Lesson 1 ▶Fractions on a Number Line

Problem Solving: ▶Partitioning the Number Line

Lesson Planner

Vocabulary Development

whole numbers
consecutive
predictable
fractions
infinite
denominator
numerator
partition
length model

Skills Maintenance

Multiplication, Common Multiples

Building Number Concepts: ▶ Fractions on a Number Line

Students see how fractions fill the gaps between whole numbers on the number line. Counting by consecutive whole numbers is predictable because there is an implied unit of 1. Counting by fractions is predictable when using fractions with the same denominator.

Objective

Students will count by using fractions on a number line.

Problem Solving: ▶ Partitioning the Number Line

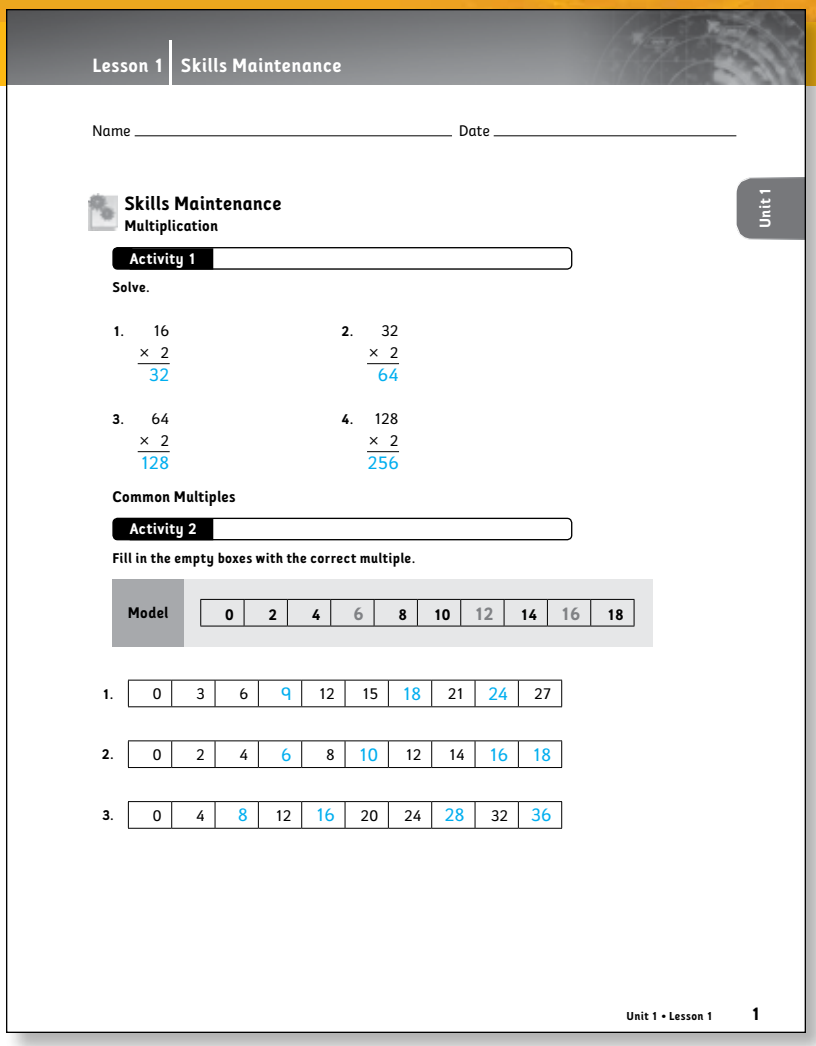
Students look at the "halving" strategy for partitioning a number line. This is helpful for observing the size of increasingly smaller fractions. When comparing fractions with the same numerator, the larger the denominator, the smaller the fraction.

Objective

Students will problem solve about fractions using a length model (number line).

Homework

Students identify fractions on a number line and name missing multiples. In Distributed Practice, students practice basic computational skills with whole numbers.



Lesson 1 | Skills Maintenance

Name _____ Date _____

Unit 1

Skills Maintenance
Multiplication

Activity 1

Solve.

1. 16 × 2 = 32
2. 32 × 2 = 64
3. 64 × 2 = 128
4. 128 × 2 = 256

Common Multiples

Activity 2

Fill in the empty boxes with the correct multiple.

Model	0	2	4	6	8	10	12	14	16	18

1.	0	3	6	9	12	15	18	21	24	27
2.	0	2	4	6	8	10	12	14	16	18
3.	0	4	8	12	16	20	24	28	32	36

Unit 1 • Lesson 1 1

Skills Maintenance

Multiplication, Common Multiples

(*Interactive Text*, page 1)

Activity 1

Students solve simple whole number multiplication problems.

Activity 2

Students name missing numbers in a list of multiples. There is a model for them to follow.

Building Number Concepts:
▶ Fractions on a Number Line

Where are fractions on a number line?
(*Student Text*, pages 3–4)

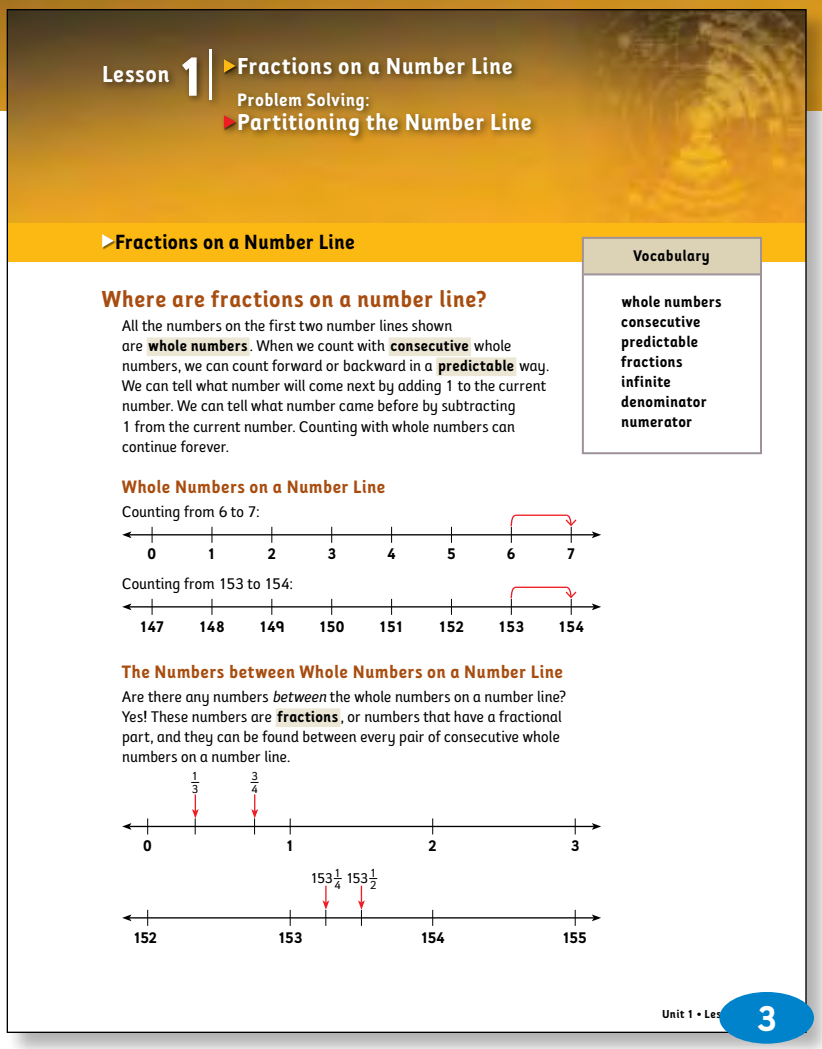
Connect to Prior Knowledge
Remind students that there are an infinite number of **whole numbers** on the number line. We can count whole numbers forever in a **predictable** way because we can always add one more.

