

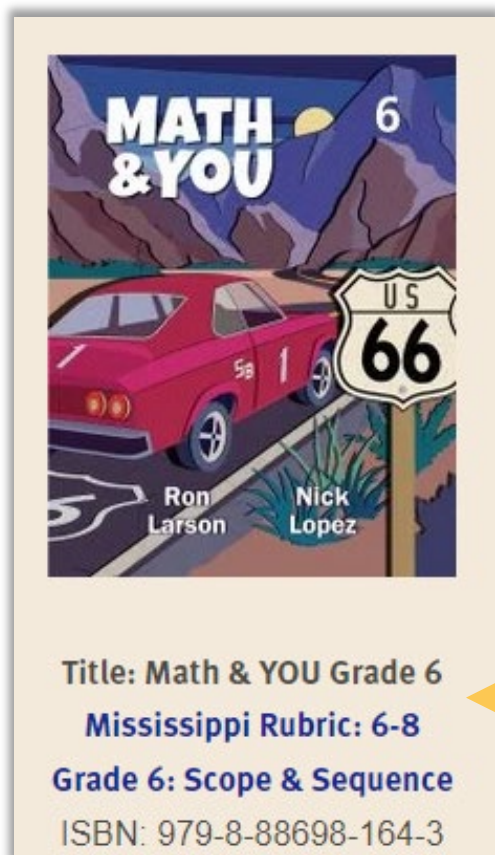
## Math & YOU 6-8 Features and Benefits

Visit <https://bigideaslearning.com/mississippi-review> (Password: MSReview2024)

Your one-stop shop for all the information needed to review *Math & YOU*.

### Step 1:

On the [Review Site](#), view the **MS HQIM Rubrics** by grade band and **Scope & Sequence** by grade level, demonstrating 100% alignment of *Math & YOU* to the MS College and Career Readiness Standards for Mathematics (2016).



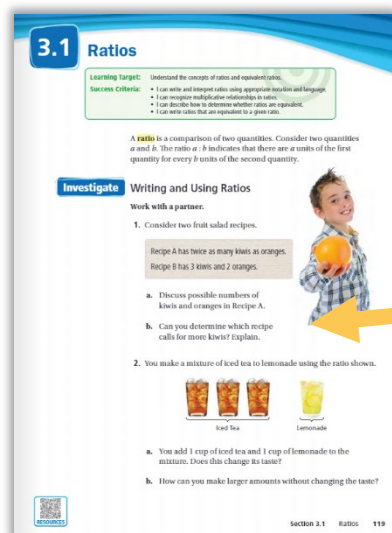
The **Scope and Sequence** and **6-8 Rubric** is provided at point of use for each grade level on the review site.

## Step 2:

Review the Teaching Edition. Resources, such as the Table of Contents, show the progression of content taught throughout the grade. At the chapter level, each chapter opens with Coherence through the Grades, which demonstrates the vertical and horizontal alignment to standards progressions and implementation of the Standards for Mathematical Practices (SMPs). It provides suggested pacing and additional family resources through the **Big Idea of the Chapter**.

## Step 3:

Identifying rigor in conceptual understanding within *Math & YOU* is the first of three prongs within our lesson design and visible in both the Teaching and Student Editions. Every lesson begins with the development of conceptual understanding through the **Motivate** (Teaching Edition only) and **Investigate** (Teaching and Student Editions). This part of the lesson design is consistent in every grade and allows opportunities for use of models, manipulatives, and real-life tools to support rigor and develop deep understanding.



Students utilize real-world contexts to deepen their understanding of the concept.

Student Edition Investigate Grade 6

### 3.1 Ratios

**Focus**

**Learning Target:** Understand the concepts of ratios and equivalent ratios.

**Success Criteria:**

- Write and interpret ratios using appropriate ratios language.
- Recognize multiplicative relationships in ratios.
- Describe how to determine whether ratios are equivalent.
- Write ratios that are equivalent to a given ratio.

**Coherence**

Students have had experiences with comparing measurable attributes using language such as longer than, less than, times as many, and so on. Students will learn that a ratio is a comparison of two quantities, with an emphasis on understanding the language and notation associated with ratios.

**Rigor**

Students will use a real-life situation to develop conceptual understanding of equivalent ratios.

**Grade 5 Section 12.5:** Create and describe numerical patterns.

**In-Class Practice:** provides opportunities for students to demonstrate their procedural skill and fluency in writing and interpreting ratios and identifying equivalent ratios.

Students will make their understandings of equivalent ratios to

**Common Misconception:** Students may believe that if you add or subtract the same quantity to (or from) each number in a ratio, the relationship stays the same.

Students may not have the language of equivalent ratios, yet it seems logical to them to double or triple the recipe.

**Talk About It**

What mathematical tools can you use to help organize, represent, or show ratio relationships?

