Grade 5 Unit 3: Geometry Explorations and the American Tour

Activity	***Everyday Mathematics* Goal for Mathematical Practice**	**Guiding Questions**
Lesson 3-1 Introduction to the American Tour		
Posting U.S. Census Results on the Probability Meter (*Teacher's Lesson Guide*, pages 156 and 157)	**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 2.2, GMP 4.1, GMP 6.2**	How is the Probability Meter helpful in displaying census data? **Why do you think most census data is represented with percentages?**
Taking a Classroom Census (*Teacher's Lesson Guide*, page 157)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 5.2, GMP 6.3**	Based on these sample questions, what different types of data do you think are collected by the short and long form? How could U.S. Census data be used?
Lesson 3-2 American Tour: Population Data		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 161)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.2, GMP 4.1**	How did you find the largest number in the table? What are some of the important features of this table?

Estimating Colonial Populations (*Teacher's Lesson Guide*, page 161)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1**	What advantages are there to providing magnitude estimates of population data, such as those in the table on *Student Reference Book*, page 371, instead of detailed population data? **How might the level of precision used to report data affect how it is interpreted?**
Lesson 3-3 Exploring Angle Measures		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 166)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.4, GMP 2.2, GMP 3.2**	How might you show that the angles of a square have a measure of 90 degrees to someone who does not know the degree measure of a right angle? **Why is it important to explain both a solution and why the solution works?**
Finding Pattern-Block Angle Measures (*Teacher's Lesson Guide*, page 167)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.6, GMP 3.1, GMP 6.1, GMP 6.2**	How does knowing the total number of degrees in a circle help you solve pattern block angle problems? What other angle measure information did you use to solve the pattern block angle problems?

Lesson 3-4 Using a Protractor		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 171 and 172)	**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**	How did you use the examples and the nonexamples shown on the journal page to define acute and obtuse angles? What information is useful to help you remember the definitions for right, straight, and reflex angles?
Practicing Measuring and Drawing Angles (*Teacher's Lesson Guide*, page 174)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 5.2, GMP 6.2, GMP 6.3**	What mistakes could a good estimate help you catch? **How do estimates help you check the answers you get with tools?**
Lesson 3-5 Using a Compass		
Finding Lengths with a Compass (*Teacher's Lesson Guide*, page 180)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 6.3**	What do you need to remember when measuring length with a compass? Why might someone use a compass instead of a ruler to measure line segments?
Measuring Angles Formed by Intersecting Lines (*Teacher's Lesson Guide*, pages 180 and 181)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 5.2, GMP 6.3, GMP 8.1**	What do you notice about the measures of pairs of vertical angles? Of adjacent angles?* **How do finding and analyzing patterns help you solve other mathematics problems?**

Lesson 3-6 Congruent Triangles		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 184)	**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**	How did the examples help you write definitions of equilateral, isosceles, and scalene triangles? How do the *non*examples help you understand the properties of each type of triangle?
Copying a Triangle Using Any Available Tools (*Teacher's Lesson Guide*, pages 184 and 185)	**GMP 5.1** Choose appropriate tools for your problem. *See also:* **GMP 1.2, GMP 3.1, GMP 3.2, GMP 5.2, GMP 6.1, GMP 6.3, GMP 8.2**	How did you choose the tools you used to solve the problem? **Why might your classmates use different tools than you?**
Lesson 3-7 Properties of Polygons		
Sorting Polygons by Their Properties (*Teacher's Lesson Guide*, pages 190 and 191)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.2, GMP 3.2, GMP 6.1, GMP 7.1, GMP 7.2**	How did you develop a rule to use to sort your polygons? What properties did you focus on? What properties of polygons helped you figure other classmates' rules?
Classifying Quadrangles (*Teacher's Lesson Guide*, pages 191A and 191B)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.1, GMP 2.2, GMP 3.1, GMP 7.1, GMP 8.2**	How did you decide which quadrangles to put in the "*not parallelograms*" side of the diagram? **What does it mean to be precise when you talk about math?**

Lesson 3-8 Regular Tessellations		
Exploring Regular Tessellations (*Teacher's Lesson Guide*, page 196)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 3.1, GMP 3.2, GMP 5.2, GMP 7.1**	What pattern or rule can you use to predict whether or not a regular polygon will tessellate? **How can patterns help you explain rules in math?**
Quadrangles (*Teacher's Lesson Guide*, pages 196A and 196B)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.2, GMP 3.1, GMP 3.2, GMP 6.1, GMP 8.2**	What other names can you give a square? How do you know? What relationships does the tree diagram show between quadrangles?
Lesson 3-9 Angles of Polygons		
Finding the Median for the Sums of Angles *and* Dividing Polygons into Triangles (*Teacher's Lesson Guide*, pages 202 and 203)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.2, GMP 6.1, GMP 8.1**	What pattern do you see in the Sums of Polygon Angles table?* Why do you think the medians for the sums of polygon angles increase by 180°?*
Dividing Polygons into Triangles (*Teacher's Lesson Guide*, pages 202 and 203)	**GMP 8.3** Reflect on your thinking before, during, and after you solve a problem. *See also:* **GMP 2.2, GMP 6.1, GMP 7.2, GMP 8.2**	How could you predict the sum of the angles in a heptagon? **Why do we make predictions before solving a problem?**

Lesson 3-10 Solving Problems Using the Geometry Template		
Drawing Circles with the Geometry Template (*Teacher's Lesson Guide*, pages 207 and 208)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 6.3**	What adjustments did you make as you practiced drawing circles with your Geometry Template? **Why is it important to practice using a tool correctly?**
Solving Problems Using the Geometry Template (*Teacher's Lesson Guide*, pages 208 and 209)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.1, GMP 1.2, GMP 1.3, GMP 1.4, GMP 1.5, GMP 2.1, GMP 5.2, GMP 6.1, GMP 6.3**	Explain how you solved one of the Geometry Template problems. **How can it be helpful to explain what you did to others?**

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

Grade 5 Unit 4: Division

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 4-1 Division Facts and Extensions		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 231 and 232)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 8.2**	How does understanding multiplication help you understand division? **How are multiplication and division related?**
Using a Mental Division Strategy (*Teacher's Lesson Guide*, page 233)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.6, GMP 6.1**	How did you break up the dividends into friendly parts? Why did you choose those numbers? What multiplication facts helped you divide?
Lesson 4-2 The Partial-Quotients Division Algorithm		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 237)	**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 2.2, GMP 6.1, GMP 7.2**	How else (besides a number model) could you represent this problem? **Why is a number model a useful way to represent a division problem?**
Reviewing the Partial-Quotients Algorithm (*Teacher's Lesson Guide*, pages 237–239)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 3.1, GMP 6.1, GMP 6.3**	How did you choose friendly numbers to rename the dividend? Why is it helpful to know multiples of the divisor?

