Grade 4 Unit 3: Multiplication and Division; Number Sentences and Algebra

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 3-1 "What's My Rule?"		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 159)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 4.1, GMP 4.2, GMP 8.2**	What do the numbers in the *in* column represent?* What do the numbers in the *out* column represent?*
Reviewing Variations of the "What's My Rule?" Routines (*Teacher's Lesson Guide,* page 160)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.1, GMP 2.2, GMP 4.2, GMP 8.1**	How do you solve the problem when the rule is missing? **What other rules do you use to solve math problems?**
Lesson 3-2 Multiplication Facts		
Factors Pairs of Prime Numbers (*Teacher's Lesson Guide,* pages 165 and 166)	**GMP 5.2** Use mathematically tools correctly and efficiently. *See also:* **GMP 3.1, GMP 5.1, GMP 6.1, GMP 7.1**	How could you use your Multiplication/Division Facts Table or Fact Triangles to find factor pairs? How did you use the Factor Pairs of Prime Numbers table to identify prime numbers and composite numbers?
Reviewing the Models of Multiplication (*Teacher's Lesson Guide,* page 166)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 1.6, GMP 2.1**	How might thinking about what a multiplication fact means help you figure out facts? **Which multiplication model makes the most sense to you? Why?**

Lesson 3-3 Multiplication Facts Practice		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 170)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 5.2, GMP 7.2, GMP 8.1**	What other patterns can you find in the multiplication facts?* **Why do we look for patterns in math?**
Administering a Multiplication Facts Practice Test (*Teacher's Lesson Guide,* pages 170 and 171)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.5, GMP 5.1**	Discuss with students the importance of memorizing multiplication facts.* When might you need to use your facts in real life?
Lesson 3-4 More Multiplication Facts Practice		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 176)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 2.2**	How did you calculate the mean? Are the median and mean test scores fairly close to each other?*
Recording and Graphing Individual Test Results (*Teacher's Lesson Guide,* page 177)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 8.3**	What do your one-minute and three–minute scores on your 50-facts test tell you? **What might you learn by graphing your scores over time?**
Lesson 3-5 Multiplication and Division		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 181)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 4.1**	How can these statements help you solve the original problem? What statements can be made about the second problem?

Using the Multiplication/Division Facts Table for Division (*Teacher's Lesson Guide,* page 183)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 1.6, GMP 6.3**	How can you use the Multiplication/Division Facts Table to solve division problems? **What other tools can you use to solve division problems?**
Lesson 3-6 World Tour: Flying to Africa		
Examining the List of Countries and Regions (*Teacher's Lesson Guide,* pages 187 and 188)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 3.2**	What kind of information can you learn from the Country Profile? How can the *Student Reference Book* support the World Tour?
Completing the Route Map and Country Notes for Egypt (*Teacher's Lesson Guide,* pages 188 and 189)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 5.2, GMP 6.1, GMP 6.2**	Why might someone want to know the exchange rate for the Egyptian pound? **Name other examples of using math in the real world.**
Lesson 3-7 Finding Air Distances		
Finding the Air Distances between Cities (*Teacher's Lesson Guide,* pages 193 and 194)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 4.1, GMP 5.1, GMP 5.2, GMP 5.3**	Why is it more accurate to calculate air distances based on measurements to the nearest 1/2 inch instead of to the nearest inch? Why is the air distance between Chicago and Beijing an *estimated* distance?
Finding More Air Distances between Cities (*Teacher's Lesson Guide,* pages 194 and 195)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.5, GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.2**	How accurate were your guesses? **Why is it important to check your estimates?**

Lesson 3-8 A Guide for Solving Number Stories		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 199 and 200)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 1.1, GMP 1.3, GMP 1.4, GMP 1.5, GMP 5.3**	Ask for suggestions on how to solve the problem.* Compare different plans for solving the problem. What can you learn from examining different plans?
Solving Number Stories about Air Distances (*Teacher's Lesson Guide,* page 201)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.1, GMP 1.2, GMP 1.3, GMP 1.4, GMP 4.1, GMP 5.1, GMP 5.3**	How could you check whether your solutions make sense? **Why should we check whether our answers make sense?**
Lesson 3-9 True or False Number Sentences		
Exploring the Meaning of *Number Sentence* (*Teacher's Lesson Guide,* pages 204 and 205)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.6, GMP 2.2, GMP 6.1**	The sum of five and eight is equal to thirteen. Ask whether there is another way to write this sentence.* **Why do we use mathematical symbols instead of words?**
Determining Whether a Number Sentence Is True or False (*Teacher's Lesson Guide,* page 205)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	Refer to this number sentence: $716 - 487 = 616 - 487$ Can you tell whether it is true or false before doing the subtractions?* How? What digits in each number helped you decide? $4{,}684 + 182 > 4{,}694 + 482$ Can you tell whether it is true or false before doing the additions?* How? What digits in each number helped you decide?

Lesson 3-10 Parentheses in Number Sentences		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 209 and 210)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 6.1, GMP 6.3, GMP 8.1**	In a number sentence, what do parentheses indicate? **What other symbols do you know how to use in math?**
Using Parentheses in Number Sentences (*Teacher's Lesson Guide,* pages 210 and 211)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 1.5, GMP 2.2, GMP 3.1, GMP 6.1, GMP 8.1, GMP 8.2**	How can you make sure you inserted parentheses correctly? What might happen if your parentheses were not in the right place?
Lesson 3-11 Open Sentences		
Introducing the Broken Calculator Activity (*Teacher's Lesson Guide,* pages 216 and 217)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 1.4, GMP 1.5, GMP 5.3, GMP 6.2, GMP 6.3, GMP 7.1, GMP 7.2**	How does solving these problems change when one key is broken on your calculator? **What do you do when it is hard to find a solution?**
Solving Open Sentences (*Teacher's Lesson Guide,* page 217)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 1.5, GMP 2.1, GMP 6.1**	Do you agree or disagree with Isabel? Explain your answer.* What could you say to Isabel to help her understand?