**Answers**

- Sample answer: If there are 3 oranges, then there are 2 × 2 = 10 blocks in the fruit salad. If there are 7 oranges, then there are 2 × 7 = 14 blocks in the fruit salad.
- no, Sample answer: Recipe A could use 3 lemons and 1 orange or 4 lemons and 2 oranges.
- no
- Add 3 cups of food to for every 1 cup of lemonade added.

### 3.1 Ratios

**Learning Target:** Understand the concepts of ratios and equivalent ratios.

**Success Criteria:**

- Write and interpret ratios using appropriate ratios language.
- Recognize multiplicative relationships in ratios.
- Describe how to determine whether ratios are equivalent.
- Write ratios that are equivalent to a given ratio.

**Investigate**

**Writing and Using Ratios**

Work with a partner.

- Consider two fruit salad recipes.
- Recipe B has twice as many lemons as Recipe A.
- Discuss possible numbers of lemons and oranges in Recipe A.
- Can you determine which recipe calls for more lemons? Explain.
- You make a mixture of lemon and 1 cup of lemonade using the ratio shown.
- You add 1 cup of lemon and 1 cup of lemonade to the mixture. Does the change in taste?
- How can you make larger amounts without changing the taste?

**Differentiating Instruction**

- Students explored how to use a ratio to describe a relationship between two quantities. They were also introduced to the concept of equivalent ratios.
- Engaging: Examples 1 and 2 give additional practice for writing and interpreting ratios. Students should recognize that ratio relationships can be part to part, part to whole, or whole to part. Help students make sense of the definition of ratio of a ratio.
- Proficient: If students are confident in writing and interpreting ratios that are part to part, part to whole, and whole to part, they can access with the In-Class Practice exercises and continue independently with Example 3.
- In Example 4, guided instruction may be needed for all students.

Teaching Edition **Motivate** promotes conceptual understanding, accesses prior knowledge, and encourages classroom discussion. The Teaching Edition also has specific **Rigor** callouts and, in this lesson, demonstrates Standards alignment to 6.RP.A.1 as noted on the Scope and Sequence for Grade 6.

## Step 4:

Developing procedural skill and fluency is the second prong of our consistent lesson design. Again, visible in both the Teaching and Student Editions, there are opportunities for teachers to model and students to practice, all with appropriate scaffolding and pedagogical approaches to instruction. The development of these skills will be visible in the **Key Concept**, **In-Class Practice**, and **Practice** sections of the lesson. In addition to developing fluency and procedural skills throughout the lesson, students also conclude the lesson with **Review & Refresh**, providing a spiral review to maintain fluency on previously learned skills.

**3.1 Practice** with **Calc Chat** and **Calc View**

**Write the ratio.** (See Example 1.)

1. frogs to turtles
2. basketballs to soccer balls
3. calculators to pencils
4. shirts to pants

**Find and interpret the value of the ratio.** (See Example 2.)

5. 3 trucks : 7 cars
6. 6 dolls to 9 dresses
7. 10 birds : 6 trees
8. During a given month, the ratio of sunny days to rainy days is 4 : 1.
  - a. Find and interpret the value of the ratio.
  - b. In another month, the number of sunny days is 5 times the number of rainy days. Write the ratio of sunny days to rainy days.

**Determine whether the ratios are equivalent. Explain.** (See Example 3.)

9. 5 : 3 and 15 : 12
10. 6 : 10 and 12 : 20
11. 28 : 32 and 7 : 8

**OPEN ENDED** Describe a real-life relationship that can be represented by the ratio.

12. 2 per 5
13. 1 out of every 7
14. 7 : 1

**Write a ratio that is equivalent to the given ratio.**

15. 3 : 1
16. 7 : 2
17. 6 : 6

**18. YOU BE THE TEACHER** Your friend says that the two ratios are equivalent. Is your friend correct? Explain your reasoning.

$\frac{4}{9} = \frac{8}{12}$

Because you can add 4 to each number in the first ratio to obtain the numbers in the second ratio, the ratios are equivalent.

**19. OPEN ENDED** A recipe for a non-Newtonian fluid combines water and cornstarch in the amounts shown. Find two possible combinations of water and cornstarch that you can use to make a larger batch. Justify your answers.

**20.** In the contiguous United States, the ratio of states that border an ocean to states that do not border an ocean is 7 : 9. How many of the states border an ocean?

**21. CONNECTING TO REAL LIFE** A train moving at a constant speed travels 3 miles every 5 minutes. A car moving at a constant speed travels 12 miles every 20 minutes. Are the vehicles traveling at the same speed? If not, which is faster? (See Example 4.)

**22. YOU** Find the ratio of the length of the red rectangle to the length of the purple rectangle. Repeat this for width, perimeter, and area. Then compare your ratios.

4 in. 6 in. 2 in. 3 in.

124 Chapter 3 Ratios and Rates Section 3.1 Ratios 125

**Practice** from the Student Edition. (Note: Exercises 1, 5, 9 have a blue triangle next to the number. This indicates these exercises are supported through **CalcChat** and **CalcView**. **CalcChat** provides a live, online tutor to support students learning. **CalcView** shows example videos of this specific exercise being worked out with explanations.