Lesson 4-3 American Tour: Finding Distances on a Map		
Using a Map Scale for Straight-Path Distances (*Teacher's Lesson Guide,* pages 244 and 245)	**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 5.2, GMP 6.2**	Why are there 3 different scales on the map(s)?* **Why do maps need scales?**
Finding Distances in the United States with a Map Scale (*Teacher's Lesson Guide,* page 245)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 2.2, GMP 4.1, GMP 4.2, GMP 5.2, GMP 6.1, GMP 6.3**	How did you decide how precisely to measure the distances on the map? How might the scale on a map affect your decision about how precisely to measure?
Lesson 4-4 Partial-Quotients Algorithm Strategies		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 249)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 3.1, GMP 7.2**	Why could the divisibility rule for 6 be called a shortcut? **Why are some rules called shortcuts?**
Reviewing the Partial-Quotients Algorithm (*Teacher's Lesson Guide,* pages 249–252)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.2, GMP 3.1, GMP 3.2, GMP 4.1, GMP 6.1, GMP 6.3**	Why might a classmate's partial-quotients list be different from yours? Why is it possible to solve partial-quotients problems in more than one way?

Lesson 4-5 Division of Decimal Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 255 and 256)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.2, GMP 1.5, GMP 2.1, GMP 2.2, GMP 6.2, GMP 6.3, GMP 7.2**	How does the situation diagram you chose help you write a number model to represent this problem? **How can situation diagrams help you solve number stories?**
Making Magnitude Estimates before Calculating Quotients (*Teacher's Lesson Guide*, page 256)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 5.3, GMP 6.2, GMP 6.3**	How did your magnitude estimate help you place the decimal point? How can you use a magnitude estimate to check your exact answers to division problems?
Lesson 4-6 Interpreting the Remainder		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 260 and 261)	**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 1.2, GMP 1.5, GMP 1.6, GMP 2.1, GMP 4.1, GMP 4.2, GMP 6.3**	What do the quotient 12 and remainder 4 mean?* **Why is it important to understand what the remainder means when solving division number stories?**

Solving Division Number Stories and Interpreting Remainders (*Teacher's Lesson Guide*, pages 261 and 262)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.2, GMP 1.5, GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2, GMP 6.1, GMP 6.3**	Why did you round the number of runs the ride needs to make up in Example 1? What is another example of a situation where you need to report a remainder as a fraction or decimal?
Lesson 4-7 Skills Review with *First to 100*		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 266 and 267)	**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 6.1**	Is there any right or wrong choice for a number to use in place of *P*?* **When is it useful to use variables to represent values in problems?**
Playing *First to 100* (*Teacher's Lesson Guide*, page 267)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 2.1, GMP 3.2, GMP 5.2, GMP 6.1, GMP 6.3**	How can you check whether your answer makes sense *before* your partner checks it on a calculator? What other tools could help you check your work in this game?

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

Grade 5 Unit 5: Fractions, Decimals, and Percents

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 5-1 Fraction Review		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 291)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	When in your life have you recently used a fraction? What was it? What was the whole? **Why are fractions important numbers to have?**
Introducing Fractions as Division (*Teacher's Lesson Guide*, page 292A)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 3.1**	How did you use a picture to solve the lemon squares problem? Could you use your picture to divide the lemon squares in a different way? How?
Lesson 5-2 Mixed Numbers		
Using Pattern Blocks to Model Mixed Numbers (*Teacher's Lesson Guide*, pages 298 and 299)	**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**	How can you use pattern blocks to represent an improper fraction and a mixed number? How do pattern blocks help you understand the relationship between improper fractions and mixed numbers?

Changing ONE with Fractions and Mixed Numbers (*Teacher's Lesson Guide*, pages 299 and 300)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 5.2, GMP 7.1**	How did you and your partner determine the ONE using the pattern block shapes? **Why is it important to know the ONE when working with fractions?**
Lesson 5-3 Comparing and Ordering Fractions		
Ordering Fractions (*Teacher's Lesson Guide*, pages 303 and 304)	**GMP 7.2** Use patterns and structures to solve problems. See also: **GMP 2.2, GMP 3.1, GMP 7.1, GMP 8.1**	What did you notice about the numerators and denominators that helped you put the fractions in order? How could using 0, 1/2, and 1 as benchmarks help you order fractions?
Introducing the Fraction-Stick Chart (*Teacher's Lesson Guide*, pages 304–306)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1, GMP 6.3, GMP 7.1**	How is the fraction-stick chart a useful tool when working with fractions? **What other tools can help you find equivalent fractions?**
Lesson 5-4 Two Rules for Finding Equivalent Fractions		
Finding Equivalent Fractions (*Teacher's Lesson Guide*, pages 309 and 310)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How does splitting rectangles help you understand equivalent fractions? How did you use the rectangle model to find a fraction that is equivalent to 1/4?

Formulating Rules for Generating Equivalent Fractions (*Teacher's Lesson Guide*, pages 310–312)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 7.1**	What patterns did you notice that helped you find the multiplication rule for equivalent fractions? **Why do we look for patterns in math?**
Lesson 5-5 Fractions and Decimals: Part 1		
Writing Fractions and Decimals (*Teacher's Lesson Guide*, page 316)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.4, GMP 1.6, GMP 2.1, GMP 2.2**	How can you convert these numbers so they can be written as decimals?* **What rules do you know that always work when you want to convert fractions into decimals?**
Rounding Decimals (*Teacher's Lesson Guide*, page 317)	**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 might a bank decide to always round interest down on a savings account? Why do you think supermarkets round up to the nearest tenth of a cent?
Lesson 5-6 Fractions and Decimals: Part 2		
Writing Fractions as Decimals (*Teacher's Lesson Guide*, pages 320 and 321)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 5.1, GMP 6.2, GMP 6.3**	What mistakes could someone make when renaming fractions as decimals using the Fraction-Stick Chart? **Why do we use tools like the fraction-stick chart when we do mathematics?**

