and 4-digit numbers</p> <p><b>28 Divide 'Em Up</b> Dividing 2-digit numbers by 1-digit numbers using models</p> <p><b>29 Money, Fraction &amp; Decimal Showdown</b> Comparing common fractions, decimals, and money amounts with models</p>