Link to Today's Concept
Tell students that we will extend our knowledge about the numbers on a number line by looking at the parts *between* whole numbers. We will see both whole numbers and **fractions** on a number line.

Demonstrate
Engagement Strategy: Teacher Modeling

Demonstrate the locations of fractions and whole numbers on the number line.

- Copy the first number line from page 3 of the *Student Text* on the board. State that the number line begins at **0** and ends at **7**. Locate the number 6 on the number line. Draw an arrow to count one more to get to 7. Remind students that counting by **consecutive** whole numbers is predictable because we can always add one more.
- Draw a new number line on the board. Label the number line consecutively from 147 to 153. Locate the number 153. Ask students what number comes next. Label 154 on the number line and draw an arrow from 153 to 154. Tell students the next number on the number line is predictable because we are adding one more.



- Draw a new number line on the board. Label the number line consecutively from 0 to 3. Ask students where to put $\frac{1}{3}$ on this number line. Then mark and label $\frac{1}{3}$. Ask students where to put $\frac{3}{4}$ on the number line. Mark and label $\frac{3}{4}$.

Demonstrate
- Draw a new number line on the board and label it consecutively from 152 to 155. Ask students to locate $153\frac{1}{4}$ and $153\frac{1}{2}$. Then mark and label the numbers on the number line. Remind students that mixed numbers can be written as improper fractions.

Where are fractions on a number line? *(continued)*

Demonstrate

- Be sure that students understand that there are an **infinite** number of fractions between any consecutive whole numbers on a number line.

Discuss

Call students' attention to the Power Concept.

- Have students look at the first number line on page 4 of the *Student Text*. The next fraction on the number line is not predictable. Tell students we can easily count fractions by using the same denominator. Review the terms **numerator** and **denominator**: The numerator is the top number and represents the parts of a whole. The denominator is the bottom number and represents the whole.

- Have students look at the middle two number lines. Point out that the first number line stops at 1 but we can keep going. The second number line shows that $\frac{5}{5}$ is the same as 1, and we can continue past 1 to $\frac{6}{5}$, $\frac{7}{5}$, and so on.

POWER CONCEPT

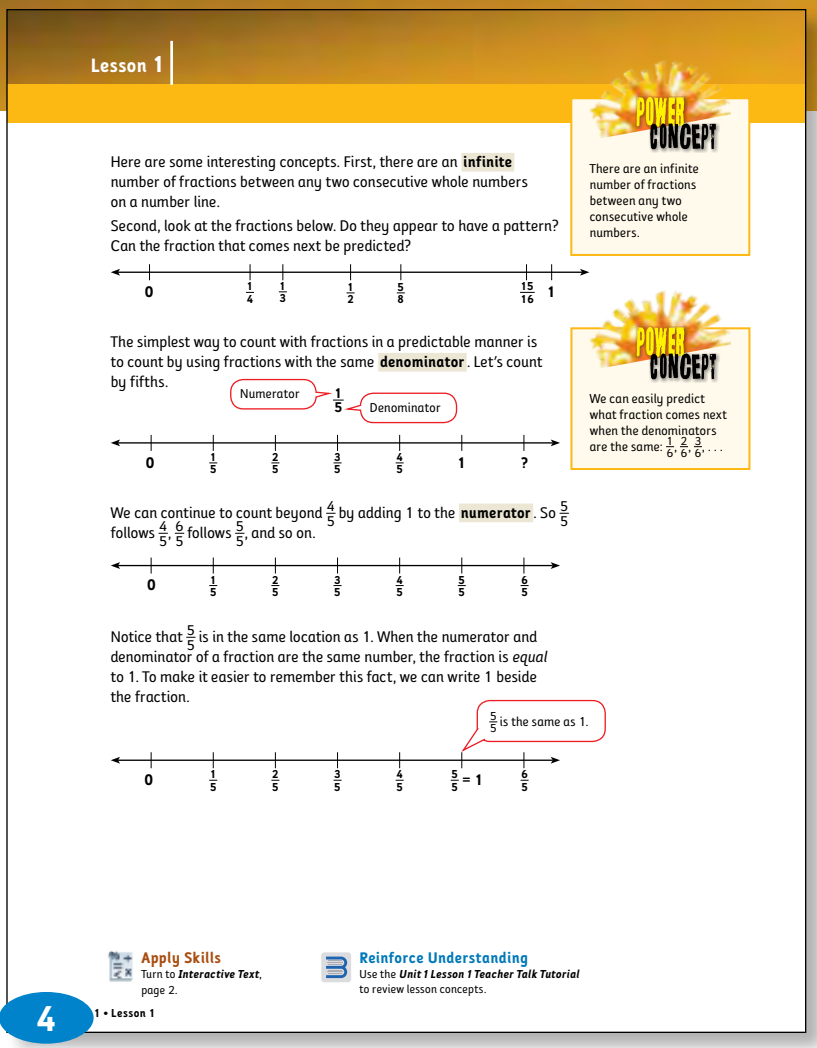
There are an infinite number of fractions between any two consecutive whole numbers.

Discuss

Call students' attention to the Power Concept.

POWER CONCEPT

We can easily predict what fraction comes next when the denominators are the same: $\frac{1}{6}, \frac{2}{6}, \frac{3}{6}, \ldots$



Demonstrate

- Have students look at the bottom number line on page 4 of the *Student Text*. Call students' attention to the fact that the fraction $\frac{5}{5}$ is the same as 1. Any time we have the same number in the numerator as in the denominator, we have a fraction that is equal to 1.

Check for Understanding

Engagement Strategy: Pair/Share

Have students work with a partner to summarize in their own words the relationship of whole numbers and fractions on a number line.

Listen for:

- *There are an infinite number of fractions between any two consecutive whole numbers.*
- *When the numerator and the denominator are the same, the fraction is equal to 1.*

Apply Skills
(*Interactive Text*, pages 2–3)

Have students turn to pages 2 and 3 in the *Interactive Text*, which provides students an opportunity to work with fractions on a number line.

Activity 1

Students are given a number line divided into equal parts. They name the missing fractions.

Activity 2

Students are given a list of fractions and they are to find the correct location for the fractions on the number line.

Monitor students' work as they complete these activities.