Filling in a Table of Decimal Equivalents for Fractions (*Teacher's Lesson Guide*, page 322)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 2.2, GMP 6.3**	What patterns do you notice in the table?* Can you predict any of the missing decimals using these patterns?
Lesson 5-7 Fractions and Decimals: Part 3		
Converting Fractions to Decimals (*Teacher's Lesson Guide*, pages 327 and 328)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.1, GMP 5.2, GMP 6.1, GMP 6.2, GMP 7.2**	Explain how you would predict whether 2/9 or 3/9 is closer to 0.25 before using your calculator.* **Why is it important to make predictions before using a calculator?**
Introducing *2-4-5-10 Frac-Tac-Toe* (Decimal Version) (*Teacher's Lesson Guide*, page 328)	**GMP 5.1** Choose appropriate tools for your problem. *See also:* **GMP 2.1, GMP 2.2, GMP 3.2, GMP 5.2, GMP 6.1, GMP 6.3**	What tools could you use to help you play *Frac-Tac-Toe (Decimal Version)*? Which tool would help you the most? Why?
Lesson 5-8 Using a Calculator to Convert Fractions to Percents		
Exploring the Purpose of Percents (*Teacher's Lesson Guide*, pages 333 and 334)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.1, GMP 2.1, GMP 2.2, GMP 3.1, GMP 5.2**	Why can it be more helpful to make comparisons using percents instead of fractions or decimals? **What do you find confusing when talking about percents, decimals, and fractions? How can using precise language help?**

Converting Fractions to Percents (*Teacher's Lesson Guide*, page 334)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.5, GMP 2.1, GMP 2.2, GMP 5.2, GMP 5.3**	Why do you think people prefer comparisons with percents in everyday situations? What are other situations in which percents would be helpful?
Lesson 5-9 Bar and Circle Graphs		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 338)	**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, GMP 6.1**	What information does the bar graph give you? The circle graph? **How might you choose which type of graph to use for a certain situation?**
Discussing Properties of Circle Graphs (*Teacher's Lesson Guide*, pages 339 and 340)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 4.1, GMP 4.2**	Why do you think the slices or sectors are different sizes?* Do you notice any interesting slices or sectors or other features in the graph?*
Lesson 5-10 The Percent Circle: Reading Circle Graphs		
Demonstrating Methods for Using a Percent Circle (*Teacher's Lesson Guide*, pages 345 and 346)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 5.1, GMP 5.3, GMP 6.3**	Do you prefer the direct comparison or difference comparison method for using the percent circle? Why? What mistakes might someone make when using a percent circle?

Reading Circle Graphs (*Teacher's Lesson Guide*, page 346)	**GMP 5.3** Estimate and use what you know to check the answers you find using tools. *See also:* **GMP 1.5, GMP 2.2, GMP 5.2, GMP 6.1, GMP 6.3**	How did you use your estimates to check your measurements with the percent circle? **Why is it important to estimate before using tools?**
Lesson 5-11 The Percent Circle: Making Circle Graphs		
Constructing a Circle Graph Using the Percent Circle (*Teacher's Lesson Guide*, pages 350 and 351)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 1.3, GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 5.1, GMP 5.2**	How do tools help you make an accurate circle graph? **Why is it important to be accurate when creating graphs?**
Constructing a Circle Graph for the Snack-Survey Data (*Teacher's Lesson Guide*, page 351)	**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, GMP 5.2, GMP 6.2, GMP 6.3**	How does the table represent the snack survey information? The circle graph? What are some advantage to displaying data in tables and graphs?
Lesson 5-12 American Tour: School Days		
Interpreting Mathematics in Text and Graphics (*Teacher's Lesson Guide*, pages 356 and 357)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See Also:* **GMP 1.6, GMP 3.1, GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.1**	What problems did your groups disagree about? What did you do? How could you use the text and graphics in the SRB to come to an agreement?

Exploring with a Calculator: Fractions, Decimals, and Percents (*Teacher's Lesson Guide*, page 357)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 2.2, GMP 7.1**	How do you convert mixed numbers into decimals on the calculator? **How can you get better at using a calculator?**

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Grade 5 Unit 6: Using Data; Addition and Subtraction of Fractions

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 6-1 Organizing Data		
Describing the Data (*Teacher's Lesson Guide*, page 380)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2**	Are the shapes of the two graphs similar? Explain your answer.* What do the shapes of the two graphs suggest about the data landmarks? Do you see any connections between the shape of the graphs and the landmarks?*
Organizing the Class Data: States Adults Have Visited (*Teacher's Lesson Guide*, page 381)	**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**	How does the line plot help a viewer see what is important about the data? **How is it helpful to represent data with line plots**?

Lesson 6-2 Natural Measures of Length		
Finding Personal Measures (*Teacher's Lesson Guide*, pages 385 and 386)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 5.1, GMP 5.2, GMP 6.1, GMP 6.3**	Why do you need to measure to the nearest millimeter or 1/16 inch for smaller measurements, but only to the nearest centimeter or 1/4 inch for the larger measurements?* **How do you decide the level of precision you need to measure different objects?**
Explaining the Challenge Questions for *Finish First* (*Teacher's Lesson Guide*, pages 386 and 387)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.1, GMP 2.1, GMP 2.2, GMP 4.2, GMP 8.3**	What does it mean for a game to be *fair*? Can you decide whether or not a game is fair after playing it once? Why or why not?
Lesson 6-3 Stem-and-Leaf Plots for Hand and Finger Measures		
Measuring the Great Span (*Teacher's Lesson Guide*, page 390)	**GMP 5.1** Choose appropriate tools for your problem. *See also:* **GMP 4.1, GMP 5.2, GMP 6.2, GMP 6.3**	What tools could you use to measure the great span of your hand? **Why did you choose the measurement tool you used in this activity?**

Organizing the Data in a Stem-and-Leaf Plot (*Teacher's Lesson Guide,* pages 391 and 392)	**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**	Why do you think this is called a stem-and-leaf plot?* Why is it useful to order the data in this way?*
Lesson 6-4 Mystery Plots		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 396)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 3.1**	How are the two stem-and-leaf plots alike? Different? Why is the second stem-and-leaf plot a more organized representation of the data?
Identifying Mystery Stem-and-Leaf Plots (*Teacher's Lesson Guide,* pages 397 and 398)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.4, GMP 1.5, GMP 1.6, GMP 2.2, GMP 4.1, GMP 4.2**	How did you figure out which stem-and-leaf plot shows arm reach? **When you disagree with a partner, how do you explain your thinking?**
Lesson 6-5 Sample Size and Sound Conclusions		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 401)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 3.1, GMP 4.1, GMP 6.1**	What did you think about in order to plan how to find the percent of each color of candy? **Do you ever change your plans after listening to the thinking of others? Why or why not?**

Graphing and Predicting on the Basis of a Sample (*Teacher's Lesson Guide*, pages 402 and 403)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2, GMP 6.1**	How do the results of the larger combined sample compare with the smaller ones?* Why are larger samples of candy color data more reliable?
Lesson 6-6 Analysis of Sample Data		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 406)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.2, GMP 2.2, GMP 3.1, GMP 4.1**	How did the bar graph help you decide whether or not *Finish First* is a fair game? **How do graphs help you solve problems?**
Displaying and Analyzing the Survey Data (*Teacher's Lesson Guide*, pages 407–409)	**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 does the frequency table show about the favorite sports data? What conclusions can you draw about shower/bath time from the stem-and-leaf plot?
Lesson 6-7 American Tour: Climate		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 412 and 413)	**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**	What do the numbers on the contour lines mean on the Average Yearly Precipitation map? **Why is it important to understand the features of a map?**