**Key Concept**

**Key Vocabulary** ratio, rate, unit rate, equivalent ratio

**Key Concept** A ratio is a comparison of two quantities. Ratios can be written as part to part, whole to whole, or whole to part comparisons. Ratios can also be written as fractions.

**Example 1 Writing Ratios**

You have the coins shown.

- a. Write the ratio of quarters to dimes.
- b. Write the ratio of dimes to the total number of coins.
- c. Write the ratio of dimes to the total number of coins as a percent.

**Answers**

1. 3 to 6, or 3 : 6
2. 7 to 16, or 7 : 16

**Lesson Insights**

Discuss the definition of the value of the ratio.

- To help students develop an understanding of rate language and notation use the following example to discuss the value of the ratio. For example, “The teacher will use that for every 3 students who like blue notebooks, 2 students do not. The ratio of students who like blue notebooks to students who do not is 3 : 2, so the value of the ratio is  $\frac{3}{2}$ .”

**Example 2 Interpreting the ratio**

Have students use colored chips to represent the ratio of rubies to diamonds. Looking at the 100, students can see that there are 48 many rubies as diamonds and twice as many diamonds as rubies.

**WRITERS**

5. The number of adult stephens is 5 times the number of baby stephens.
4.  $4 \frac{1}{2}$  : 2 the number of sharks in the tank
5.  $5 \frac{1}{2}$  : 2 the number of dolphins
6.  $5 \frac{1}{2}$  : 2 the number of dolphins

**Key Concept**

The number 5 associated with the ratio 5 : 2 is the **value of the ratio**. It describes the multiplicative relationship between the two quantities.

**Example 2 Writing and Interpreting Ratios**

1. The ratio of perimeter to area of a square is 4 : 1. Find and interpret the value of the ratio.
2. The number of perimeter unit diamonds is 4 times the number of perimeter unit squares.
3. The number of perimeter unit diamonds is 4 times the number of perimeter unit squares.
4. The ratio of perimeter to area of a square is 4 : 1.

**In-Class Practice**

1. Write the ratio. Then find and interpret the value of the ratio.
  - a. diamonds to rubies
  - b. rubies to diamonds
2. Write the ratio. Then find and interpret the value of the ratio.
  - a. diamonds to rubies
  - b. rubies to diamonds

**Talk About It**

Exercises 1 and 2: Explain to a partner how to write and interpret the ratios using appropriate notation and language.

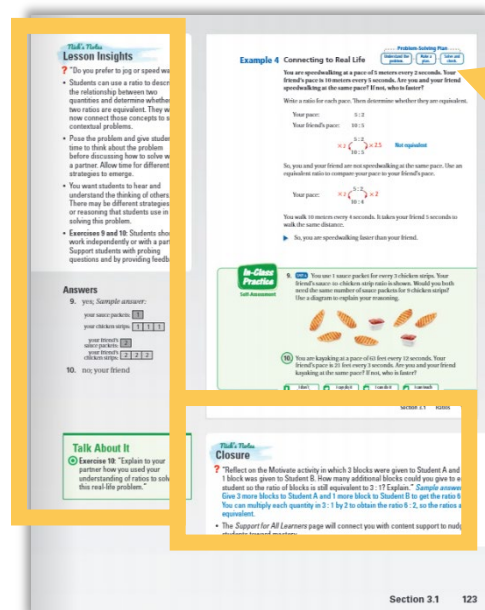
**Answers**

1. 3 to 6, or 3 : 6
2. 7 to 16, or 7 : 16

**Key Concept and In-Class Practice** with scaffolding opportunities, discussion prompts, formative check, and feedback opportunities from the Teaching Edition.

## Step 5:

To complete the third prong of rigor, *Math & YOU* lessons conclude with application opportunities. Again, demonstrated in both the Student and Teaching Editions, teachers and students will find math relevant by practicing examples relating to real-world applications. This section strongly concludes the lesson with final formative check-ins and a closure activity to ensure student understanding. Students will practice applying what they have learned in the **Connect to Real Life** sections. This application is reinforced by the teacher’s guidance in the **Talk About It** section found in the Teaching Edition.



**Connect to Real-Life** uses real-world examples that students can relate to.

Teaching Edition highlighting **Connecting to Real Life**, Teacher check-ins through multiple discussion prompts and feedback opportunities, including **Talk About It** and the **Closure** for this lesson.

## Step 6:

In need of even more ways to provide tailored, rigorous instruction for your students? Look at the chapter openers and closers, which include **Learning Targets and Success Criteria**, **SMP guidance**, **Career Explorations** and connections, corresponding **Performance Tasks**, and **Chapter Practice**. Also, in the print **Practice Workbook**, teachers have access to Tier-1 practice for every lesson as well as targeted standards-based practice. Further practice, differentiation and assessments can be found using the online platform, [www.myadamath.com](http://www.myadamath.com). Login credentials and a digital walk through are found on the [Review Site webpage](#) (password: MSReview2024).