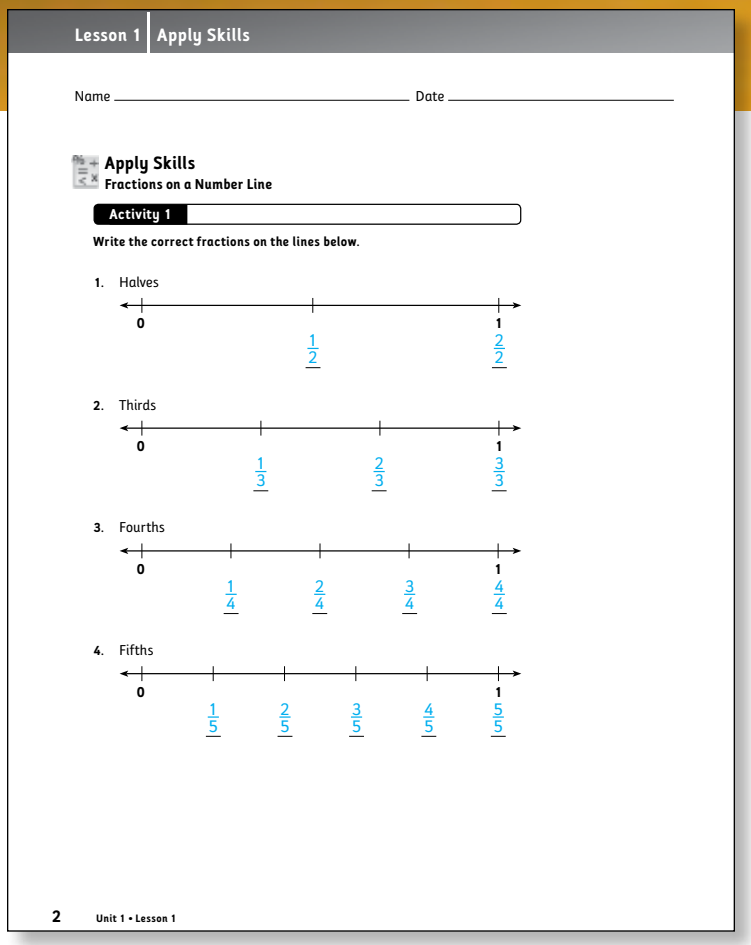
Watch for:

- Can students identify the fraction that belongs in a particular location on the number line?
- Do students understand that a fraction with the same numerator and denominator is equal to 1?
- Can students put common fractions in order from least to greatest on a number line when the fractions have different denominators?

It's important for students to work with fractions on the number line to gain the necessary number sense they need about rational numbers. Number lines provide an important visual model for understanding order, magnitude, and how fractions intermix with whole numbers.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 1 Teacher Talk Tutorial*.



Lesson 1 | Apply Skills

Name _____ Date _____

Apply Skills
Fractions on a Number Line

Activity 1

Write the correct fractions on the lines below.

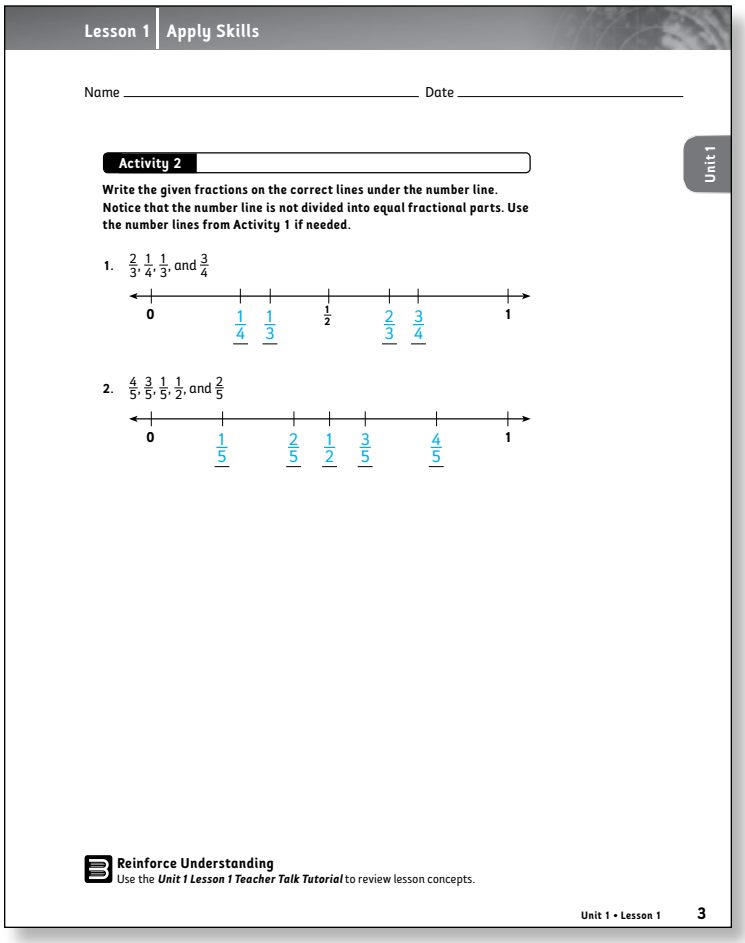
1. Halves

2. Thirds

3. Fourths

4. Fifths

2 Unit 1 • Lesson 1



Lesson 1 | Apply Skills

Name _____ Date _____

Unit 1

Activity 2

Write the given fractions on the correct lines under the number line. Notice that the number line is not divided into equal fractional parts. Use the number lines from Activity 1 if needed.

1. $\frac{2}{3}, \frac{1}{4}, \frac{1}{3}$, and $\frac{3}{4}$

2. $\frac{4}{5}, \frac{3}{5}, \frac{1}{5}, \frac{1}{2}$, and $\frac{2}{5}$

Reinforce Understanding
Use the ***Unit 1 Lesson 1 Teacher Talk Tutorial*** to review lesson concepts.

Unit 1 • Lesson 1 3

Problem Solving: Partitioning the Number Line

How do we partition the number line?

(*Student Text*, page 5)

Connect to Prior Knowledge

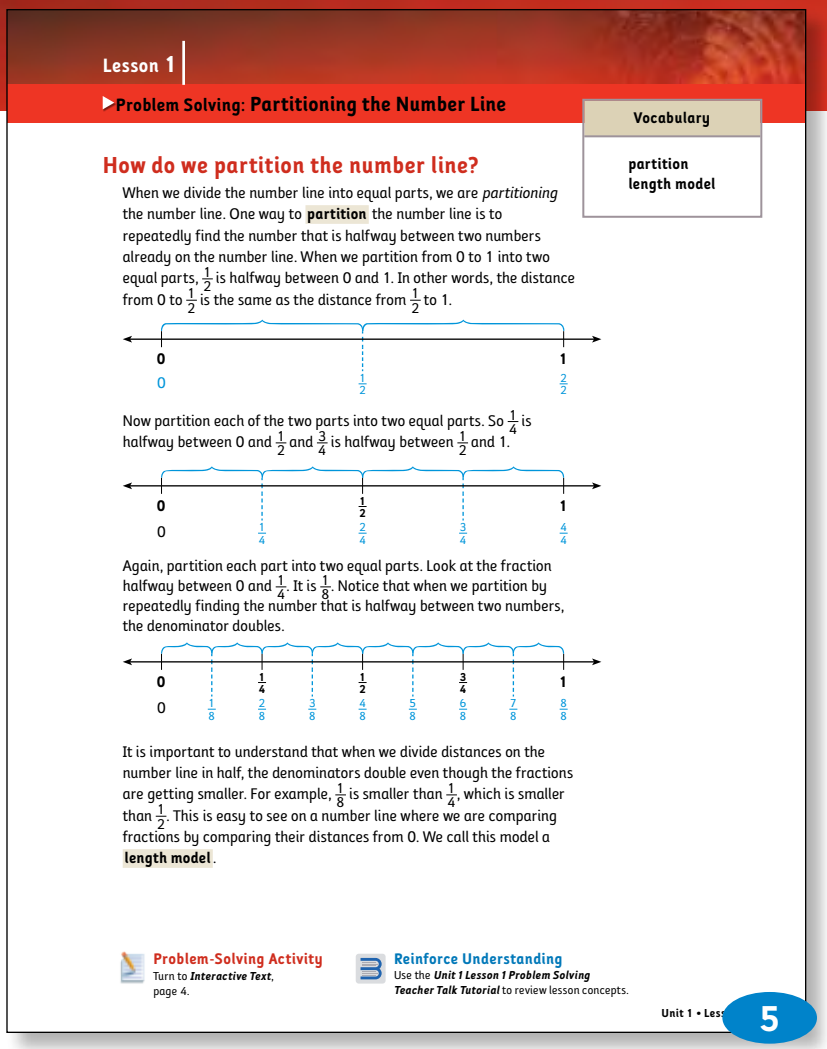
Begin by asking students if they have ever had to divide something in half, such as a sandwich or a cookie. Have students describe different methods for dividing something in half.