Using Climate Maps to Answer Questions (*Teacher's Lesson Guide*, page 414)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2, GMP 4.2**	Why might someone want to know precipitation data? Who might want to know the lengths of growing seasons in different regions in the United States?
Lesson 6-8 Using Benchmarks with Fraction Addition and Subtraction		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 418 and 419)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 1.5, GMP 5.1, GMP 5.2, GMP 7.2**	How are the number line and Fraction Card representations of fractions similar? Different? How are the representations on the Fraction Cards useful when estimating sums of fractions?
Using Benchmarks to Estimate Sums and Differences of Fractions (*Teacher's Lesson Guide*, page 420)	**GMP 5.1** Choose appropriate tools for your problem. *See also:* **GMP 1.4, GMP 1.6, GMP 5.2, GMP 4.1**	What tool(s) did you use to estimate sums and differences with fractions? Why? **How do tools help you solve mathematics problems?**
Lesson 6-9 Clock Fractions and Common Denominators		
Using a Multiplication Table to Explore Equivalent Fractions (*Teacher's Lesson Guide*, pages 425 and 426)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 5.2, GMP 6.1, GMP 8.1**	What patterns do you notice in your lists of fractions? How could you extend these patterns?

Using a Common Denominator (*Teacher's Lesson Guide,* pages 426 and 427)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.6, GMP 2.2, GMP 5.2, GMP 8.1**	How did you use the multiplication rule to find common denominators? **How do rules make solving problems easier?**
Lesson 6-10 Quick Common Denominators		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 430)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 8.1**	How do you find *quick common denominators*? **What could help you remember and use new math vocabulary?**
Using Common Denominators (*Teacher's Lesson Guide,* pages 431 and 432)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 5.2, GMP 6.1, GMP 7.1, GMP 8.2**	What did you do to be sure you solved the problems accurately? What tools or rules did you use to help you solve the problems accurately?

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

Grade 5 Unit 7: Exponents and Negative Numbers

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 7-1 Exponential Notation		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 543)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 6.3**	What is the difference between standard notation and exponential notation? Explain how you used your knowledge of exponential notation to solve the Math Message.
Working with Exponents on a Calculator (*Teacher's Lesson Guide*, page 544)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 3.1, GMP 5.2**	If these mistakes were made by a classmate, what would you explain to him or her about exponents? **How can noticing and correcting other people's mistakes help you learn?**
Lesson 7-2 Exponential Notation for Powers of 10		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 548 and 549)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 6.1**	How does exponential notation help you generate more names for numbers? **Why do we represent numbers with multiple names?**

Using Guides for Powers of 10 (*Teacher's Lesson Guide*, page 549)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 5.2, GMP 7.2**	Why is it useful to use powers of 10 to describe real-life situations? When might someone use number-and-word notation rather than exponential notation?
Lesson 7-3 Scientific Notation		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 553)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.6, GMP 6.3, GMP 7.1, GMP 8.1**	What patterns did you notice in Problems 1–5? How did the patterns in Problems 1–5 help you solve Problems 6–10?
Translating Scientific Notation (*Teacher's Lesson Guide*, pages 553 and 554)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 6.1, GMP 7.2**	How did you use the chart to write the numbers in scientific notation? **Can a chart be a tool for doing mathematics? Explain your thinking.**
Lesson 7-4 Parentheses in Number Sentences		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 558 and 559)	**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 3.1, GMP 6.1, GMP 6.3**	What do parentheses mean in number sentences?* **Why is it important for mathematical symbols to have the same meaning for everyone?**

Matching Number Stories to Appropriate Expressions (*Teacher's Lesson Guide*, page 559)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How did you use parentheses to write an expression for the total number of undamaged cans in Problem 6? How do you know your expression is correct?
Lesson 7-5 Order of Operations		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 563)	**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**	How did Anne and Rick get 44?* Who do you think was right? Explain your answer.*
Introducing the Rules for Order of Operations (*Teacher's Lesson Guide*, pages 563–565)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.1, GMP 2.2, GMP 6.1, GMP 6.3**	How do you apply order of operations to a problem? **What other rules do you use to solve problems in math?**
Lesson 7-6 American Tour: Line Graphs		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 569 and 570)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How does organizing data help you to display data? What kind of information would be best to display in a bar graph? In a circle graph?

American Tour: Comparing Data on Line Graphs (*Teacher's Lesson Guide*, page 571)	**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**	What other questions could you answer using this graph? **How do graphs help you solve problems?**
Lesson 7-7 Using Negative Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 574)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.1, GMP 2.2, GMP 6.1**	How can the meanings of negative, positive, and zero change depending on the situation? **Why is it important to understand what a number means in the context of a real-world situation?**
Graphing Positive and Negative Numbers on a Number Line (*Teacher's Lesson Guide*, page 575)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2**	How are the chart and the graph similar? How are they different? Which model helps you see whether ticket sales were above or below the goal more easily? Explain your answer.
Lesson 7-8 Addition of Positive and Negative Numbers		
Finding Sums of Positive and Negative Numbers (*Teacher's Lesson Guide*, page 581)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 7.1, GMP 7.2**	How did you use your counters to solve these problems? **What other tools help you solve problems with positive and negative numbers?**

Developing Rules for Adding Positive and Negative Numbers (*Teacher's Lesson Guide*, page 582)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 7.1, GMP 8.2**	How could we use the addition problems on journal page 233 to help us make a set of rules for adding positive and negative numbers?* How could you use your counters to explain these rules?
Lesson 7-9 Subtraction of Positive and Negative Numbers		
Developing a Rule for Subtracting Positive and Negative Numbers (*Teacher's Lesson Guide*, pages 586 and 587)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 4.2, GMP 6.1, GMP 7.2, GMP 8.1, GMP 8.2**	What patterns did you notice as you solved Problems 1–8? What other pairs of problems could you write based on these patterns?
Subtracting Positive and Negative Numbers (*Teacher's Lesson Guide*, page 587)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 3.2, GMP 4.1, GMP 6.3**	What rule did you apply to rewrite the subtraction problems as addition problems? **When might you use rules for adding and subtracting positive and negative numbers in your life?**
Lesson 7-10 Line Plots		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 591 and 592)	**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 6.3**	What information does the line plot represent? Why is it helpful to represent this information in a line plot?