*denotes a question that is currently in the *Everyday Mathematics* materials

Grade 4 Unit 4: Decimals and Their Uses

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 4-1 Decimal Place Value		
Reviewing the Place-Value Chart for Whole Numbers and Extending It to Decimals (*Teacher's Lesson Guide,* pages 240 and 241)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 2.2, GMP 5.2, GMP 6.2, GMP 7.1**	How might the relationships between ones, tens, and hundreds help you understand the relationships between tenths, hundredths, and thousandths? **Why do you think our number system is called base-10?**
Identifying Digits and the Values of Digits in Decimals (*Teacher's Lesson Guide,* page 241)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 6.2, GMP 7.1**	Discuss why the decimal point is necessary.* Discuss the value of each digit.*
Lesson 4-2 Review of Basic Decimal Concepts		
Understanding Fraction Concepts (*Teacher's Lesson Guide,* pages 245 and 246)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 5.2**	Why do you need to know what is the ONE, or the whole, when talking about fractions? When we use base-10 blocks to represent fractions, how can the flat represent the ONE?
Modeling Decimals with Base-10 Blocks (*Teacher's Lesson Guide,* pages 246 and 247)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.6, GMP 2.2, GMP 5.2, GMP 6.1**	Do 0.04 and 4/100 represent the same value? How do you know? **How does representing decimals in different ways help you understand the value?**

Lesson 4-3 Comparing and Ordering Decimals		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 251)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.2, GMP 3.1, GMP 5.1, GMP 6.1, GMP 6.2, GMP 7.2**	Arjun thought that 0.3 was less than 0.15. Explain or draw pictures to help Arjun see that 0.3 is more than 1.5.* **How might explaining other people's mistakes help your understanding?**
Ordering Decimals (*Teacher's Lesson Guide,* page 252)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How could base-10 blocks help you compare and order decimals? Why do you need to know the value of each base-10 block when using them to compare decimals?
Lesson 4-4 Estimating with Decimals		
Discussing Why Decimals are Useful (*Teacher's Lesson Guide,* pages 256 and 257)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.1**	Why is 45.6 miles more precise than 45 miles? **How can decimals help you be more precise?**
Estimating Decimal Sums (*Teacher's Lesson Guide,* pages 257 and 258)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.5, GMP 6.2**	Explain your estimation strategies.
Lesson 4-5 Decimal Addition and Subtraction		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 261 and 262)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 2.2, GMP 3.1, GMP 3.2, GMP 6.1, GMP 7.2**	Have students discuss why the answer to the problem is incorrect. There are many ways to explain the mistake.* Which explanation makes the most sense to you? Why?

Adding and Subtracting Decimals Using an Algorithm (*Teacher's Lesson Guide,* page 262)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.5, GMP 1.6, GMP 6.2**	Is it possible to use the same methods for adding and subtracting decimals that you use for whole numbers?* **What other ways might whole number place value help you understand decimal place value?**

Lesson 4-6 Decimals in Money

Practicing Mental Arithmetic (*Teacher's Lesson Guide,* page 268)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.1, GMP 2.2, GMP 4.1, GMP 6.1**	Estimate whether Kate will have more or less than $100.00 at the end of April.*
Maintaining a Savings Account (*Teacher's Lesson Guide,* page 268)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 4.2, GMP 6.2, GMP 6.3**	Why might Kate need to keep track of her bank balance? **When have you needed to add or subtract money amounts in your life?**

Lesson 4-7 Thousandths

Math Message Follow-Up (*Teacher's Lesson Guide,* page 272)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 6.1**	What happens to the denominator of the fractions 1/10, 1/100, 1/1,000? Why? **How could representations of decimals in the tenths and hundredths help you understand thousandths?**
Modeling Decimals with Base-10 Blocks (*Teacher's Lesson Guide,* page 273)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.6, GMP 2.2, GMP 6.1, GMP 6.2, GMP 7.2**	If there are fewer than 1,000 cubes, is the fraction (and the equivalent decimal) less than or greater than 1?* How many cubes are needed to show a number that is at least 1?*

Lesson 4-8 Metric Units of Length		
Reviewing Metric Units of Linear Measures (*Teacher's Lesson Guide,* pages 278 and 279)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 6.1, GMP 6.2, GMP 7.1**	What do the numbers stand for?* What do the smallest marks stand for?* **How could knowing the values of each unit help you convert between different metric units of length?**
Measuring in Centimeters (*Teacher's Lesson Guide,* page 280)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 2.1, GMP 3.1, GMP 3.2, GMP 5.1, GMP 5.2, GMP 6.2**	Which objects did you disagree about? Why do you think you did not get the same measurements? What did you do to find a measurement you could agree upon?
Lesson 4-9 Personal References for Metric Length		
Finding Personal References for Metric Units of Length (*Teacher's Lesson Guide,* page 285)	**GMP 5.1** Choose appropriate tools for your problem. *See also:* **GMP 3.2, GMP 4.1, GMP 5.2, GMP 6.2, GMP 6.3**	What tools could help you find personal references for 1 centimeter? 1 decimeter? 1 meter? **How do tools help you find personal references for units of length?**
Practicing Estimating Lengths (*Teacher's Lesson Guide,* page 286)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 5.1, GMP 5.2, GMP 6.2, GMP 6.3**	How did you use your personal references to estimate distances? How did your estimates compare with the actual lengths?

Lesson 4-10 Measuring in Millimeters		
Measuring Lengths in Millimeters and Centimeters (*Teacher's Lesson Guide,* page 291)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.5, GMP 2.1, GMP 5.2, GMP 6.2, GMP 6.3**	How could you use centimeter marks as a guide to measure in millimeters? **How do larger measurements help you understand smaller measurements?**
Measuring Invertebrates in Metric Units (*Teacher's Lesson Guide,* page 292)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1, GMP 6.2**	How do the guidelines help you to measure accurately? Why was it helpful to use your regular ruler and not the paper ruler?

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Grade 4 Unit 5: Big Numbers, Estimation, and Computation

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 5-1 Extended Multiplication Facts		
Developing a Rule for Multiplying Ones by Tens (*Teacher's Lesson Guide,* page 316)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 3.2, GMP 6.1, GMP 7.1**	What patterns helped you figure out the shortcut? **How could you use the shortcut to help you?**
Playing *Beat the Calculator* (*Teacher's Lesson Guide,* page 317)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 3.2, GMP 5.2**	How did your shortcuts for multiplying by tens help you while playing *Beat the Calculator?* Without these shortcuts who do you think would win, the Brain or the Calculator? Why?
Lesson 5-2 *Multiplication Wrestling*		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 321)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 1.4, GMP 2.2, GMP 6.1, GMP 6.3, GMP 7.2**	How did you know if you had found the largest possible answer? **Why should you keep trying to solve problems if you don't get the answer on the first try?**
Playing *Multiplication Wrestling* (*Teacher's Lesson Guide,* pages 321 and 322)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 3.1, GMP 3.2, GMP 8.2**	Ask students about the patterns they noticed and the strategies they used while playing and completing the record sheet.* How could you use these patterns to your advantage when playing *Multiplication Wrestling*?