Link to Today's Concept

Explain that in this lesson we will look at partitioning a number line repeatedly in half and make observations about the fractions that we find at the halfway mark.

Demonstrate

- Have students turn to page 5 in the *Student Text*. Draw a number line on the board. Label 0 on the left and 1 on the right. Ask a student to come to the board and draw a tick mark halfway between 0 and 1. Ask students to name the location of the tick mark. Label the tick mark as $\frac{1}{2}$. Ask students to give another name for 1. Write $\frac{2}{2}$ under the 1.
- Ask another student to come to the board and draw a tick mark halfway between 0 and $\frac{1}{2}$ and a tick mark halfway between $\frac{1}{2}$ and 1. Ask students to name the location of each tick mark. Label the tick marks as $\frac{1}{4}$, $\frac{2}{4}$, $\frac{3}{4}$, and $\frac{4}{4}$. Ask students if they can predict what the denominator of the next "half numbers" will be. (*8, which is double 4*)
- Now have a student come to the board and put tick marks halfway between 0 and $\frac{1}{4}$, $\frac{1}{4}$ and $\frac{1}{2}$, $\frac{1}{2}$ and $\frac{3}{4}$, and $\frac{3}{4}$ and 1. Point to the tick mark for $\frac{1}{8}$. What is the name of this number? $\left(\frac{1}{8}\right)$ Label the tick mark and the other tick marks.
- Circle the fractions $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$. Ask students to compare these fractions by comparing their distances from 0. How does $\frac{1}{8}$ compare to $\frac{1}{4}$? How does $\frac{1}{4}$ compare to $\frac{1}{2}$? Have students look at the fractions again. Students should begin to notice that when fractions have the same numerator, the lesser fraction is the fraction with the greater denominator. Be sure to emphasize this is only when the numerators are the same.
- Finally, tell students that a number line allows us to compare fractions based on their distance from 0. We call this model a **length model**.



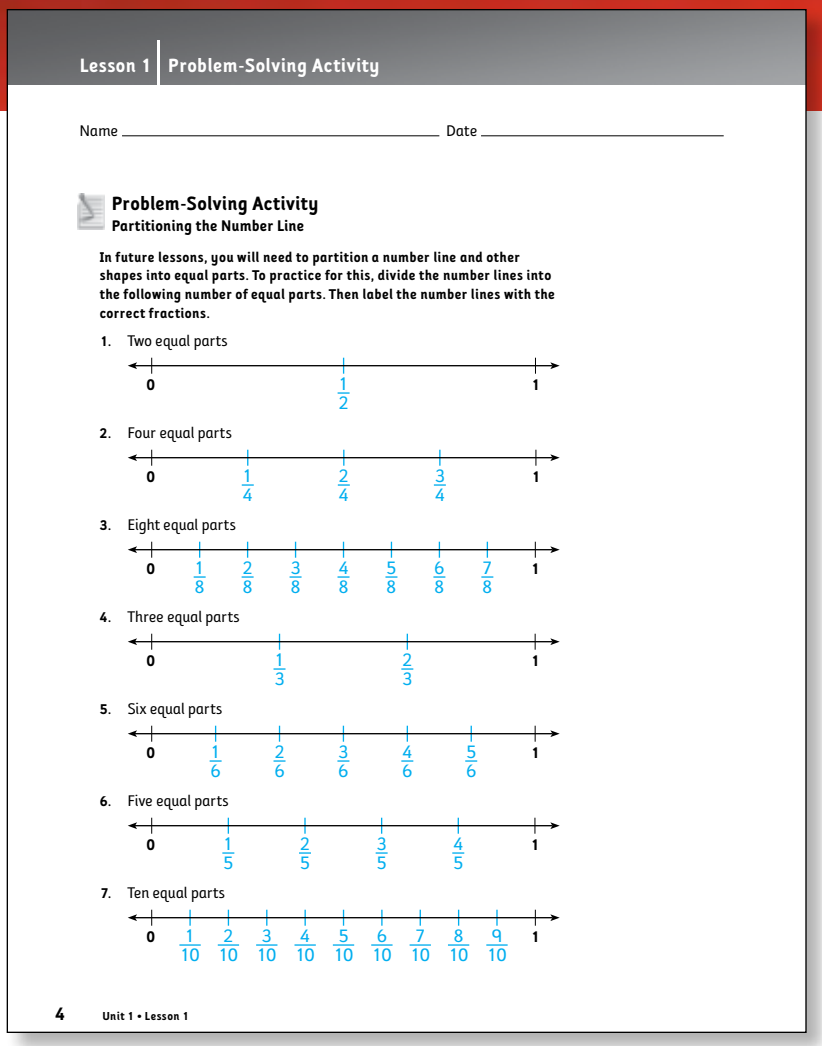
Problem-Solving Activity
(*Interactive Text*, page 4)

Have students turn to page 4 in the *Interactive Text*, which provides students an opportunity to partition a number line. It is a skill they will need throughout the unit. Tell them to do the best they can. Explain that some of the fractions take practice. Tell them to think carefully about a strategy for those fractions that they can't divide evenly in half, such as THIRDS and FIFTHS.

Monitor students' work as they complete this activity.

Watch for:

- Can students accurately partition the number line into halves, fourths, and eighths?
- Can students find a strategy for partitioning the number line into thirds and fifths?
- Once students have found thirds, do they notice the connection to sixths?
- Once students have found fifths, do they notice the connection to tenths?



Lesson 1 | Problem-Solving Activity

Name _____ Date _____

Problem-Solving Activity
Partitioning the Number Line

In future lessons, you will need to partition a number line and other shapes into equal parts. To practice for this, divide the number lines into the following number of equal parts. Then label the number lines with the correct fractions.

1. Two equal parts

2. Four equal parts

3. Eight equal parts

4. Three equal parts

5. Six equal parts

6. Five equal parts

7. Ten equal parts

4 Unit 1 • Lesson 1

Homework

Go over the instructions on page 6 of the *Student Text* for each part of the homework.