Displaying and Analyzing Data on a Line Plot (*Teacher's Lesson Guide*, page 593)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1**	How does the line plot help you analyze the rainfall data? **Why do we represent data in graphs?**
Lesson 7-11 Calculator Practice: Working with Negative Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 597)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 5.2**	Why is the change-sign key called the OPP key? Why do you think calculators display a – sign in front of negative numbers, but rarely a + sign in front of positive numbers?
Practicing Addition and Subtraction Using the Calculator (*Teacher's Lesson Guide*, page 598)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 5.3, GMP 6.3**	What mistakes could someone make when solving problems with negative numbers on a calculator? **Why is it important to know how to use a calculator to solve mathematical problems?**

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

Grade 5 Unit 8: Fractions and Ratios

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 8-1 Review: Comparing Fractions		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 619 and 620)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 1.6, GMP 5.2**	Why does your method for comparing fractions work? Why do you need a different method for different fraction comparisons?
Renaming Fractions as Equivalent Fractions (*Teacher's Lesson Guide*, pages 620 and 621)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 5.1, GMP 8.2**	How could you find equivalent fractions without using the Fraction-Stick and Decimal Number-Line Chart?* **Why is it important to have more than one method for finding equivalent fractions?**
Lesson 8-2 Adding Mixed Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 625)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.4, GMP 6.2**	How did you use your estimates to check whether your answers make sense? **Why is it important to check whether your answers make sense?**

Adding Mixed Numbers with Fractions Having Unlike Denominators (*Teacher's Lesson Guide*, page 627)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 3.1, GMP 6.3**	What rules did you apply when adding mixed numbers with unlike denominators? How is adding with unlike denominators different from adding with like denominators?
Lesson 8-3 Subtracting Mixed Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 631)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.4, GMP 6.2**	How did you use your estimates to check the differences? **Why do you use estimation to check your answers?**
Subtracting Mixed Numbers with Renaming (*Teacher's Lesson Guide*, pages 631–633)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.5, GMP 1.6, GMP 2.1, GMP 6.1, GMP 6.3**	Explain two ways to rename the minuend for the problem 8 – 2 2/3. For the problem 6 – 1/4. When is it helpful to know more than one way to solve a problem?
Lesson 8-4 Calculator Practice: Computation with Fractions		
Introducing *Fraction Action, Fraction Friction* (*Teacher's Lesson Guide*, page 638)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.5, GMP 3.2, GMP 5.2**	Why can you estimate sums rather than find exact answers to win *Fraction Action, Fraction Friction?* When would you check yours or your partner's estimate on a calculator?

Exploring Fraction-Operation Keys on a Calculator (*Teacher's Lesson Guide*, pages 638 and 639)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 3.1**	What are some of the important steps to remember when working with a calculator?* What mistakes might someone make when working with fractions on a calculator?
Lesson 8-5 Fractions of Fractions		
Modeling How to Find a Fraction of a Fraction (*Teacher's Lesson Guide*, pages 644–646)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2**	How are you modeling a fraction of a fraction by folding the paper? How do the paper models help you solve "fraction of" problems?
Finding a Fraction of a Fraction (*Teacher's Lesson Guide*, page 646)	**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 4.2**	Why can the whole be thought of as fourths, thirds, and twelfths? **Why is it important to understand the meanings of pictures and other representations?**
Lesson 8-6 An Area Model for Fraction Multiplication		
Using the Area Model for Fraction Multiplication (*Teacher's Lesson Guide*, pages 650–652)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 4.4**	How does the diagram show the answer to 2/3 * 3/4?* **Which representation of fraction multiplication helps you most? Why?**

Deriving a Fraction Multiplication Algorithm (*Teacher's Lesson Guide*, page 652)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.1, GMP 7.1, GMP 8.1, GMP 8.2**	Look carefully at the fractions on journal page 266. What is the relationship between the numerators and denominators of the two fractions being multiplied and the numerator and denominator of their product?* Describe a way to multiply two fractions.*
Lesson 8-7 Multiplication of Fractions and Whole Numbers		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 655)	**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**	How can you rewrite each problem using a number sentence? **Why do we use number models to represent problems?**
Using an Algorithm to Multiply a Fraction and a Whole Number (*Teacher's Lesson Guide*, pages 656 and 657)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 8.1, GMP 8.2**	What patterns do you notice about the numerators and denominators when multiplying fractions by whole numbers? Why is the denominator in the product the same as the denominator in the fraction factor?

Lesson 8-8 Multiplication of Mixed Numbers		
Multiplying with Mixed Numbers (*Teacher's Lesson Guide*, pages 660 and 661)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 3.1, GMP 6.3, GMP 8.1, GMP 8.2**	When might you prefer to use partial products when multiplying mixed numbers? Improper fractions? **How could it help you to know different methods for solving the same problems?**
Multiplying Fractions and Mixed Numbers (*Teacher's Lesson Guide*, page 662)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 2.2, GMP 4.1, GMP 6.1**	How did you check that your solutions were accurate? How did the method you chose help you solve the problems accurately?
Lesson 8-9 Finding a Percent of a Number		
Finding the Percent of a Number (*Teacher's Lesson Guide*, page 665 and 666)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.1, GMP 1.5, GMP 6.1**	Which solution strategies make the most sense to you? Why? Why is it useful to know more than one strategy for solving problems?
Calculating a Percent Discount (*Teacher's Lesson Guide*, pages 666 and 667)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.4, GMP 2.2, GMP 5.3, GMP 6.2**	How could estimating percent discounts help you in the future? **Why do we talk about how math is important in your life?**

Lesson 8-10 Relating Fractional Units to the Whole		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 670)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 8.2**	How can you use unit fractions and percents to solve problems? **What resources can help you communicate clearly about math?**
Using Unit Fractions to Find the Whole (*Teacher's Lesson Guide*, page 671)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 8.1**	How is using a unit fraction to solve a problem like using a rule? How does understanding how to work with unit fractions help you when solving other kinds of fraction problems?
Lesson 8-11 American Tour: Rural and Urban		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 675)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.2**	Which of these questions could be on a survey for the U.S. Census? How do you think census data is used?
Estimating Rural and Urban Populations (*Teacher's Lesson Guide*, pages 676 and 677)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 1.5, GMP 3.1, GMP 4.1, GMP 5.2, GMP 6.1, GMP 6.2**	Did you and your group members disagree about any steps in the estimation process? How did you resolve your disagreements? How did your thinking change while you worked with your group? Why?

Lesson 8-12 Fraction Division		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 681 and 682)	**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**	How do these visual models represent division? **How do visual models help you in math?**
Dividing with Unit Fractions (*Teacher's Lesson Guide,* pages 682–683A)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.1, GMP 1.6, GMP 2.1, GMP 2.2, GMP 6.1, GMP 6.3**	How does drawing pictures help you solve fraction division problems? What other models help you understand and solve problems?