CHAPTER 3		Teaching Chapter 3 with	Learning Targets and Success Criteria
<b>Big Idea of the Chapter: Relationships between Quantities</b>			
Learning Target	Success Criteria	Vocabulary	Suggested Pacing
<b>Chapter 3</b> Units and Rates	Understand rates. • Write and interpret rates. • Identify equivalent rates. • Solve a problem using rates. • Apply rate reasoning to convert units of measure.		Chapter Opener 1 Day
<b>3.1</b> Rates	Understand the concepts of rates and equivalent ratios. • Why and interpret ratios using appropriate notation and language. • Recognize multiplicative relationships in ratios. • Describe how to determine whether ratios are equivalent. • Write ratios that are equivalent to a given ratio.	rate, value of a rate, equivalent ratio	3 Days
<b>3.2</b> Using Tape Diagrams	Use tape diagrams to model and solve rate problems. • Interpret tape diagrams that represent rate relationships. • Draw tape diagrams to model rate relationships. • Find the value of one part of a tape diagram. • Use tape diagrams to solve rate problems.		3 Days
<b>3.3</b> Using Ratio Tables	Use ratio tables to represent equivalent rates and solve rate problems. • Use ratio tables to compare rates. • Use various operations to create tables of equivalent ratios. • Use ratio tables to compare rates.	ratio table	3 Days
<b>3.4</b> Graphing Rate Relationships	Represent rate relationships on a coordinate plane. • Create and plot ordered pairs from a rate relationship. • Use ratio tables to compare rates. • Create graphs to compare rates.		3 Days
<b>3.5</b> Rates and Unit Rates	Understand the concept of a unit rate and solve rate problems. • Find unit rates. • Use unit rates to solve rate problems. • Use unit rates to compare rates.	rate, unit rate, equivalent rates	3 Days
<b>3.6</b> Converting Measures	Use rate reasoning to convert units of measure. • Write conversion facts as unit rates. • Convert units of measure using ratio tables. • Convert units of measure using conversion factors. • Convert rates using conversion factors.	U.S. customary system, metric system, conversion factor, unit analysis	3 Days
<input type="checkbox"/> <b>Vocabulary Support</b> Students can access interactive Vocabulary Cards and the Math Language Glossary online.		Chapter Review/Chapter Practice/Practice Test Chapter Test Performance Task Total Chapter 3 Total Year-to-Date	1 Day 1 Day 1 Day 25 Days 78 Days

At the beginning of each chapter, teachers can review the **Learning Targets and Success Criteria**, related to each lesson, review **Vocabulary** and view the **Suggested Pacing** to ensure mastery and understanding for all students. This dives into standards at a deeper level, ensuring all parts of a standard are taught and mastered.