Lesson 5-3 Estimating Sums		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 326 and 327)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.1, GMP 1.2, GMP 1.4, GMP 1.5, GMP 3.1, GMP 4.1, GMP 6.1**	Is it always necessary to find the exact answer? **When is it appropriate or useful to estimate?**
Planning a Trip (*Teacher's Lesson Guide,* page 328)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 4.1, GMP 6.2**	How did you make your estimates? Why did you do it this way? Why did the problems ask for estimates instead of exact answers?
Lesson 5-4 Estimating Products		
Using the Food-Survey Data to Make Magnitude Estimates (*Teacher's Lesson Guide,* pages 332 and 333)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.4, GMP 1.5, GMP 4.2, GMP 6.1, GMP 6.2**	Based on your answers to Problems 1–3, do you think like you eat like an average American? Explain why or why not.* Why do you think the U.S. Department of Agriculture collects the food survey data?
Estimating Averages (*Teacher's Lesson Guide,* page 334)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.4, GMP 3.1, GMP 3.2, GMP 4.1, GMP 5.3, GMP 6.2**	How can you check whether your estimates make sense? **How can an exact answer help you check your estimate?**
Lesson 5-5 Partial-Products Multiplication (Part 1)		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 338)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.1, GMP 1.5, GMP 2.2, GMP 3.1, GMP 6.3**	Have students share solution strategies.* Was there a strategy shared you might try when solving a problem? How was this strategy different?

Using the Partial-Products Algorithm with 1-Digit Multipliers (*Teacher's Lesson Guide,* page 340)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.5, GMP 3.1, GMP 6.2, GMP 8.2**	Explain how you made your estimate using these numbers. Explain how estimation can help you decide whether an answer to a multiplication problem makes sense.*
Lesson 5-6 Partial-Products Multiplication (Part 2)		
Estimating Products (*Teacher's Lesson Guide,* pages 344 and 345)	**GMP 1.5 Check whether your answer makes sense.** *See also:* **GMP 1.1, GMP 6.2, GMP 7.2**	Why are you asked to estimate the products before finding the exact answers? **Why is it important to check whether your answer makes sense?**
Using the Partial-Products Algorithm (*Teacher's Lesson Guide,* page 346)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 1.5, GMP 7.2, GMP 8.2**	Explain how the partial-products algorithm is similar to finding a team's score in a game of *Multiplication Wrestling*.* How are they different?
Lesson 5-7 Lattice Multiplication		
Demonstrating the Lattice Method for 2-Digit Multipliers (*Teacher's Lesson Guide,* page 352)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 2.2, GMP 6.3, GMP 7.2**	How does the lattice method use place value? What rules do you need to follow while doing lattice multiplication problems?
Practicing the Lattice Method with 2-Digit Multipliers (*Teacher's Lesson Guide,* page 352)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.2, GMP 3.1, GMP 5.1, GMP 6.1**	How can it help to check your answers with a partner?

Lesson 5-8 Big Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 356 and 357)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 6.2, GMP 7.1**	Why are the commas important when reading and writing large numbers? **Why is it important to read and write large numbers correctly?**
Exploring the Relationships among a Thousand, a Million, and a Billion (*Teacher's Lesson Guide*, page 358)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 5.2**	How did you use the array to find patterns? How did you extend the patterns to determine that there are 1 million dots in a ream of paper?
Lesson 5-9 Powers of 10		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 362)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1, GMP 6.2**	What other very large numbers are referred to in the World Tour section? Why do you think people use *scientific notation* to represent very large numbers?
Introducing Exponential Notation for Powers of 10 (*Teacher's Lesson Guide*, pages 363–365)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 2.2**	Ask students to look for patterns in their completed charts.* **What do the patterns tell you about the value of each place?**
Lesson 5-10 Rounding and Reporting Large Numbers		
Reviewing Rounding (*Teacher's Lesson Guide*, page 369 and 370)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.5, GMP 3.1, GMP 4.1, GMP 7.2**	Which version of the marathon count would you report: 9,059; 9,060; 9,100; or 9,000? Explain your answer.* Would you include a rough estimate or the most accurate count in your report? Why?

Rounding Baseball Team Attendance Figures (*Teacher's Lesson Guide,* page 370)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 3.1, GMP 4.1, GMP 4.2, GMP 6.2, GMP 7.2**	What do the attendance figures tell you? How accurate do you think the figures are? **How do tables help you interpret the data?**
Lesson 5-11 Comparing Data		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 374 and 375)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 3.1, GMP 6.1, GMP 6.3**	Which digits tell you that Everest is taller than K-2?* When comparing large numbers with the same number of digits, which digits should you consider?
Looking Up and Comparing Data about the Countries in Europe (*Teacher's Lesson Guide,* page 375)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 7.2**	Why is it useful to know the temperature of a region?

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Grade 4 Unit 6: Division; Map Reference Frames; Measures of Angles

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 6-1 Multiplication and Division Number Stories		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 401)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.4, GMP 1.5, GMP 2.2, GMP 4.2, GMP 4.1**	How can this diagram help you explain multiplication? **How can diagrams help you organize information?**
Solving Division Number Stories (*Teacher's Lesson Guide,* pages 402 and 403)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.5, GMP 1.6, GMP 2.1, GMP 2.2, GMP 3.1, GMP 4.1**	How can the Multiplication/Division Diagrams help you solve number stories? How are a Multiplication/Division Diagram and a number sentence alike?
Lesson 6-2 Strategies for Division		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 407 and 408)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.1, GMP 1.3, GMP 2.1, GMP 2.2, GMP 3.1, GMP 4.1, GMP 6.1, GMP 7.2**	Which strategies might you use to solve other division number story problems? Why? **Why is it helpful to share different strategies for solving problems?**
Using Multiples to Solve Division Number Stories (*Teacher's Lesson Guide,* pages 408–410)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.1, GMP 1.2, GMP 5.3, GMP 6.2**	How did multiples help you solve division problems? How do the lists of multiples help you estimate the quotient?