* denotes a question that is currently in the materials

Grade 5 Unit 9: Coordinates, Area, Volume, and Capacity

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 9-1 *Hidden Treasure:* A Coordinate Game		
Math Message Follow-Up (*Teacher's Lesson Guide,* pages 705 and 706)	**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 3.1, GMP 6.1, GMP 6.3**	Do the coordinates (3,4) and (4,3) name the same point?* How could you remember which axis the coordinates refer to in an ordered pair?*
Playing the *Hidden Treasure* Game (*Teacher's Lesson Guide,* page 707)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 3.2**	What strategies could you use to get closer to naming your partner's hidden point? **How can it help you to make a plan before you solve a problem?**
Lesson 9-2 Coordinate Graphs: Part 1		
Plotting Ordered Number Pairs and Transforming Figures (*Teacher's Lesson Guide,* page 712)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 2.1, GMP 6.3, GMP 8.2**	How do you remember the rules for plotting ordered number pairs? Why is it important to be accurate when using a coordinate grid?

Discussing the Results of Operations on Number Pairs (*Teacher's Lesson Guide*, page 712)	**GMP 8.3** Reflect on your thinking before, during, and after you solve a problem. *See also:* **GMP 1.3, GMP 2.2, GMP 6.1, GMP 7.1, GMP 8.1**	How do the changes to the sailboat compare to the predictions you made before plotting the sailboat transformations? What knowledge did you use to predict how the angles and the area of the new sailboats would change?
Lesson 9-3 Coordinate Graphs: Part 2		
Plotting Ordered Number Pairs and Transforming Figures (*Teacher's Lesson Guide*, page 718)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 1.5, GMP 8.2**	What could happen if you didn't connect the plotted points in order? How can you make sure your points are plotted correctly?
Discussing Operations on Ordered Number Pairs (*Teacher's Lesson Guide*, page 718)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.5, GMP 8.1, GMP 8.3**	Why are New Sailboats 1 and 4 called *translations*? **What strategies do you use to remember math vocabulary?**
Lesson 9-4 Areas of Rectangles		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 723)	**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 3.2, GMP 6.1**	Why is area measured in square units? How would you explain what area is in your own words?

Discussing Formulas for the Area of a Rectangle (*Teacher's Lesson Guide*, page 725)	**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, GMP 7.1**	What do you notice about the relationship between the base and height and the actual area of each figure?* **Why are some rules called formulas?**
Lesson 9-5 The Rectangle Method for Finding Area		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 730)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 3.1, GMP 3.2, GMP 6.1**	Why can your personal references for area be estimates rather than exact calculations? **What does it mean to make *reasonable* estimates?**
Finding the Area of a Nonrectangular Figure (*Teacher's Lesson Guide*, page 730)	**GMP 1.3** Try different approaches when your problem is hard. *See also:* **GMP 1.2, GMP 4.2, GMP 8.2**	What strategies could you use to figure out the area of a figure that is not a rectangle? What could you do if your strategy doesn't work?
Lesson 9-6 Formulas for the Areas of Triangles and Parallelograms		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 736)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 2.2, GMP 7.1, GMP 8.1**	How could you use the figures of triangles and parallelograms to define base and height? Why is it important to have common, precise definitions for mathematical terms?

Developing Area Formulas for Triangles and Parallelograms (*Teacher's Lesson Guide*, pages 737 and 738)	**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, GMP 7.1, GMP 7.2**	How did you determine a formula for the area of a triangle? A parallelogram? **Why are rules in math based on many examples instead of just one?**
Lesson 9-7 Earth's Water Surface		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 742)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 4.1, GMP 8.3**	What information did you use to help you estimate the percent of Earth's surface covered by water? **Why are some estimation strategies more accurate than others?**
Locating Points on Land or Water (*Teacher's Lesson Guide*, pages 742 and 743)	**GMP 8.3** Reflect on your thinking before, during, and after you solve a problem. *See also:* **GMP 4.1**	How does the random sample data compare with your estimate? Why might the class data be different from the actual percent of water?
Lesson 9-8 Volume of Rectangular Prisms		
Defining Base and Height for Rectangular Prisms (*Teacher's Lesson Guide*, page 749)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.6, GMP 2.2, GMP 8.1**	How did you use the figures of rectangular prisms to define base and height? Why is it important to have a common, precise definition for base and height?

Developing a Formula for Volume (*Teacher's Lesson Guide,* pages 749 and 750)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 2.2, GMP 4.2, GMP 5.3, GMP 6.3, GMP 8.2**	How does filling the box with centimeter cubes model the formula for volume ($V = B * h$)*?* **How are area and volume related?**
Lesson 9-9 Volume of Right Prisms		
Verifying the Volume Formula for Prisms (*Teacher's Lesson Guide,* pages 755 and 756)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 2.1, GMP 2.2, GMP 3.1**	How does this activity verify that $V = B * h$ can be used to calculate the volume of these prisms? **Why would mathematicians want to verify a formula?**
Finding the Volumes of Prisms (*Teacher's Lesson Guide,* page 757)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 4.2, GMP 6.3**	Why is it helpful to have a formula to solve volume problems? Give an example of another problem that can be solved using this formula.
Lesson 9-10 Capacity: Liter, Milliliter, and Cubic Centimeter		
Demonstrating that 1 Liter Equals 1,000 cm^3 (*Teacher's Lesson Guide,* page 762)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 3.1**	What is the relationship between liters and cubic centimeters? What is the relationship between volume and capacity?

Exploring Volume (*Teacher's Lesson Guide*, page 763)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.1, GMP 7.1, GMP 7.2**	How did you use the grid paper to solve this problem? **Why is it important to be able to model mathematical problems?**

* denotes a question that is currently in the materials

Grade 5 Unit 10: Using Data; Algebra Concepts and Skills

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 10-1 Pan-Balance Problems		
Demonstrating How to Solve Pan-Balance Problems (*Teacher's Lesson Guide,* pages 785–787)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 4.2, GMP 6.1**	How are pan-balance problems like equations? Why do you have to make sure that both sides are equal in a pan-balance problem and in an equation?
Solving Pan-Balance Problems (*Teacher's Lesson Guide,* page 787)	**GMP 1.5** Check whether your solution makes sense. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.2, GMP 6.1, GMP 6.3**	How can you check your answers to pan-balance problems? **When should you check whether your answers make sense? Why?**
Lesson 10-2 Pan-Balance Problems with Two Balances		
Demonstrating How to Solve More Complex Pan-Balance Problems (*Teacher's Lesson Guide,* pages 792–794)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2**	How do the pan balances help you find the weight of different objects? **How can models help you make sense of ideas in mathematics?**