CHAPTER 3		Standards for Content and Mathematical Practice
<b>COHERENCE Through the Chapter</b>		
<b>Content Standard</b>	<b>3.1</b>	<b>3.2</b> <b>3.3</b> <b>3.4</b> <b>3.5</b> <b>3.6</b>
Understand the concept of a rate and use rate language to describe a relationship between two quantities.	●	● ● ● ● ●
Understand the concept of a unit rate $a/b$ associated with a ratio $a:b$ with $b \neq 0$ , and use rate language in the context of a ratio relationship.	●	● ● ● ● ●
Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations.	●	● ● ● ● ●
Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare rates.	●	● ● ● ● ●
Solve unit rate problems including those involving unit pricing and constant speed.	●	● ● ● ● ●
Use ratio reasoning to convert measurement units; multiply and transform units appropriately when multiplying or dividing quantities.	●	● ● ● ● ●
<b>Key:</b> ● preparing ● learning ● extending		
<b>Standards for Mathematical Practice</b> Students have opportunities to engage in the Mathematical Practices throughout the chapter. Below are some suggested examples.		
<b>1</b> <b>Make Sense of Problems and Persevere in Solving Them</b> 3.1, p. 127 <b>2</b> <b>Reason Abstractly and Quantitatively</b> 3.4, p. 161 <b>3</b> <b>Construct Viable Arguments and Critique the Reasoning of Others</b> 3.1, p. 127 <b>4</b> <b>Model with Mathematics</b> 3.1, p. 127	<b>5</b> <b>Use Appropriate Tools Strategically</b> 3.1, p. 127 <b>6</b> <b>Attend to Precision</b> 3.4, p. 161 <b>7</b> <b>Look for and Make Use of Structure</b> 3.1, p. 127 <b>8</b> <b>Look for and Express Regularity in Repeated Reasoning</b> 3.1, p. 127	<b>1</b> <b>SEE and Grit</b> Sometimes students cannot actually connect with their peers due to various barriers or hidden fears that may exist. This can create a lack of engagement and social awkwardness. Model ways your students can show Social Awareness by teaching them to talk to their peers in ways that show empathy and compassion. For example, "Have you ever done today?" or "Let me help you understand that exercise." Sometimes, students need to hear examples to understand real, thoughtful ways to interact. Let students know that it is okay to support and encourage each other. Through these lessons, students will learn things about respecting others and supporting diversity. Continue this support throughout the year so you lead your students to academic success. ● Refer to <b>Appendix A</b> for suggestions on connections between <b>SEL and Grit</b> and <b>Mathematical Practices</b> .
<b>Prior Learning</b>   <b>Current Learning</b>   <b>Future Learning</b>		
<b>Grade 4</b> <ul style="list-style-type: none"> <li>Section 3.1: Multiply to solve word problems involving multiplicative comparison.</li> <li>Section 3.1.1: 3.1.5 Compare sizes of measurement units within a system. Write length, mass, and volume using equivalent measures.</li> </ul> <b>Grade 5</b> <ul style="list-style-type: none"> <li>Section 5.1–5.5: Multiply whole numbers by fractions, fractions by whole numbers, and fractions by fractions.</li> <li>Section 5.7: Compare a product to each of its factors.</li> <li>Section 5.8 and 5.9: Understand how fractions and mixed numbers relate to division.</li> <li>Section 5.9: 5.9.2: Double whole numbers to use the area and divide and reduce to lowest terms, and use the area of a coordinate plane.</li> <li>Section 5.9 and 5.10: Count, represent, and describe the relationship between two equivalent patterns. Use two numerical patterns to write and plot ordered pairs in a coordinate plane.</li> </ul>	<b>Grade 3 Chapter 3</b> <ul style="list-style-type: none"> <li>Section 3.1–3.6: Understand the concept of a rate and use rate language to describe a rate relationship between two quantities.</li> <li>Section 3.1–3.6: Use rate and rate reasoning to solve mathematical and real-world problems.</li> <li>Section 3.2: Find missing values in ratio tables and create tables of equivalent ratios. Use ratio tables to compare rates.</li> <li>Section 3.4: Plot ordered pairs from a rate relationship on a coordinate plane. Use graphs to compare rates.</li> <li>Section 3.5: Understand the concept of a unit rate and use rate language in the context of a rate relationship.</li> <li>Section 3.5: Use unit rates to solve rate problems.</li> <li>Section 3.6: Use rate reasoning to convert units of measure.</li> </ul>	<b>Grade 6</b> <ul style="list-style-type: none"> <li>Section 4.4: Represent points of numbers using an equation, a ratio table, or a model.</li> <li>Section 6.1: Find percents of numbers. Solve problems involving finding the whole given a part and a percent.</li> <li>Section 6.4–6.5: Write and solve equations with addition, subtraction, multiplication, or division.</li> <li>Section 6.9: Write and graph equations that describe the relationship between two variables to solve real-world problems.</li> </ul> <b>Grade 7</b> <ul style="list-style-type: none"> <li>Section 4.1–4.3: Write and solve one and two-step equations.</li> <li>Section 5.2: Use unit rates to solve rate problems.</li> <li>Section 5.3: Use ratio tables to solve rate problems.</li> <li>Section 5.3 and 5.5: Determine whether two quantities are in a proportional relationship.</li> <li>Section 5.3 and 5.5: Find the unit rate (constant of proportionality) of a proportional relationship.</li> <li>Section 5.4: Use proportions to represent and solve real-life problems.</li> <li>Section 5.4: Explain what a point on the graph of a proportional relationship means in terms of the situation.</li> <li>Section 5.5: Create equations to represent proportional relationships.</li> <li>Section 5.5: Use a scale drawing to find the actual length and area of a scale object.</li> </ul> <b>Algebra 1</b> <ul style="list-style-type: none"> <li>Section 1.3: Use unit analysis to model real-world problems.</li> </ul>
116C Chapter 3 <span style="float: right;">Chapter 3 116D</span>		

Teaching Edition Chapter Introduction with **SMP Guidance** and vertical and horizontal alignment with **Coherence Through the Grades**.

## CHAPTER 3

### Mathematics of the Chapter

**Online Learning Center**  
Explore additional resources that provide professional insights from our authors, or help engage students in their learning using the powerful search and browse features.

**Nick's Notes**  
**Overview**  
What we're doing...  
This chapter begins with the introductory skills associated with writing and representing ratios. Fractional notation is purposely avoided. Instead, the number  $\frac{a}{b}$  is referred to as the value of the ratio  $a$  to  $b$ . Once the concept of a ratio has been introduced, equivalent ratios can be used to solve a wide variety of problems.

**Nick's Insights**  
Listen to Nick talk about how this chapter fits in with your students' learning progressions.

**Why we're doing it...**  
The foundational work completed in this chapter will connect to skills later in Grade 6 and future grades. In the next chapter, students will extend their understanding of ratios and rates to solve percent problems. Later in Grade 6, students will write and graph equations in two variables to relate two quantities.