Activity 1

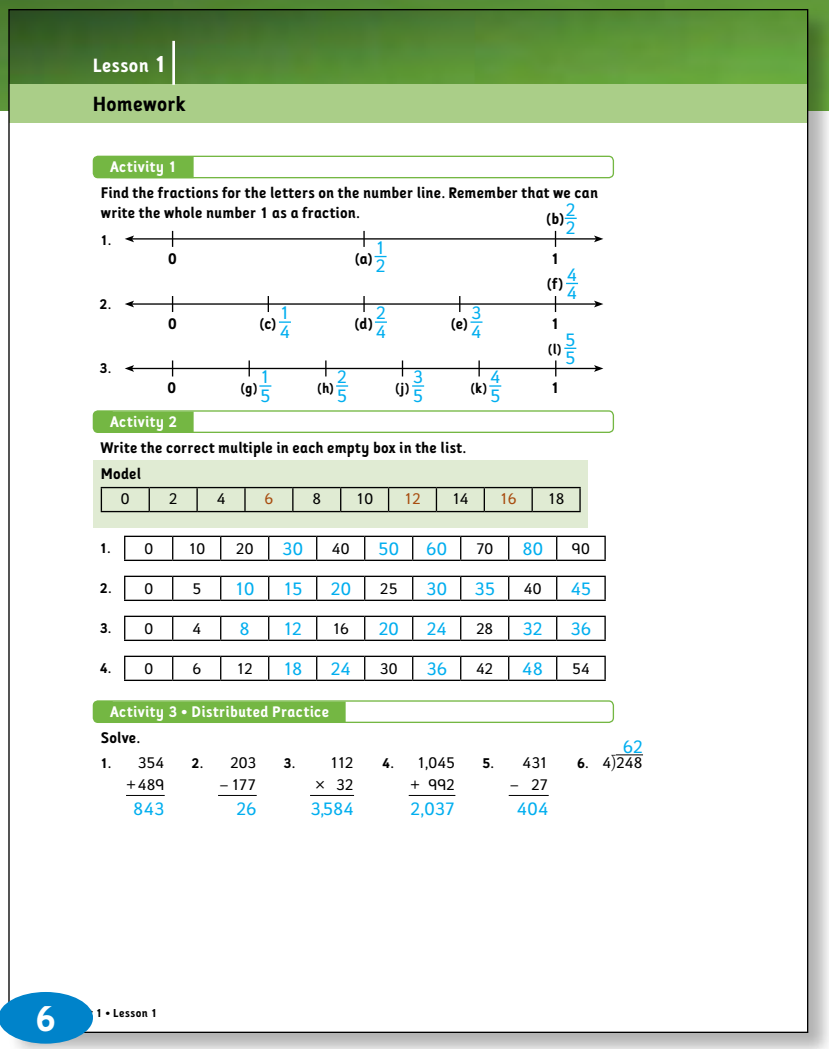
Students write the correct fraction on a number line.

Activity 2

Students write the missing multiples from a list on their papers.

Activity 3 • Distributed Practice

Students practice basic computational skills. Tell students that they practice these skills so they do not forget the algorithms and they continue to get better at them.



Lesson 2 Connecting Fractions and Fair Shares to Geometry

Problem Solving: Noncongruent Fair Shares

Lesson Planner

Vocabulary Development

fair share **area models**
congruent **noncongruent**
area

Skills Maintenance

Multiples, Fractions on Number Lines

Building Number Concepts: Connecting Fractions and Fair Shares to Geometry

In this lesson, students learn about different ways to visualize fractions and the importance of fair shares. We can use a variety of shapes to represent fractions. We have to divide a shape into equal parts, or fair shares, for it to represent a fraction.

Objective

Students will understand the importance of fair shares.

Problem Solving: Noncongruent Fair Shares

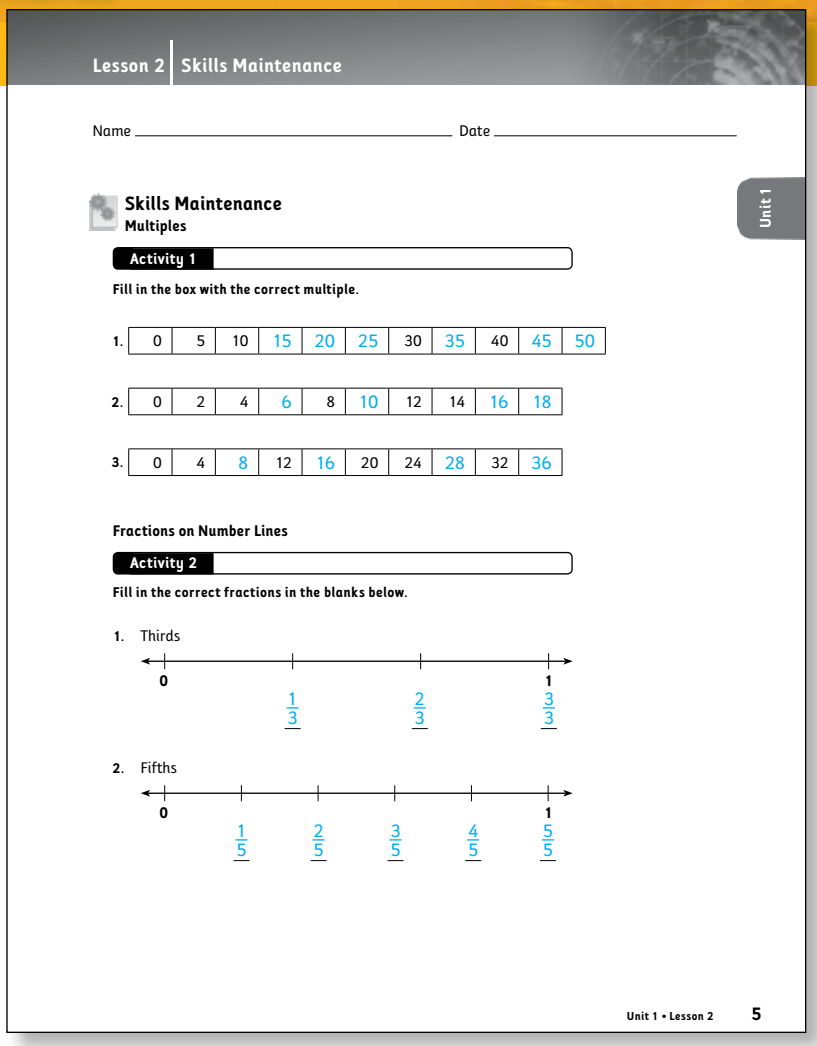
Students learn the area model for representing fractions. Fair shares in area models do not have to be congruent, as long as they have equal areas.

Objective

Students will represent fractions using area models (shapes on a grid) drawn with both congruent and noncongruent fair shares.

Homework

Students fill in missing fractions on a number line, divide rectangles into fair shares, and determine if fair shares are congruent or noncongruent and why. In Distributed Practice, students practice basic computational skills with whole numbers.



Lesson 2 | Skills Maintenance

Name _____ Date _____

Unit 1

Skills Maintenance
Multiples

Activity 1

Fill in the box with the correct multiple.

1. 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 | 50

2. 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18

3. 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36

Fractions on Number Lines

Activity 2

Fill in the correct fractions in the blanks below.

1. Thirds

2. Fifths

Unit 1 • Lesson 2 5

Skills Maintenance

Multiples, Fractions on Number Lines

(*Interactive Text*, page 5)

Activity 1

Students fill in missing numbers in a list of multiples.

Activity 2

Students fill in the correct fractions on a number line.

Building Number Concepts:
▶ Connecting Fractions and Fair Shares to Geometry

How can fractions on a number line be related to fair shares?

(*Student Text*, pages 7–8)

Connect to Prior Knowledge

Draw a number line on the board. Label the number line with 0 at the left and 1 at the right. Remind students that they have already worked with number lines and ask them how they would divide the number line into fourths.

Listen for:

- *Draw a tick mark halfway between 0 and 1. Label the mark as* $\frac{1}{2}$.
- *Draw a tick mark halfway between 0 and* $\frac{1}{2}$. *Label the mark as* $\frac{1}{4}$.
- *Draw a tick mark halfway between* $\frac{1}{2}$ *and 1. Label the mark as* $\frac{3}{4}$.
- *The number line must have four equal parts to be divided into fourths.*

Link to Today's Concept

Tell students that in today's lesson, we look at different ways to visualize fractions besides the number line. We look at shapes and how to divide them into fractional parts.