Solving Pan-Balance Problems (*Teacher's Lesson Guide*, page 794)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 1.1, GMP 4.2, GMP 6.3**	How did you decide which of the two statements should be completed first? Why do you need to decide this before solving the problem?
Lesson 10-3 Algebraic Expressions		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 798)	**GMP 1.1** Work to make sense of your problem. *See also:* **GMP 1.4, GMP 1.5, GMP 3.1**	How is this problem different from other math problems you have solved? **What could you do if you don't understand a problem the first time you read it?**
Introducing Algebraic Expressions (*Teacher's Lesson Guide*, pages 798 and 799)	**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 4.1, GMP 6.1**	What is the advantage to representing situations using algebraic expressions?
Lesson 10-4 Rules, Tables, and Graphs: Part 1		
Displaying a Rate of Speed (*Teacher's Lesson Guide*, page 805)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1**	What other questions could this graph help you answer? **How do graphs help you solve problems?**

Comparing Three Ways of Representing Rates (*Teacher's Lesson Guide,* page 806)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.2, GMP 4.1, GMP 6.1**	What is a disadvantage to displaying mathematical relationships in a table? When might you prefer to represent a mathematical relationship with a graph?
Lesson 10-5 American Tour: Old Faithful's Next Eruption		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 810)	**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 6.1**	How is the formula for the wait time between Old Faithful's eruptions like a rule? What does it mean if $W = 50$?
Predicting When Old Faithful Will Erupt Next (*Teacher's Lesson Guide,* pages 810 and 811)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 4.2, GMP 8.2**	Why might park rangers need to predict the wait time between eruptions of Old Faithful? **How can mathematics help you make decisions in the real world?**
Lesson 10-6 Rules, Tables, and Graphs: Part 2		
Solving the Footrace Problem (*Teacher's Lesson Guide,* pages 816 and 817)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 4.1, GMP 4.2, GMP 7.1**	How did you use Lupita's data to develop a rule? **Why do patterns in math often lead to rules?**

Graphing the Footrace Data (*Teacher's Lesson Guide*, pages 817 and 818)	**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 4.1, GMP 4.2, GMP 6.3**	What does this graph tell you about the footrace? What title would you give this graph?
Lesson 10-7 Reading Graphs		
Reading Graphs (*Teacher's Lesson Guide*, pages 821 and 822)	**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 1.1, GMP 4.1, GMP 4.2**	What does Ahmed's graph show about his speed? What information about Tom and Alisha's race does the graph show?
Interpreting Mystery Graphs (*Teacher's Lesson Guide*, pages 822 and 823)	**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 1.1, GMP 4.1**	What could Graph D represent? **What other situations could you represent with graphs like this, where time is represented on the horizontal axis?**
Lesson 10-8 Circumference of a Circle		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 826 and 827)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 3.1, GMP 6.1, GMP 8.2**	Explain why students might have given the following answers: 144 square inches; 48 square inches.* **What can you learn from explaining other's mistakes?**

Making a Stem-and-Leaf Plot (*Teacher's Lesson Guide,* page 828)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 2.2, GMP 4.2**	What do you notice about the ratio of circumference to diameter? Based on your data and the class data, what might you conclude about the ratio of circumference to diameter?
Lesson 10-9 Area of a Circle		
Math Message Follow-Up (*Teacher's Lesson Guide,* page 832)	**GMP 6.2** Use the level of precision you need for your problem. *See also:* **GMP 1.2, GMP 1.4, GMP 6.3**	Why is it difficult to find the area of a circle by counting squares? When might you need to know the exact area of a circle?
Using a Formula to Find the Area of a Circle (*Teacher's Lesson Guide,* page 834)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 1.4**	What is the advantage to using a rule to find the area of a circle? **Do you think formulas are always more accurate than other methods? Why or why not?**

* denotes a question that is currently in the materials

Grade 5 Unit 11: Volume

Activity	***Everyday Mathematics* Goal for Mathematical Practice**	**Guiding Questions**
Lesson 11-1 Review of Geometric Solids: Part 1		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 857)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 4.2**	Describe one of your group's objects using the terms surfaces, faces, edges, and vertices. **What vocabulary helps you communicate clearly about geometric solids?**
Investigating Regular Polyhedrons (*Teacher's Lesson Guide*, pages 858 and 859)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 6.1**	How did the polyhedral dice help you answer the questions on the journal page? Are polyhedral dice fair? How do you know?*
Lesson 11-2 Review of Geometric Solids: Part 2		
Math Message Follow-Up (*Teacher's Lesson Guide*, pages 862 and 863)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 2.1, GMP 6.1**	Why are we are looking for similarities and differences between prisms and pyramids? How does focusing on similarities and differences help you differentiate between a prism and a pyramid?

Playing *3-D Shape Sort* (*Teacher's Lesson Guide*, pages 863 and 864)	**GMP 8.2** Use properties, rules, and shortcuts to solve problems. *See also:* **GMP 4.2**	How can you get better at playing *3-D Shape Sort*? **What helps you remember properties of geometric objects?**
Lesson 11-3 Volume of Cylinders		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 867)	**GMP 1.1** Work to make sense of your problem. *See also:* **GMP 1.2, GMP 6.1, GMP 8.2**	Why do you need to know the relationship between the circumference and diameter of a circle to solve the Math Message? **What could you do if you don't understand what a problem is asking you to do?**
Introducing and Verifying the Cylinder Volume Formula (*Teacher's Lesson Guide*, pages 867 and 868)	**GMP 6.3** Be accurate when you count, measure, and calculate. *See also:* **GMP 1.4, GMP 4.1, GMP 4.2, GMP 5.2, GMP 6.1, GMP 8.2**	What did you do to ensure the calculated volumes of your cans were accurate? What could you do to make the measurement of liquid capacity in Problem 4 more accurate?
Lesson 11-4 Volume of Pyramids and Cones		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 873)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 6.1, GMP 8.2**	How do you know your solution strategy works? **How is it helpful to explain *why* your strategy works?**

Exploring the Relationship between the Volumes of Cylinders and Cones (*Teacher's Lesson Guide*, page 874)	**GMP 8.1** Use patterns and structures to create and explain rules and shortcuts. *See also:* **GMP 1.6, GMP 4.2**	How do these demonstrations support the formula for the volume of pyramids and cones, $V = 1/3 * B * h$? Do you think this would work for any cylinder and cone that have identical bases and heights? Why or why not?
Lesson 11-5 Finding Volume by a Displacement Method		
Calibrating a Bottle (*Teacher's Lesson Guide*, pages 879 and 880)	**GMP 5.2** Use mathematical tools correctly and efficiently. *See also:* **GMP 2.1, GMP 2.2, GMP 6.2**	Why do you need to calibrate a bottle before measuring the volume of irregular objects? **Why is it important to know that any measuring tool is correctly calibrated?**
Using a Calibrated Bottle to Measure the Volumes of Various Objects (*Teacher's Lesson Guide*, page 881)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 5.2, GMP 6.2**	How did you find the volume of the other objects in Problem 3? How might you find the volume of a piece of cork, or some other object that floats?
Lesson 11-6 Capacity and Weight		
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 6.1**	Why are some of the letters on journal page 386 within other letters? Why is G the largest letter? Why is C the smallest letter?