**Essential Background**  
Students have prior understandings of multiplication, division, and fractions that will support their success in this chapter. In the previous grade, students applied and extended their understandings of multiplication and division to multiply and divide fractions. Students also have experience with analyzing patterns and relationships.

## 3 Ratios and Rates

**Pilot**  
Pilot opportunities will be fewer for pilots as people have more air traffic. Pilots are responsible for the safety of all passengers and crew on board.

**India's Notes**  
**Talk About Careers**  
There are different types of pilots, which include airline, agricultural, and commercial pilots. Most airline pilots have a bachelor's degree and must have 1,500 hours of flight experience. They must also obtain a commercial pilot certificate with a multi-engine rating to fly large planes with multiple engines. **?** What kinds of places might a pilot work? *Sample answer:* hospitals, package delivery corporations, law enforcement, corporate airlines

**Career Explorations Video**  
Get students excited about careers! Hear from a real Pilot and how they use math on the job.

**Performance Task**  
Analyze real-world data about the number of miles and gallons of fuel used to determine the most fuel-efficient plane for your group.

**Launch the Chapter with the Career**  
Discuss the prompt and questions about pilots on the student page. This discussion should spark students' interest and promote thinking about pilots and the work they do.

**Sample answers:**

- mail, retail goods, and fruits
- light routes, weather, and fuel required
- They might use math to calculate how much fuel they will need based on distance, altitude, and speed.

**Conclude the Chapter with the Career**  
Taking Flight on pages 170 and 171 is a rigorous application that asks students to analyze a data display and apply concepts from the chapter to a real-life situation. Students will use their understanding of ratio relationships and unit rates to determine the speed, fuel costs, and cruising altitudes of various aircrafts.

116E Chapter 3 Chapter 3 116

The *Mathematics of the Chapter* provides teacher support for new and veteran teachers. It explains the relevance of the content, common misconceptions and introduces a career that relates to the content of the chapter and lessons.

## CHAPTER 3

### Big Idea of the Chapter: Relationships between Quantities

This activity encourages curiosity and provides an opportunity for meaningful mathematical thinking and discussion.

- Have students discuss the radial bar graph. Have them make a list of any questions they have about the data display. Discuss these questions as a class.
- Pick any destination in the world. How long would it take to travel to your chosen location? What type of vehicle would you need to get there?
- The record speed for humans was set by Usain Bolt at the 2009 World Championships in Athletics. He ran at a speed of about 23.35 miles per hour.
- The speed of sound is about 767 miles per hour. Is there any animal that travels faster than sound?

**EL English Learner Support**  
**Interpreting Mathematical Explanations**

- Allow EL students to use translation tools if they struggle to make sense of the context of this activity.
- Have EL students work with native speakers to complete this activity.

## Big Idea of the Chapter Relationships between Quantities

**Chapter Learning Target:** Students will be able to...  
 • use unit rates to compare two quantities.  
 • use unit rates to solve problems.  
 • use unit rates to compare two quantities.

**Engage**  
Engage students with an activity for inspiration in designing vehicles such as cars, boats, and airplanes. The radial bar graph shows how many miles some of the fastest animals on Earth could travel in one hour at their top speeds.

**Explore**  
What do you notice about the animals? Is it easier to go feet on land, water, or in the air? Why do you think that is?  
 How long do you think an ostrich can travel at its top speed? Is miles per hour the best measure of an animal's speed?  
 How can we travel about 100 miles per hour. If peregrine falcons can fly at a distance of 2,000 miles, how long would it take them to fly to the moon? (Assume the falcon could sustain its top speed.)

**Answers**

- Sample answer: Most of the animals travel less than 100 miles per hour.
- Sample answer: etc. Low obstacles and wind can be used as an advantage.
- not very long; no
- about 5 hours

### Getting Ready

Students have converted between different units of measurement within a given measurement system. Review these conversions and point them to the conversion facts in the back of their textbook for reference.

- To help students check their answers, students should first determine whether they are converting from larger unit to a smaller unit or from a smaller unit to a larger unit. When converting to a larger unit, they should end up with a smaller number than the original. When converting to a smaller unit, the number should be larger than the original. Demonstrate this in the examples.
- Have students work on the exercises with a partner and compare answers with another pair. Discuss any discrepancies as a class.

**English Learner Support**  
**Interpreting Mathematical Explanations**

- Remind students to add all unfamiliar words to their math vocabulary notebooks. Images and examples will also be helpful throughout the chapter.
- Consider having students include a translation of each term in their home language.

**Answers**

1. 900
2. 85,000
3. 4
4. 17,200
5. 216
6. 92
7. 102
8. 6
9. 60 to inches; You multiply by 12 because there are 12 inches in a foot.

### Getting Ready for Chapter 3

**Converting Metric Measures**

**EXAMPLE** Convert 16.7 grams to milligrams.

There are 1,000 milligrams in 1 gram.  
 Because you are converting from a larger unit to a smaller unit, multiply.  
 $16.7 \times 1,000 = 16,700$

Convert the measures.