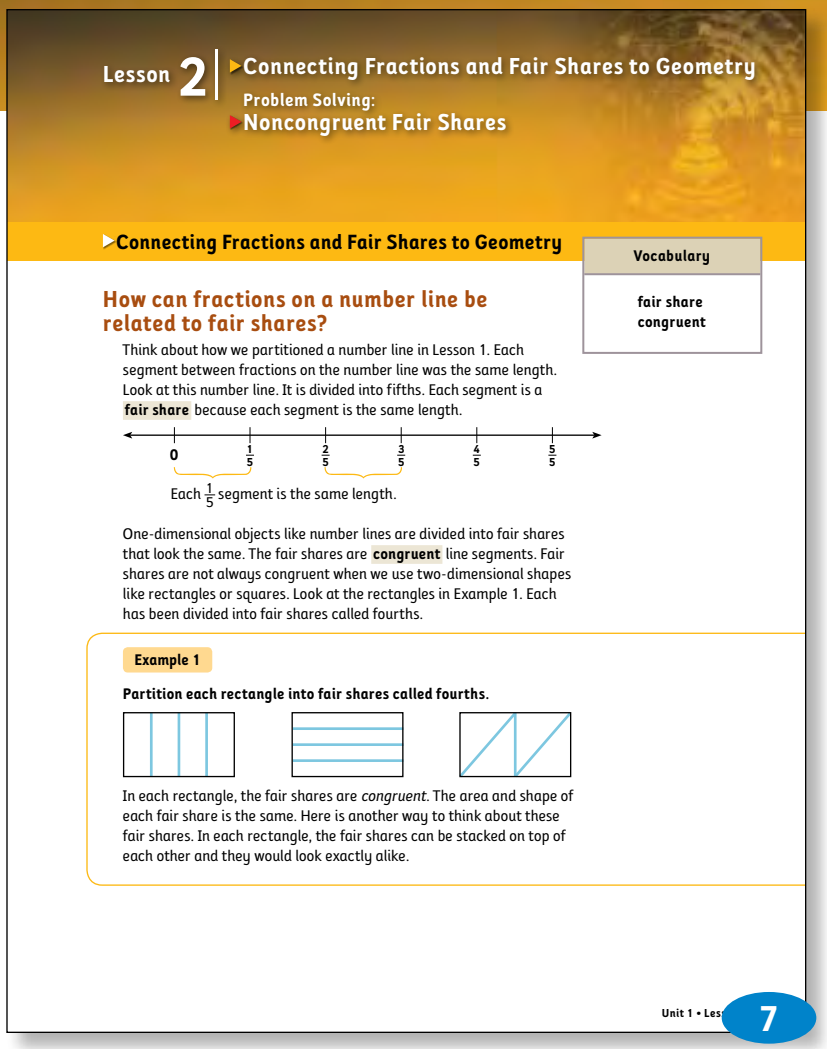
Build Vocabulary

Introduce the term **fair share** and explain that when we show a fraction, the parts have to be equal parts.

Demonstrate

Engagement Strategy: Teacher Modeling

Demonstrate how we connect number lines with shapes in the following way:


Lesson 2 ▶Connecting Fractions and Fair Shares to Geometry
Problem Solving: ▶Noncongruent Fair Shares

▶Connecting Fractions and Fair Shares to Geometry

Vocabulary: fair share, congruent

How can fractions on a number line be related to fair shares?

Think about how we partitioned a number line in Lesson 1. Each segment between fractions on the number line was the same length. Look at this number line. It is divided into fifths. Each segment is a **fair share** because each segment is the same length.

0, $\frac{1}{5}$, $\frac{2}{5}$, $\frac{3}{5}$, $\frac{4}{5}$, $\frac{5}{5}$

Each $\frac{1}{5}$ segment is the same length.

One-dimensional objects like number lines are divided into fair shares that look the same. The fair shares are **congruent** line segments. Fair shares are not always congruent when we use two-dimensional shapes like rectangles or squares. Look at the rectangles in Example 1. Each has been divided into fair shares called fourths.

Example 1

Partition each rectangle into fair shares called fourths.

In each rectangle, the fair shares are *congruent*. The area and shape of each fair share is the same. Here is another way to think about these fair shares. In each rectangle, the fair shares can be stacked on top of each other and they would look exactly alike.

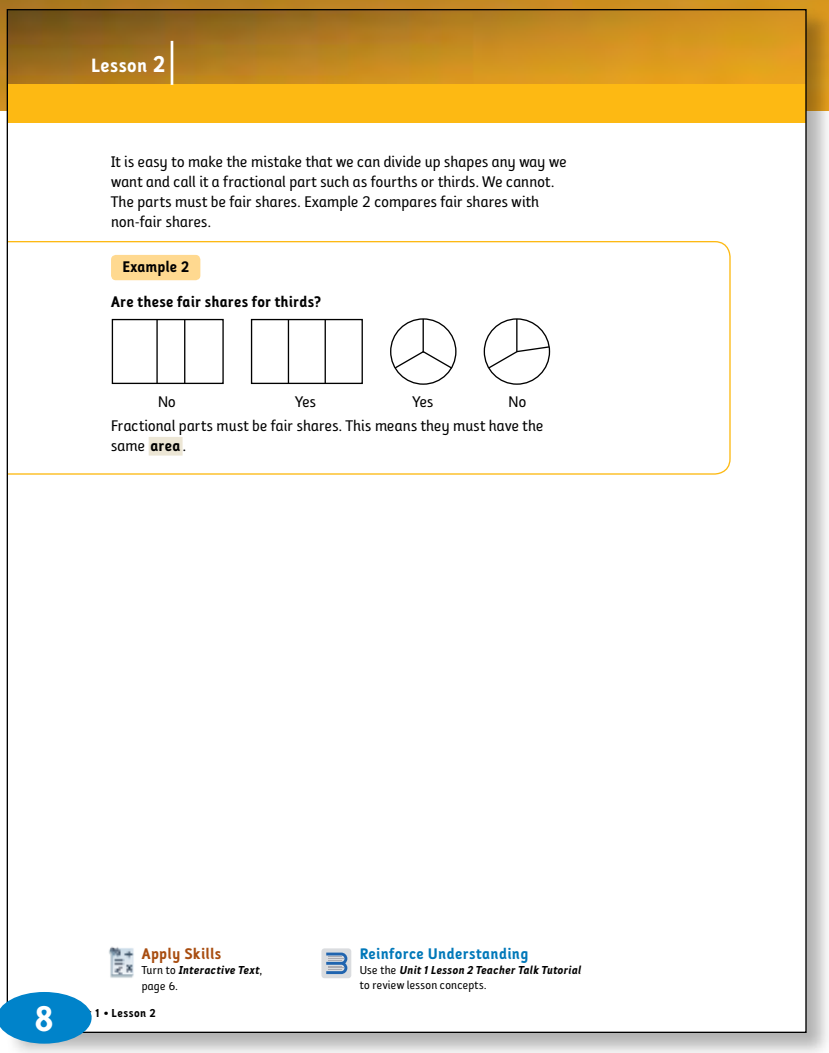
Unit 1 • Les 7

- Have students look at the number line on page 7 of the *Student Text*. It has been divided into fair shares called fifths. We can tell they are fair shares because each $\frac{1}{5}$ segment is the same length. They all look the same. We call parts that are the same size and shape **congruent**.
- Have students look at **Example 1** in which each rectangle has been divided into fair shares called fourths. The fair shares are all congruent. Ask students to describe the different ways the shapes have been divided. The first rectangle has three vertical lines that divide it into four congruent fair shares. The second rectangle has three horizontal lines that divide it into four congruent fair shares. The third rectangle has one vertical line and two diagonal lines that make four congruent fair shares.