Lesson 6-3 The Partial-Quotients Division Algorithm, Part 1		
Introducing the Partial-Quotients Algorithm (*Teacher's Lesson Guide,* pages 413–416)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 3.1, GMP 6.3, GMP 8.2, GMP 8.3**	Decide what you need to find out.* Identify the data you need to solve the problem.* Decide what to do to find the answer.* **How can it help you to have a plan for solving a problem?**
Using the Partial-Quotients Algorithms (*Teacher's Lesson Guide,* page 416)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.6, GMP 2.2, GMP 4.1**	What does your summary number model represent? How is a summary number model like a number model with an unknown? How is it different?
Lesson 6-4 Expressing and Interpreting Remainders		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 420 and 421)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 1.6, GMP 2.1, GMP 4.1, GMP 6.1**	What do the quotient 4 and remainder 1 represent?* Should the 1 be ignored?*
Interpreting Remainders in Problem Contexts (*Teacher's Lesson Guide,* page 422)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.5, GMP 1.6, GMP 2.2, GMP 6.1**	Name a situation when you could ignore a remainder. **Why do you need to consider remainders when sharing things in real life?**

Lesson 6-5 Rotations and Angles		
Investigating Rotations and Degree Measures (*Teacher's Lesson Guide,* pages 426–428)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 1.6, GMP 6.1, GMP 6.3**	How do the straws help you visualize an angle? **How can a tool help you determine an angle measure?**
Measuring Elapsed Time in Degrees (*Teacher's Lesson Guide,* page 428)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 4.2, GMP 6.1, GMP 6.3**	How are your straw angles like hands on a clock? How does finding elapsed time on a clock help you find the degrees the minute hand has moved?
Lesson 6-6 Using a Full-Circle Protractor		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 432)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.2, GMP 6.1, GMP 8.2**	What are common properties of angles? **Why is it helpful to know the properties of angles?**
Using a Full-Circle Protractor (*Teacher's Lesson Guide,* pages 433 and 434)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 3.1, GMP 5.3, GMP 6.1, GMP 8.2**	How do you read angle measures on a full-circle protractor? What mistakes might someone make when using a full-circle protractor?
Lesson 6-7 The Half-Circle Protractor		
Measuring Angles with a Half-Circle Protractor (*Teacher's Lesson Guide,* pages 439 and 440)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.1, GMP 1.5, GMP 5.2, GMP 6.1, GMP 6.2**	How might you estimate whether an angle has a measure that is more than 90° or less than 90° (is acute or is obtuse)? How did your estimates compare with your actual measurements of the angles?

Drawing Angles with a Half-Circle Protractor (*Teacher's Lesson Guide,* page 440)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 5.1, GMP 5.3, GMP 6.1**	How did estimation help you determine if you used the protractor correctly?
Lesson 6-8 Rectangular Coordinate Grids for Maps		
Using Ordered Pairs to Locate Points on a Map (*Teacher's Lesson Guide,* pages 444 and 445)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.5, GMP 2.1, GMP 2.2, GMP 8.1**	Why is the order of the numbers in parentheses important? What rules do you need to follow when locating points on a coordinate grid using ordered pairs?
Estimating Distances on a Map (*Teacher's Lesson Guide,* pages 445 and 446)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.5, GMP 5.1, GMP 5.3, GMP 6.2**	Have students compare estimates and strategies.* Why are the estimates obtained by the last two methods probably less than the actual length?*
Lesson 6-9 Global Coordinate Grid System		
Studying a World Globe (*Teacher's Lesson Guide,* pages 450 and 451)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.6, GMP 2.2**	Why are latitude lines called parallels? How might knowing what parallel lines are help you understand differences between latitude and longitude lines?
Locating Places on Regional Maps (*Teacher's Lesson Guide,* pages 452 and 453)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.1, GMP 4.1, GMP 6.2, GMP 6.3**	If a location did not fall exactly on the lines of latitude and longitude, how did you and your partner agree on an estimate? **How can working with a partner help you solve problems?**

Lesson 6-10 The Partial-Quotients Division Algorithm, Part 2		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 456 and 457)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.1, GMP 1.3, GMP 1.4, GMP 2.1, GMP 2.2**	What are different ways to represent dividing 246 into equal groups of 12 using only math symbols? **Why are there so many ways to represent problems?**
Introducing the Partial-Quotients Algorithm with 2-Digit Divisors (*Teacher's Lesson Guide,* pages 457 and 458)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.3, GMP 1.4, GMP 1.5, GMP 2.1, GMP 2.2, GMP 6.3**	How might you use the "Easy Multiples" list to help you solve division problems?

*denotes a question that is currently in the *Everyday Mathematics* materials

Grade 4 Unit 7: Fractions and Their Uses; Chance and Probability

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 7-1 Review of Basic Fraction Concepts		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 571)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 3.2, GMP 6.1**	List three ways that fractions are used outside of your math class.* When could you need 1/2 of something? 1/4 of something?
Entering Fractions and Mixed Numbers on a Calculator (*Teacher's Lesson Guide,* page 573)	**GMP 5.2** Use mathematical tools correctly and efficiently.	Why is it important to follow the appropriate steps when using a calculator?
Lesson 7-2 Fractions of Sets		
Modeling "Fraction-of" Problems with Pennies (*Teacher's Lesson Guide,* pages 577 and 578)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 4.2, GMP 6.1**	What is the "whole" in fractions of sets? What does a "fair share" represent when determining fractions of sets?
Solving "Fraction-of" Problems (*Teacher's Lesson Guide,* page 578)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 2.2, GMP 4.1, GMP 6.3**	How do you use pennies or counters to represent the whole in "fraction-of" problems? **When might you need to find fractions of sets in real life?**