Solving Problems Involving Units of Weight and Capacity (*Teacher's Lesson Guide*, pages 885 and 886)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.6**	Why might someone need to calculate the volume of food that has been consumed? The weight? **When have you needed to know information about weight or volume in your life?**
Lesson 11-7 Surface Area		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 891)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.2, GMP 1.4, GMP 4.2**	Use geometry vocabulary to describe the box.* How does precisely describing the box help you determine a strategy for wrapping the box with the least amount of paper?
Finding the Surface Area of a Can (*Teacher's Lesson Guide*, pages 891 and 892)	**GMP 1.2** Make a plan for solving your problem. *See also:* **GMP 1.1, GMP 4.2, GMP 6.1, GMP 8.2**	How can you use what you know about area to find the surface area of the whole can? **Why is it helpful to make a plan before you solve a problem?**

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Grade 5 Unit 12: Probability, Ratios, and Rates

Activity	*Everyday Mathematics* Goal for Mathematical Practice	Guiding Questions
Lesson 12-1 Factor Trees		
Finding Greatest Common Factors (*Teacher's Lesson Guide*, pages 915 and 916)	**GMP 1.4** Solve your problem in more than one way. *See also:* **GMP 1.5, GMP 2.1, GMP 7.2, GMP 8.1, GMP 8.2**	Which is a more efficient way to find the greatest common factor: listing all the factors and identifying the largest or using prime factorization? **Why do we learn multiple solution strategies?**
Finding Least Common Multiples (*Teacher's Lesson Guide*, page 917)	**GMP 7.2** Use patterns and structures to solve problems. *See also:* **GMP 1.4, GMP 8.1, GMP 8.2**	How did you use prime factorization to find the least common multiples? Why do you think this works?
Lesson 12-2 Choices, Tree Diagrams, and Probability		
Introducing the Multiplication Counting Principle and Tree Diagrams (*Teacher's Lesson Guide*, pages 922 and 923)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 1.4, GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.2, GMP 6.1**	Why might someone want to know the number of different food combinations in a cafeteria? **What other combination problems could you model with a tree diagram?**

Solving Probability Problems (*Teacher's Lesson Guide,* page 923)	**GMP 1.6** Connect mathematical ideas and representations to one another. *See also:* **GMP 1.4, GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2**	What is the relationship between the Multiplication Counting Principle and tree diagrams?* Why might someone prefer to make a tree diagram instead of using the Multiplication Counting Principle?
Lesson 12-3 American Tour: Ratio Exploration		
Reading Ratios and Writing them in Equivalent Forms (*Teacher's Lesson Guide,* pages 927 and 928)	**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, GMP 6.1**	According to the survey, how many 11-year-olds out of 100 play basketball? What percent is this? What simple fraction is this close to?* **Why is it helpful to represent certain situations with ratios?**
Using Ratios to Examine Trends (*Teacher's Lesson Guide,* pages 928 and 929)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 2.2, GMP 4.2**	Based on the trends, predict the ratios for various jobs in the year 2030. Will the fraction or percent of people in various jobs—farmers, engineers, clergy, and so on—increase, decrease, or stay about the same, compared with the current levels?* Why do you think these will be the trends in 2030?

Lesson 12-4 Ratios of Parts to Wholes		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 932)	**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 5.2**	What does each shaded tile represent? What does each white tile represent?
Solving Ratio Problems (*Teacher's Lesson Guide*, pages 933 and 934)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.4, GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 5.2**	How did you use your tiles to model the ratios in the number stories? **What are other ways you could model ratio problems?**
Lesson 12-5 Number Models for Ratio Number Stories		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 937)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2**	How do the tiles help you explain your solution strategy? How else could you explain your solution strategy to someone who does not understand the problem?

Introducing Number Models for Ratio Number Stories (*Teacher's Lesson Guide*, pages 937 and 938)	**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 4.2, GMP 6.1**	How does a number model represent a ratio problem? **Why is it important to keep track of units in math problems?**
Lesson 12-6 Finding Your Heart Rate		
Finding Heart Rates (*Teacher's Lesson Guide*, pages 943 and 944)	**GMP 3.1** Explain both what to do and why it works. *See also:* **GMP 2.1, GMP 4.1, GMP 5.2, GMP 6.2, GMP 6.3**	How did you use the rate in problem 1 to calculate the number of heart beats in 1 minute, 1 hour, 1 day and 1 year? **How could your explanations help someone else in math?**
Playing *Spoon Scramble* (*Teacher's Lesson Guide*, page 944)	**GMP 6.1** Communicate your mathematical thinking clearly and precisely. *See also:* **GMP 3.2**	How do you know if your cards are equivalent? What math are you practicing in this game?
Lesson 12-7 Collecting, Graphing, and Interpreting Data		
Making a Personal Heart-Rate Profile (*Teacher's Lesson Guide*, pages 948 and 949)	**GMP 4.2** Use mathematical models such as graphs, drawings, tables, symbols, numbers, and diagrams to solve problems. *See also:* **GMP 1.6, GMP 2.1, GMP 2.2, GMP 4.1**	What do you notice about your heart-rate profile? How did you use your profile to predict your heart rate after 30 jumping jacks?

Comparing Line Plots (*Teacher's Lesson Guide*, page 949)	**GMP 7.1** Find, extend, analyze, and create patterns. *See also:* **GMP 2.1, GMP 2.2, GMP 4.1, GMP 4.2**	What do you notice when comparing the data in each line plot? **How do patterns help you make sense of mathematical situations?**
Lesson 12-8 Finding Your Cardiac Output		
Math Message Follow-Up (*Teacher's Lesson Guide*, page 953)	**GMP 3.2** Work to make sense of others' mathematical thinking. *See also:* **GMP 2.2, GMP 3.1**	What mistake was made by the people who gave the answer 13/15?* **How does understanding other people's mistakes help you learn?**
Comparing Cardiac Output at Rest and After Exercising (*Teacher's Lesson Guide*, page 954)	**GMP 4.1** Apply mathematical ideas to real-world situations. *See also:* **GMP 3.1, GMP 3.2**	Why might your cardiac output at rest and after exercise be different from others in your class? Why might someone need to calculate his/her heart rate? Target heart rate? Cardiac output?

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