How can fractions on a number line be related to fair shares? *(continued)*

Demonstrate

- Point out to students that it is a common mistake to think we can divide shapes any way we want and still call them fractional parts. Be sure they understand the parts must be fair shares.
- Have students look at **Example 2** on page 8 of the *Student Text*. Ask students why one rectangle has fair shares and why one does not. Listen for an explanation about fair shares needing to be the same size, equal, congruent, or have the same area. Ask students why one circle has fair shares and why one does not. Again, listen for students to describe the need for equal parts.
- Summarize by telling students that fractional parts must be fair shares. When the whole is a two-dimensional shape, the parts must have the same area. The parts may or may not be congruent.



Check for Understanding

Engagement Strategy: Look About

Tell students that they are to draw a shape to represent fifths with the help of the whole class. They can use any shape as long as it is divided into fair shares. Students should draw large shapes on a piece of paper or a dry erase board. When finished, they should hold up their drawings for the class to see.

If students are unsure of the answer, prompt them to look at other students' solutions to help their thinking. Make sure students understand that there is more than one shape possible. Review the answers after all students have held up their solutions.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 2 Teacher Talk Tutorial*.

Apply Skills
(*Interactive Text*, pages 6–7)

Have students turn to pages 6 and 7 in the *Interactive Text*, which provides students an opportunity to work with fair shares.

Activity 1

Students do their best to divide a number line into fair share segments for various fractional parts. Remind them of the "halving" strategy for even numbers of parts.

Activity 2

Students are given various shapes, and they are to divide the shapes into fair shares as directed. Have students practice on dry erase boards first if they need extra practice drawing the fair shares.

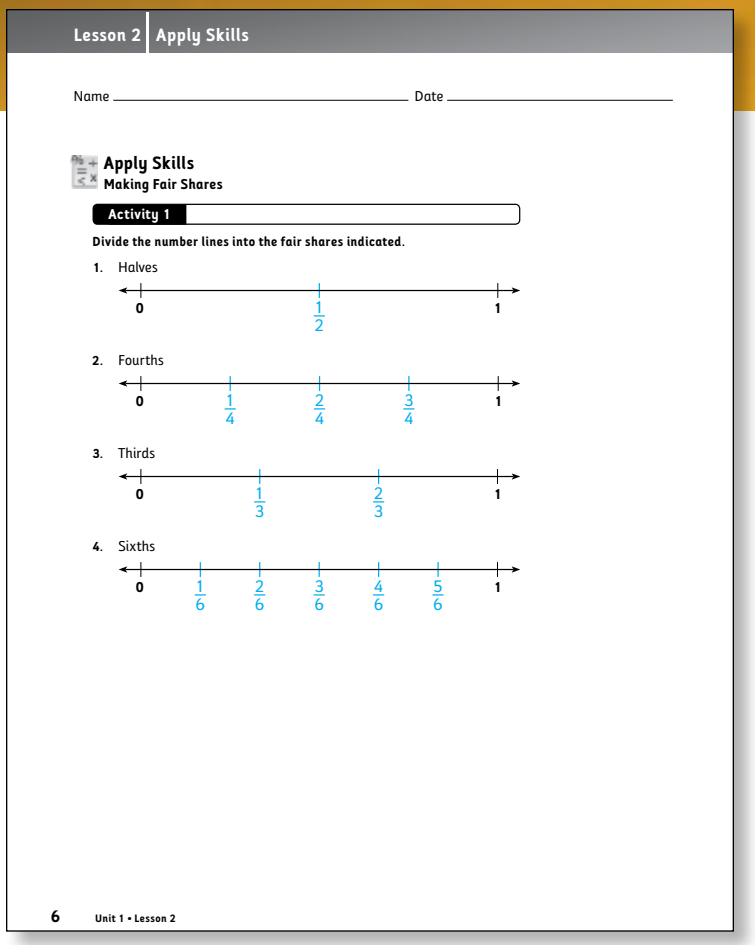
Monitor students' work as they complete these activities.

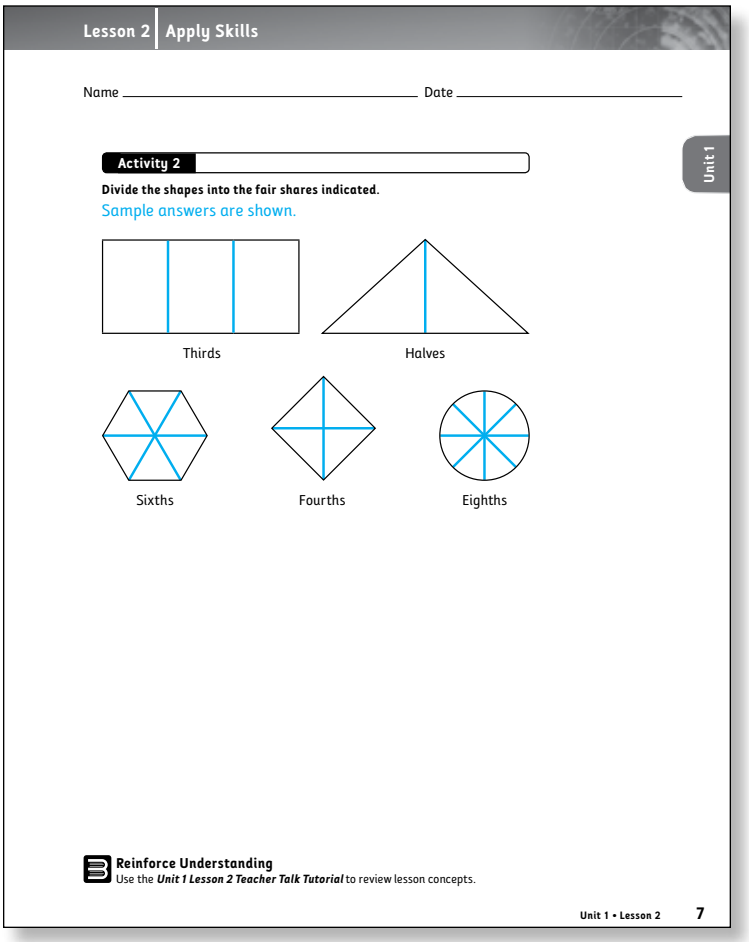
Watch for:

- Can students identify fair shares on a number line?
- Can students identify fair shares in different shapes?
- Do students recognize that they need only two lines to represent thirds and at most three lines to represent fourths? A common misconception is that we must draw three lines for thirds in a rectangle.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 2 Teacher Talk Tutorial*.