1. 0.31 g = 310 mg
2. 40 g = 40,000 mg
3. 4,000 g = 4 kg
4. 17.2 L = 17,200 mL

**Converting Customary Lengths**

**EXAMPLE** Convert 30 inches to feet.

There are 12 inches in 1 foot.  
 Because you are converting from a smaller unit to a larger unit, divide.  
 $30 \div 12 = 2 \text{ R } 6$

So, 30 inches is 2 feet 6 inches.

Convert the lengths.

1. 6 yd = 54 in.
2. 276 in. = 23 ft
3. 4 yd = 36 in.
4. 12 in. = 1 ft
5. 12 in. = 1 ft
6. 12 in. = 1 ft
7. 12 in. = 1 ft
8. 12 in. = 1 ft
9. You divided multiple the length of an object by 12 to convert the length in a different unit of measure. However what unit of measure do you think your friend is converting? English.

The *Big Idea of the Chapter* encourages curiosity and provides opportunities for meaningful mathematical thinking and discussion.

## CHAPTER 3 Performance Task

### 3 TAKING FLIGHT

#### Performance Task

##### Conclude the Chapter with the Career

Students will interpret a data display and apply their understanding of ratio relationships and unit rates to complete a performance task about aircraft.

##### Notice and Wonder

- Give students 2 minutes to glean information from the page. Then have students close their books and take turns sharing information they remember with a partner.

- Have students reopen their books and verify that they remembered the information correctly.

What information is being shared in the display? What mathematical statements can you make about the data?

##### Analyzing Data

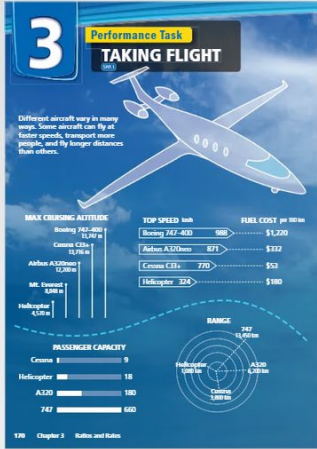
Exercise 2: What conversion factor can you use to relate kilometers to miles?  $1 \text{ mi} \approx 1.6 \text{ km}$

Exercise 3: Allow students to use the Internet to find the flight distance from Santa Barbara to San Francisco.

Which do you think will be shorter, driving or flight distance? Explain.

##### Plan a Trip

- Provide a large sheet of paper or allow students to use multimedia (e.g., slides, videos) to share their trip plans.



### Analyzing Data

Use the information on the previous page to complete the following exercises.

- Explain what is shown in the data display. What do you notice? What do you wonder?
- How fast can the Boeing 747-400 fly in miles per hour?
- How much is spent on fuel to fly an Airbus A320neo from Denver, Colorado to Kansas City, Missouri?
- How much higher (in yards) can the Boeing 747-400 fly than a helicopter?

**PLAN A TRIP**

You are a pilot planning a trip. Make a plan for your trip. Include the start and end points of your flight, the total distance you will fly, the aircraft you are flying, and the total cost of fuel. Explain why you chose your aircraft. Then plan the same trip using a different aircraft.

Component	Points
Trip plan that includes start and end points of flight, total flight distance, choice of aircraft, and total fuel cost	4
Accurate plan that includes all 4 criteria	4
Messy accurate plan that includes at least 3 criteria	3
Somewhat accurate plan that includes at least 3 criteria	2
Somewhat accurate plan that includes 2 criteria	1
Explanation of why aircraft is chosen	1
Reasonable explanation	1
Plan of the same trip with a different aircraft	2
Accurate fuel cost for chosen aircraft	2
Somewhat accurate fuel cost for chosen aircraft	1
Total	7 Points

**English Learner Support: Constructing Mathematical Explanations**

**Build** background knowledge by displaying images of the aircraft in the task.

**Entering—Emerging:** Encourage students to translate as needed. Have students work with native speakers in groups of 2 or 4 to complete the exercises, plan the trips, and explain their reasoning.

**Developing—Expanding:** Have students work with native speakers in groups of 2 or 3 to complete the exercises, plan the trips, and explain their reasoning. Have students compare their findings with another group.

**Bridging—Reaching:** Have students work with a partner to complete the exercises, plan the trips, and explain their reasoning. Encourage each pair to present their plans to another pair.

- ### Answers
- Sample answer: The data display shows different information like max cruising altitude and top speed for a Boeing 747, Conquest Airbus A320, and a helicopter. The Boeing 747 has the highest speed and fuel cost compared to the other aircraft. How does max cruising altitude relate to fuel cost?
  - about 612.56 miles per hour or 613.66 miles per hour
  - about \$1,494
  - about 10,196 yards or 10,033 yards

The chapter concludes with **Chapter Review**, **Chapter Practice**, a **Practice Test**, **Performance Task** (directly related to the career launched at the beginning of the chapter), and **Chapter Assessment** (on digital experience) to reinforce and assess learned content.