Lesson 7-3 Probabilities When Outcomes Are Equally Likely		
Reviewing Words and Phrases Associated with Chance Events (*Teacher's Lesson Guide,* pages 582 and 583)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 4.1**	How likely do you think it is that the card I picked is a black card?* How likely do you think it is that the card I picked is a face card? a heart? a heart, diamond, or club?* **How does probability language help you clearly explain the chances of an event?**
Introducing a Formula for Finding the Probability of an Event When the Outcomes are Equally Likely (*Teacher's Lesson Guide,* pages 583 and 584)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How do you use the total outcomes and favorable outcomes to find the probability? Why is it helpful to find the probability of an event?
Lesson 7-4 Pattern-Block Fractions		
Solving Problems about Shape B (*Teacher's Lesson Guide,* page 589)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1**	What represents the "whole?" Why do the fractions of pattern blocks change when the whole changes?
Solving Problems about Shape C (*Teacher's Lesson Guide,* page 590)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 1.1, GMP 1.5, GMP 2.1, GMP 5.2, GMP 6.1**	How did you determine the fraction of a hexagon if you cannot cover Shape C with hexagons? **How can trying to solve difficult math problems help you learn?**

Lesson 7-5 Fraction and Mixed-Number Addition and Subtraction		
Modeling Fraction and Mixed-Number Sums (*Teacher's Lesson Guide,* pages 593-594A)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 2.2, GMP 5.2, GMP 6.3, GMP 7.1, GMP 7.2**	How do you use pattern blocks to model adding and subtracting fractions? How do pattern blocks help you add and subtract fractions with unlike denominators?
Solving Fraction and Mixed-Number Addition and Subtraction Problems (*Teacher's Lesson Guide,* page 596)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.3, GMP 1.6, GMP 2.1, GMP 5.2**	Why is finding multiple solutions for sums of fractions helpful?
Lesson 7-6 Many Names for Fractions		
Starting a Collection of Fraction Names (*Teacher's Lesson Guide,* page 600)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 7.1**	How can you use your Fraction Cards to find equivalent fractions? **What other tools could help you find equivalent fractions?**
Continuing a Collection of Fraction Names (*Teacher's Lesson Guide,* page 600)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 5.2, GMP 7.2**	What patterns do you see in your Equivalent Names for Fractions table*?* How could you use the pattern to find additional equivalent fractions?
Lesson 7-7 Equivalent Fractions		
Developing a Rule for Finding Equivalent Fractions (*Teacher's Lesson Guide,* pages 604 and 605)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 6.1, GMP 7.1**	How do the numerators and denominators of equivalent fractions change? How would you explain a rule for the relationship between equivalent fractions?

Generating Equivalent Fractions (*Teacher's Lesson Guide,* pages 605 and 606)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 2.1, GMP 6.3, GMP 7.1, GMP 8.1**	How did you use the Equivalent Fractions Rule to find more equivalent fractions? How could you use the rule to check the equivalent fractions you found using your Fraction Cards?
Lesson 7-8 Fractions and Decimals		
Renaming Fractions as Decimals with a Calculator (*Teacher's Lesson Guide,* page 612)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How could decimal representations help you find equivalent fractions? **How are fractions and decimals related?**
Discussing Fractions and Division (*Teacher's Lesson Guide,* pages 612 and 613)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 2.1, GMP 6.3**	How could you use fraction models to solve division problems?
Lesson 7-9 Comparing Fractions		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 616)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.2, GMP 7.2**	What tools could you use to check whether your answer makes sense? **Why is it important to check whether answers make sense?**
Comparing Fractions with $\frac{1}{2}$ (*Teacher's Lesson Guide,* page 618)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 1.6, GMP 2.1, GMP 5.2**	What do you notice about all the fractions that are less than 1/2? What do you notice about the fractions that are greater than 1/2?

Lesson 7-10 The ONE for Fractions		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 622)	**GMP 1.1** Work to make sense of your problem. *See also:* **GMP 1.5, GMP 1.6, GMP 2.1, GMP 2.2**	What is a way to write the ONE as a fraction? **Why is it important to understand what the ONE is in fraction problems?**
Using Counters to Find the ONE (*Teacher's Lesson Guide,* page 623)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 1.1, GMP 1.2, GMP 1.3, GMP 1.4, GMP 1.5, GMP 2.1, GMP 4.1**	How did using objects help you solve the problems?
Lesson 7-11 Probability, Fractions, and Spinners		
Spinning a Spinner (*Teacher's Lesson Guide,* page 628)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 6.2**	How can you make sure you are using your spinner correctly? **Why should you use tools correctly?**
Doing Spinner Experiments (*Teacher's Lesson Guide,* pages 628 and 629)	**GMP 8.3** Reflect on your thinking before, during, and after you solve a problem. *See also:* **GMP 3.1, GMP 5.2, GMP 6.1, GMP 6.3**	Ask students to summarize their results.* Did the results meet your expectations? Why or why not?
Lesson 7-12 A Cube-Drop Experiment		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 633)	**GMP 8.3** Reflect on your thinking before, during, and after you solve a problem. *See also:* **GMP 6.1**	How could you test your predicted outcomes? **Why do we make predictions before doing experiments?**

Predicting the Result of an Experiment (*Teacher's Lesson Guide,* pages 633 and 634)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.2, GMP 6.2, GMP 8.3**	How are dropping a cube onto a colored grid and spinning a spinner similar?*
Lesson 7-12a Multiplying Fractions by Whole Numbers		
Using a Visual Fraction Model to Multiply a Unit Fraction by a Whole Number (*Teacher's Lesson Guide,* pages 637B and 637C)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 1.6, GMP 2.1, GMP 6.1, GMP 7.1**	Which number in the equation tells you the size of the jump?* Which number in the equation tells you the number of the jumps?*
Using a Visual Fraction Model to Multiply Any Fraction by a Whole Number (*Teacher's Lesson Guide,* pages 637C and 637D)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.5, GMP 2.1, GMP 2.2, GMP 3.1, GMP 7.1**	How might the number lines help you write an equation? **How is it helpful to use visual representations to solve problems?**

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Grade 4 Unit 8: Perimeter and Area

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 8-1 Kitchen Layouts and Perimeter		
Analyzing Kitchen Arrangements (*Teacher's Lesson Guide,* pages 660 and 661)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 6.2**	What did you learn about your kitchen? How might you use these recommendations to change your kitchen?
Sketching Work Triangles of Given Perimeters (*Teacher's Lesson Guide,* page 661)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 1.4, GMP 1.5, GMP 2.1, GMP 4.1, GMP 6.1, GMP 8.3**	What might the perimeter of a work triangle tell you about a kitchen? **What do the work triangles represent?**
Lesson 8-2 Scale Drawings		
Making a Rough Floor Plan of the Classroom (*Teacher's Lesson Guide,* pages 665 and 666)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 2.2, GMP 5.2, GMP 5.3, GMP 6.2, GMP 6.3**	What information do you need to draw a rough floor plan?* **How will the rough floor plan help you make a scale drawing?**
Making the Scale Drawing (*Teacher's Lesson Guide,* pages 666 and 667)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 5.2, GMP 5.3, GMP 6.1, GMP 6.3**	Why would you want a rough floor plan of a room?* When would someone need to make a more accurate scale drawing?*

Lesson 8-3 Area		
Estimating Areas of Polygons by Counting Squares (*Teacher's Lesson Guide,* page 672)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 3.1, GMP 4.2, GMP 6.2, GMP 6.3**	What is the difference between centimeters and square centimeters? **Why is it important to use the correct units when you explain problems?**
Estimating the Area of the Classroom Floor (*Teacher's Lesson Guide,* page 672)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 1.5, GMP 4.1, GMP 4.2, GMP 6.2**	How can estimating the area of polygons by counting squares help you estimate the area of the classroom? Would you use the same strategy to estimate the area of polygons and the area of the classroom floor? Why or why not?
Lesson 8-4 What Is the Area of My Skin?		
Estimating the Area of Your Skin (*Teacher's Lesson Guide,* pages 676 and 677)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.4, GMP 2.2, GMP 4.2, GMP 6.2**	What does "the total area of your skin is 100 times the area of the outline of your hand" mean? How did you use this rule of thumb to calculate the total area of your skin?
Sharing the Results of the Experiment (*Teacher's Lesson Guide,* pages 677 and 678)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.1, GMP 1.5, GMP 4.1, GMP 6.1, GMP 8.3**	What is the difference between a guess and an estimate? **When might you make an estimate instead of a guess?**
Lesson 8-5 Formula for the Area of a Rectangle		
Developing a Formula for the Area of a Rectangle (*Teacher's Lesson Guide,* pages 682 and 683)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.2, GMP 4.2, GMP 8.1**	What pattern(s) can you find between the length and the width of a rectangle and its area? Extend the pattern and give other examples of length, width, and area.

Using a Formula for the Area of a Rectangle (*Teacher's Lesson Guide,* pages 683 and 684)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 2.2, GMP 7.2**	Which is more efficient: counting squares or using the formula to calculate area of a rectangle? Why? **Why do we call some math rules shortcuts?**
Lesson 8-6 Formula for the Area of a Parallelogram		
Developing a Formula for the Area of a Parallelogram (*Teacher's Lesson Guide,* pages 689 and 690)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 6.1, GMP 7.1, GMP 8.2, GMP 8.3**	How is a parallelogram like a rectangle? How is it different? **How can two polygons that look different have the same area?**
Solving Area Problems (*Teacher's Lesson Guide,* pages 690 and 691)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 2.1, GMP 2.2, GMP 3.1, GMP 3.2, GMP 6.3, GMP 8.2**	Which area problem was the most challenging? Why?
Lesson 8-7 Formula for the Area of a Triangle		
Exploring Triangle Properties (*Teacher's Lesson Guide,* pages 694 and 695)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 7.1, GMP 8.1**	Can an equilateral triangle also be a right triangle? Explain.* Can an isosceles triangle also be a right triangle? Explain.*
Developing a Formula for the Area of a Triangle (*Teacher's Lesson Guide,* pages 695 and 696)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.2, GMP 6.1, GMP 7.1, GMP 8.2**	Discuss the relationship between the area of the triangle and the area of the parallelogram.* **How do properties of triangles and rectangles help you explain the formula for the area of a triangle: $A = 1/2 \, (b * h)$?**

Lesson 8-8 Geographical Area Measurements		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 700)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 4.1, GMP 5.2, GMP 6.2**	Why is it hard to measure the areas of countries, oceans and deserts?* What information surprised you?
Comparing Country Areas (*Teacher's Lesson Guide,* page 701)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 4.2, GMP 5.2, GMP 5.3, GMP 6.2, GMP 7.2**	How do you think the countries with larger areas are different than countries with smaller areas? How could they be alike? **How might this information be useful?**

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Grade 4 Unit 9: Fractions, Decimals, and Percents

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 9-1 Fractions, Decimals, and Percents		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 723 and 724)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 3.2, GMP 4.1, GMP 6.1**	What are different ways to explain percent situations? What does the 100% box represent?
Finding Equivalent Names for Percents (*Teacher's Lesson Guide,* page 725)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.1, GMP 2.1, GMP 2.2, GMP 4.1**	How does the grid help you determine the fraction and decimal name? **Why is it important to find many names for numbers?**
Lesson 9-2 Converting "Easy" Fractions to Decimals and Percents		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 729)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.5, GMP 2.2, GMP 4.2, GMP 6.1, GMP 7.1**	How might you use the decimal to figure out the number of problems each student missed? How might you use the fraction? The percent? The grid? **How can using equivalent names help you to solve problems?**
Completing the Table of Equivalent Names for Fractions (*Teacher's Lesson Guide,* page 730)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 1.5, GMP 2.1, GMP 2.2, GMP 4.2**	What patterns can you find in the equivalencies table? How could this pattern help you find more equivalent decimals? Percents? Fractions?

Lesson 9-3 Using a Calculator to Convert Fractions to Decimals		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 735)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1**	What shortcut can you use to rename a fraction as a decimal? **When might you use this shortcut?**
Using a Calculator to Rename Any Fraction as a Decimal (*Teacher's Lesson Guide,* page 736)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 5.2, GMP 6.2, GMP 8.1**	What do fractions with short decimal names have in common?* Do you see any patterns in the longer decimal names?*
Lesson 9-4 Using a Calculator to Rename Fractions as Percents		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 740)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1**	What shortcut can you use to rename a fraction as a percent? How is this shortcut similar to renaming a fraction as a decimal?
Solving Number Stories Involving Discounts (*Teacher's Lesson Guide,* page 741)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.3, GMP 1.5, GMP 2.1, GMP 2.2, GMP 3.1, GMP 6.1, GMP 8.2**	What do you need to know to calculate a sale price? **When might you need to determine the sale price an item?**
Lesson 9-5 Conversions among Fractions, Decimals, and Percents		
Renaming Fractions as Percents (*Teacher's Lesson Guide,* pages 746 and 747)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 5.2, GMP 7.2**	Why did you round the population to the nearest million? Why is it helpful to round the percent answers to the nearest whole-number percent?
Completing the Equivalent Names for Fraction Table (*Teacher's Lesson Guide,* page 747)	**GMP 8.2** Use patterns and structures to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 3.1, GMP 7.1, GMP 7.2**	What shortcuts can you use when naming a decimal as a percent? **When might this shortcut help you in real life?**