## Step 7:

*Math & YOU* is designed to support teachers with point-of-use professional development in the Teaching Edition. *Math & YOU* embeds proven high-impact strategies within every lesson. These strategies, such as classroom discussion, teacher clarity, and feedback, are proven to be highly effective strategies that are within a teacher's control from Dr. John Hattie's *Visible Learning* research. These high-impact strategies are found in every lesson beginning with Learning Targets and Success Criteria, along with opportunities for feedback, and discussion prompts all at point of use in every lesson.

*Learning Targets and Success Criteria align with the high-impact strategy of Teacher Clarity*

*Red Question Marks indicate classroom discussion prompts for the teacher.*

**4.1 Percents and Fractions**

**Learning Target:** Write percents as fractions and fractions as percents.

**Success Criteria:**

- Draw models to represent fractions and percents.
- Write percents as fractions.
- Write equivalent fractions with denominators of 100.
- Write fractions as percents.

**Coherence**

In previous chapters, students worked with fractions and ratios. They will now extend this understanding to percents by making connections between percent, fraction, and ratio models. Models support students in making sense of writing percents as fractions and fractions as percents.

**Prerequisite Skills**

Grade 4 Sections 7.3 and 7.4. Use multiplication and division to find equivalent fractions.

**Rigor**

- Students will use models to develop conceptual understanding of the relationships among percents, fractions, and ratios.
- In-Class Practice exercises provide opportunities for students to demonstrate their procedural skill and fluency in writing percents as fractions and fractions as percents.
- Students will apply their understanding of writing fractions as percents to solve real-life problems.

**WIDA English Language Development Standards**

ELD-MA.6-8 Explain Interpretive Interpret mathematical explanations by analyzing possible ways to represent and solve a problem.

ELD-MA.6-8 Explain Expressive Construct mathematical explanations that state reasoning used to generate a solution.

**Think Time**

**Motivate**

Goal: Students will use the context of coins to begin thinking about percents.

- Shake a few real coins in your hand to draw attention to the money. Be sure to include a dollar coin.
- On a whiteboard, write the value of each U.S. coin as a fractional amount of \$1.00: penny:  $\frac{1}{100}$ ; nickel:  $\frac{5}{100}$ ; dime:  $\frac{10}{100}$ ; quarter:  $\frac{25}{100}$ ; half-dollar:  $\frac{50}{100}$ ; dollar:  $\frac{100}{100}$ .

**?** "A cent is one hundredth of a dollar, and cent means one hundred. What do you think percent means?" per one hundred

**?** "Where have you heard the word percent used?" Discuss applications and contexts involving percents.

**Talk About It**

**?** "In this section, you will continue to make connections between fractions and percents."

**Answers**

1 a. 10%;  $\frac{10}{100}$ ; 10:100  
b. 51%;  $\frac{51}{100}$ ; 51:100

2. Percents, fractions, and ratios all describe relationships between quantities. For percents one of the quantities is 100%, for fractions the quantities are the numerator

**4.1 Percents and Fractions**

**Learning Target:** Write percents as fractions and fractions as percents.

**Success Criteria:**

- Use draw models to represent fractions and percents.
- Use write percents as fractions.
- Use write equivalent fractions with denominators of 100.
- Use write fractions as percents.

**The Meaning of a Word** Percent

A century is 100 years. A cent is one-hundredth of a dollar.

**Investigate**

**Interpreting Models**

Work with a partner:

- Write a percent, a fraction, and a ratio shown by each model.
  - 
  -
- How are percents, fractions, and ratios related?

**Differentiating Instruction**

- Students** explored the origin of the word percent and interpreted percent models. Are students able to make the connection between fractions and ratios that are part-to-whole and their equivalent percents?
- Emerging** Students may see the fractional part of a model but struggle to explain its meaning. These students need more opportunities for relating a fraction with a denominator of 100 to a percent model. Some students may need to use 10-by-10 grids to visualize percents and make connections to fractions.
- Proficient** Students can explain percent models and write percents as fractions, ratios, and vice versa. After reviewing the Key Concepts, have students self-assess using the Learning Targets and Success Criteria.

175A Chapter 4

Section 4.1 175

*The bullseye icon indicates opportunities for feedback directly relating to the Learning Targets and Success Criteria.*

## Step 8:

Using the digital access credentials found on the [Review Site](#), visit [www.myadamath.com](http://www.myadamath.com) to view summative, formative, and self-assessment options. Once logged in, select **Plan**. Along the left side of your Learning Path, you will find **Pre-Course Tests**, additional **Course Resources**, **Standards-Based Practice**, and **Additional Topics & Lessons**. Expand a chapter to view the **Mid-Chapter Tests**, **Performance Task**, **Chapter Tests**, and in select chapters, a **Multi-Chapter Test**. You will have the opportunity to view reports for all assessments, including **Item Analysis Reports**.