Lesson 9-6 Comparing the Results of a Survey		
Tabulating Survey Results for the Whole Class (*Teacher's Lesson Guide,* page 752)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 4.1, GMP 6.1**	What does the "total" column represent? **Why do we organize data in tables?**
Analyzing the Survey Results (*Teacher's Lesson Guide,* pages 752 and 753)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 2.2, GMP 4.1, GMP 6.1, GMP 6.2, GMP 7.1**	How did you use the data table to decide what people are more likely to prefer? Why are the percents more useful when figuring out people's preferences?
Lesson 9-7 Comparing Population Data		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 757 and 758)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 3.2**	How might countries with larger urban populations be different from countries with larger rural populations? **Who might use this type of data in real life?**
Tallying Predictions (*Teacher's Lesson Guide,* page 758)	**GMP 1.1** Work to make sense of your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1**	What are you trying to figure out? How can you explain it in your own words? What information from the data chart might you need to answer this question?
Lesson 9-8 Multiplication of Decimals		
Estimating Products of Decimals (*Teacher's Lesson Guide,* pages 763–765)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.4, GMP 1.5, GMP 7.2**	How might you use the number model to estimate where the decimal point belongs? **What do you need to know about place value to estimate products of decimals?**

Multiplying Decimals (*Teacher's Lesson Guide,* page 765)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.5, GMP 6.2, GMP 7.2**	What strategies can you use for estimating the product? Why is it important to estimate before solving a problem?
Lesson 9-9 Division of Decimals		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 769)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 3.2**	Think of a number story that could be solved by dividing 4.2 by 7.* Which of these problems could you imagine solving in real life?
Estimating Quotients of Decimals (*Teacher's Lesson Guide,* pages 770 and 771)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.5, GMP 6.1, GMP 2.2, GMP 6.3, GMP 7.2**	How are you using estimation to accurately place the decimal point? **How is this similar to placing the decimal point when multiplying decimals?**

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Grade 4 Unit 10: Reflections and Symmetry

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 10-1 Explorations with a Transparent Mirror		
Using a Transparent Mirror to "Move" Shapes (*Teacher's Lesson Guide,* pages 795 and 796)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 5.2**	Why is the image you drew first called the *preimage*? How might you use the transparent mirror to describe congruent figures?
Using the Transparent Mirror to Draw Images of Shapes (*Teacher's Lesson Guide,* page 796)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 6.2**	How did you use your mirror to "move" the hat, nose and mouth? **How do you use a transparent mirror correctly?**
Lesson 10-2 Finding Lines of Reflection		
Playing Games that Involve Reflections (*Teacher's Lesson Guide,* pages 800 and 801)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 3.1, GMP 4.1, GMP 5.2**	Where should you place the mirror to "move" the darts onto the target or balls into the pocket? **How can using tools correctly help you be more precise?**
Introducing the Concept of Reflection (*Teacher's Lesson Guide,* pages 801 and 802)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 5.2, GMP 6.2**	How do you use your transparent mirror to find the line of reflection? Why do you need to find the line of reflection to play these games?

Lesson 10-3 Properties of Reflections		
Examining Relationships between an Object and Its Reflected Image (*Teacher's Lesson Guide*, pages 806 and 807)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.2, GMP 3.1, GMP 3.2, GMP 5.2, GMP 6.1**	What did you find out about the distances [between the line of reflection and the points on the preimage and reflected image]?* **How could you describe a rule that explains the distances between the images and the line of reflection?**
Folding Paper to Observe Reflected Images (*Teacher's Lesson Guide,* page 807)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 6.2, GMP 7.1**	How do you know if the preimage and image are congruent?* What are different ways of showing that the preimage and image are congruent?
Lesson 10-4 Line Symmetry		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 811)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 6.1**	What is symmetry? Be ready to name an object in the classroom that has line symmetry.* **How might identifying an object with line symmetry in your classroom help you explain what it means?**
Completing Symmetric Pictures (*Teacher's Lesson Guide,* page 811)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 5.2, GMP 6.1**	What is a line of symmetry? How is it different from a line of reflection?

Lesson 10-5 Frieze Patterns		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 817)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 4.1, GMP 8.1**	Ask students to describe what they notice about each of the frieze patterns on *Student Reference Book,* page 108.* How could you use the patterns to continue each frieze?
Drawing Frieze Patterns (*Teacher's Lesson Guide,* page 818)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 2.2, GMP 6.1, GMP 7.1, GMP 7.2**	Explain how you created your pattern in Problem 2.* **How can drawing your own pattern help you understand rigid motion?**
Lesson 10-6 Positive and Negative Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 823 and 824)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1**	What does the negative sign tell you about a number? **Why do you need to explain what math symbols mean?**
Playing the *Credits/Debits Game* (*Teacher's Lesson Guide,* page 825)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2, GMP 7.2**	When accountants say the company is "in the red," what do you think they mean? When might someone do the same operations in this game in real life?

*denotes a question that is currently in the *Everyday Mathematics* materials.

Grade 4 Unit 11: 3-D Shapes, Weight, Volume, and Capacity

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 11-1 Weight		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 849 and 850)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 4.1, GMP 5.1, GMP 6.1**	What might be measured in milligrams? In grams? In kilograms? In metric tons?* What might be measured in ounces? In pounds? In tons?*
Converting between Metric and Customary Weights (*Teacher's Lesson Guide,* page 851)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 4.1, GMP 5.1, GMP 5.3, GMP 6.2, GMP 7.2**	How did you use the number line to convert between grams and ounces? **What might happen if you used this tool incorrectly?**
Lesson 11-2 Geometric Solids		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 855)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.1, GMP 7.1**	How does it help you to hear other students' examples of polyhedrons? **How could other students' examples help you recognize 3-dimensional shapes in real life?**
Modeling Geometric Solids (*Teacher's Lesson Guide,* pages 856 and 857)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 4.1, GMP 7.1, GMP 7.2**	How does your straw rectangular prism help you find and count properties like faces, edges, and vertices? How might the objects help you describe the shapes?

Lesson 11-3 Constructing Geometric Solids		
Solving Geometry Riddles (*Teacher's Lesson Guide,* pages 862 and 863)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.1, GMP 1.5, GMP 6.1, GMP 7.2, GMP 8.1**	What properties of polyhedrons do you need to understand to solve geometry riddles? **Why is it important to identify properties of shapes?**
Drawing Cube Models (*Teacher's Lesson Guide,* page 863)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 6.1, GMP 6.2, GMP 6.3, GMP 8.3**	Why do you think there are two methods for drawing cubes? Which one do you think more accurately represents a cube? Why?
Lesson 11-4 A Volume Exploration		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 867)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 3.2, GMP 6.1**	What are other examples in which it is useful to know the volume of an object?* **When have you needed to know the volume of something in your life?**
Using Cubes to Find the Volume of a Rectangular Prism (*Teacher's Lesson Guide,* pages 869 and 870)	**GMP 2.1** Represent problems and situations mathematically with numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects. *See also:* **GMP 2.2, GMP 3.1, GMP 4.2, GMP 6.1**	How do the centimeter cubes represent the volume of the box? What else could you use to represent the volume of your box?
Lesson 11-5 A Formula for the Volume of Rectangular Prisms		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 873)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 6.1, GMP 6.3**	What does the "*l*" stand for on a rectangle? What does the "*w*" stand for? **Why is it helpful to explain what formulas mean?**

Deriving a Formula for the Volume of a Rectangular Prism (*Teacher's Lesson Guide,* pages 874 and 875)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 2.2, GMP 7.1**	What patterns in your table helped you develop the formula for volume of a rectangular prism? How did the cube stacking activity help you develop the formula?
Lesson 11-6 Subtraction of Positive and Negative Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 879)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 3.1, GMP 6.1, GMP 8.1, GMP 8.3**	On a sheet of paper, list any shortcuts that you use when you add credits and debits (positive and negative numbers).* **Why do you think these are called shortcuts?**
Playing the *Credits/Debits Game* (Advanced Version) (*Teacher's Lesson Guide,* page 880)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.2, GMP 3.1, GMP 4.1, GMP 8.2, GMP 8.3**	Your partner says that adding a negative number (a debit) is the same as subtracting it. Is your partner correct? How do you know? Your partner also says that subtracting a negative number (a debit) is the same as adding it. Is your partner correct? How do you know?
Lesson 11-7 Capacity		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 885)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 2.1, GMP 5.2, GMP 6.1, GMP 7.1**	Did anyone figure out the meaning of the picture next to the Math Message problems?* How can the picture help you remember how many cups are in a pint, how many pints are in a quart, and how many quarts are in a gallon?*

Solving Capacity Number Stories (*Teacher's Lesson Guide,* page 887)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 4.1, GMP 5.1, GMP 6.1, GMP 6.2**	What do you notice about all the amounts you would measure in liters? Milliliters? **How do examples of liquid amounts help you learn the differences between liters and milliliters?**

*denotes a question that is currently in the *Everyday Mathematics* materials.

Grade 4 Unit 12 Rates

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 12-1 Introducing Rates		
Comparing Eye-Blinking Rates (*Teacher's Lesson Guide,* pages 910 and 911)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 4.1, GMP 4.2, GMP 7.1**	What is meant by the phrase *a typical student?** Why would you make predictions or describe results in terms of *a typical student* instead of particular classmates?
Listing Examples of Rates (*Teacher's Lesson Guide,* page 911)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2**	List as many examples of rates as you can.* **Why do we talk about how math is important in real life?**
Lesson 12-2 Solving Rate Problems		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 915)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 1.1, GMP 1.4, GMP 2.1, GMP 3.1, GMP 4.1**	What was your solution strategy for solving the problem?* **Why is it helpful to make a plan before solving a problem?**
Practicing with Rate Problems (*Teacher's Lesson Guide,* page 917)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 1.6, GMP 2.1, GMP 4.1, GMP 6.1, GMP 7.1, GMP 8.1**	What are *unit rates*? How do the unit rates help you solve rate problems?
Lesson 12-3 Converting between Rates		
Exploring Methods for Checking Data (*Teacher's Lesson Guide,* page 922)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.1, GMP 1.5, GMP 3.1, GMP 4.1**	Bring the class together to share solution strategies.* What data did you need to use these strategies?

Checking whether Data Make Sense (*Teacher's Lesson Guide*, page 923)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.1, GMP 1.4, GMP 3.1, GMP 4.1**	Does this number make sense to you? Explain.* **Why is it helpful to check whether the data makes sense?**
Lesson 12-4 Comparison Shopping: Part 1		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 927)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 6.1**	What are some products and services you have used recently?* **How do you use math when you go shopping?**
Calculating and Comparing Unit Prices (*Teacher's Lesson Guide*, page 929)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.6, GMP 2.1, GMP 7.1, GMP 8.1, GMP 8.3**	How did you calculate the unit prices? Why did you take those steps? How did you use the unit price to calculate the other prices?
Lesson 12-5 Comparison Shopping: Part 2		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 932 and 933)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.5, GMP 2.1, GMP 5.2, GMP 6.2**	Why might you need to ignore some digits in the answers you get using a calculator? How is this like making an estimate?
Calculating Unit Prices for Supermarket Items (*Teacher's Lesson Guide*, page 933)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 4.1, GMP 8.1, GMP 8.2**	How did you use your calculator to solve these problems? **How might tools help you in mathematics?**

Lesson 12-6 World Tour Wrap-Up		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 937)	**GMP 2.2** Explain the meanings of the numbers, words, pictures, symbols, gestures, tables, graphs, and concrete objects you and others use. *See also:* **GMP 4.1, GMP 6.2**	Did the total distance you traveled seem greater or less than what you expected? **How could you use this data to plan future trips?**
Reflecting on the World Tour (*Teacher's Lesson Guide,* page 938)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 3.2**	To which countries would you most like to travel in your lifetime? Explain your answer.* What would you want to share with people from other countries about your culture?* What are some things you have enjoyed on the World Tour?* What is something about the World Tour you would like to add or change?*

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