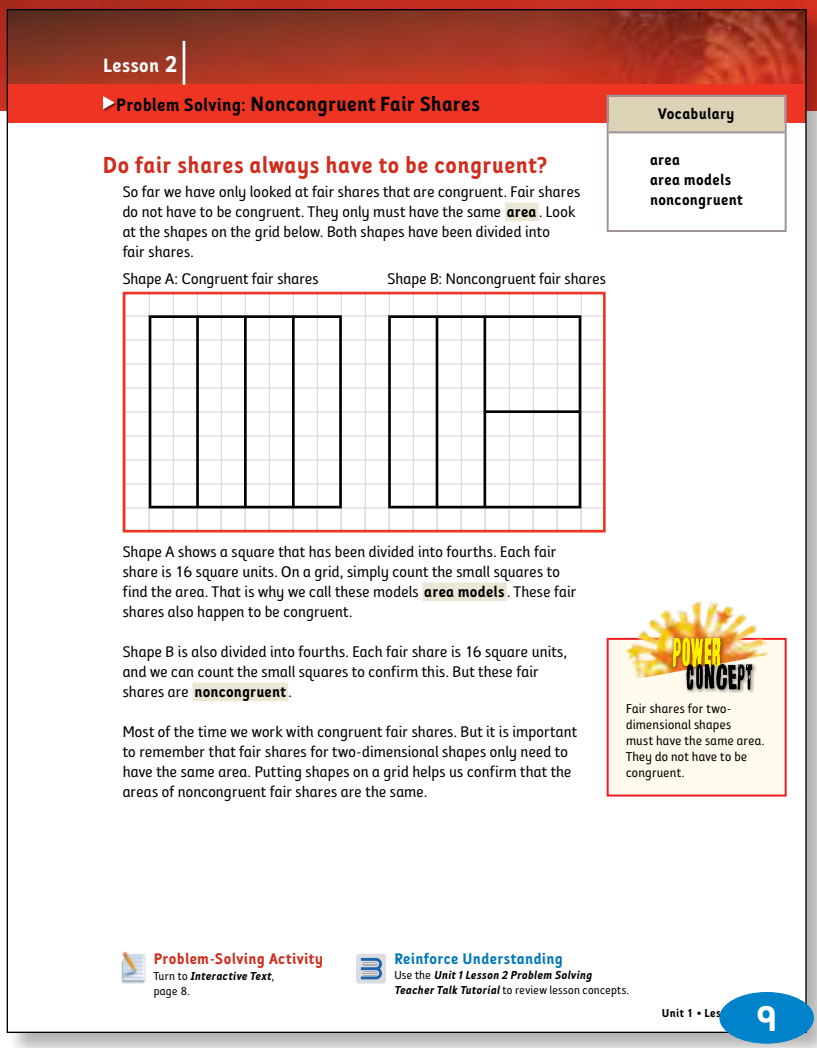




Problem Solving:
▶ Noncongruent Fair Shares

Do fair shares always have to be congruent?

(*Student Text*, page 9)



Connect to Prior Knowledge

Begin by reminding students about the concept of **area**. Area is the amount of space a shape covers. Area is measured in square units. Distribute graph paper and have students draw a rectangle with an area of 12 square units. Tell students that graph paper is good for finding area because we can just count the small squares inside the shape. Each small square has an area of one square unit. Look for a variety of different ways to show a rectangle with an area of 12 square units: 3 units by 4 units, 4 units by 3 units, 2 units by 6 units, 6 units by 2 units, 1 unit by 12 units, or 12 units by 1 unit.

Link to Today's Concept

Explain that in this lesson we will look at partitioning shapes on grids so that we can compare areas when the fair shares are not congruent.

Demonstrate

- Have students look at the picture of congruent and noncongruent fair shares drawn on a grid on page 9 of the *Student Text*. Tell students we call this type of model an **area model** because we compare areas of the fair shares. Point out that Shape A has been divided into congruent fair shares and Shape B has been divided into noncongruent fair shares. Ask students to describe the differences they see. Listen for observations about the dimensions and shape of the parts.
- Now have students count the squares of each part in Shapes A and B. (*16 square units*) In Shape A, the parts have the same area and are all congruent. In Shape B, the parts have the same area but some of the parts are not congruent.
- Tell students that fair shares in two-dimensional shapes do not have to be congruent. We call these **noncongruent** fair shares. They are not the same shape but they have the same area.

Discuss

Call students' attention to the Power Concept.

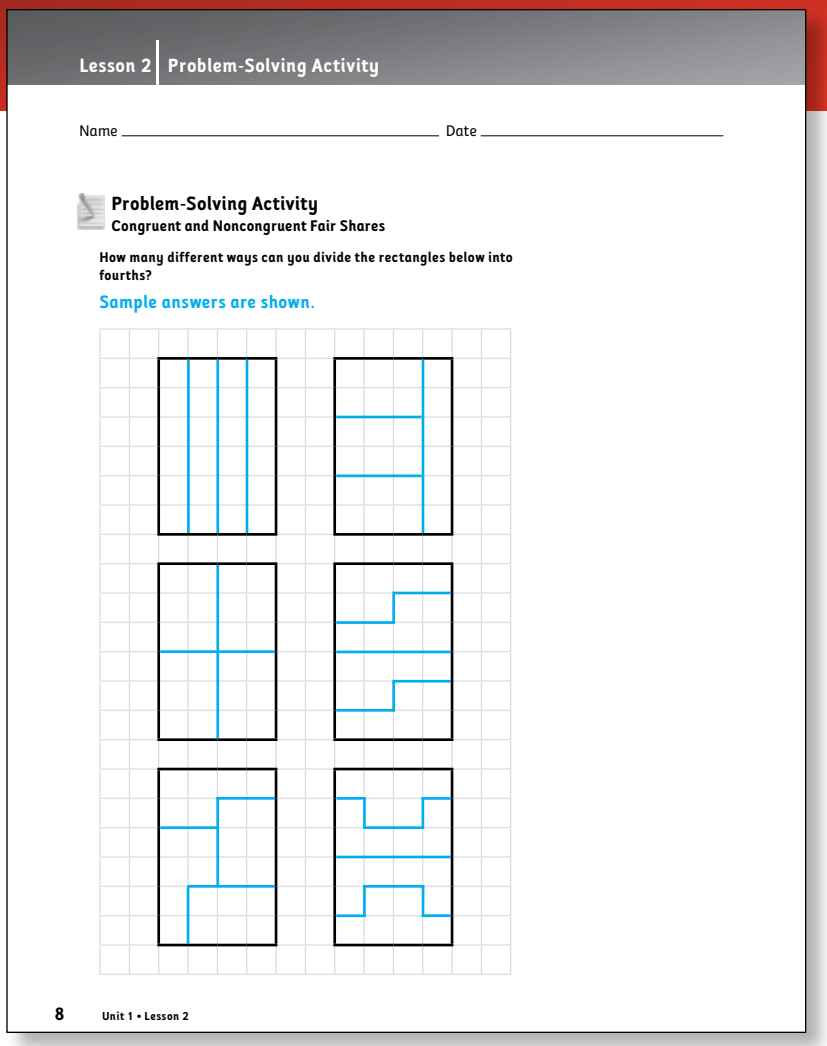
Problem-Solving Activity
(*Interactive Text*, page 8)

Have students turn to page 8 in the *Interactive Text*, which provides students an opportunity to find different ways to divide shapes into fair shares. There are six congruent rectangles. Students are to come up with six unique ways to divide the rectangles into congruent and noncongruent fair shares. Remind students to count the squares to verify equal areas in all of the parts.

Monitor students' work as they complete this activity.

Watch for:

- Can students come up with six different ways to divide the rectangles into fair shares of fourths?
- Are students creating both congruent and noncongruent fair shares?
- Are students able to verify that the parts in each rectangle all have equal areas?



Homework

Go over the instructions on pages 10 and 11 of the *Student Text* for each part of the homework.

Activity 1

Students name the fraction for each letter on the number line.

Activity 2

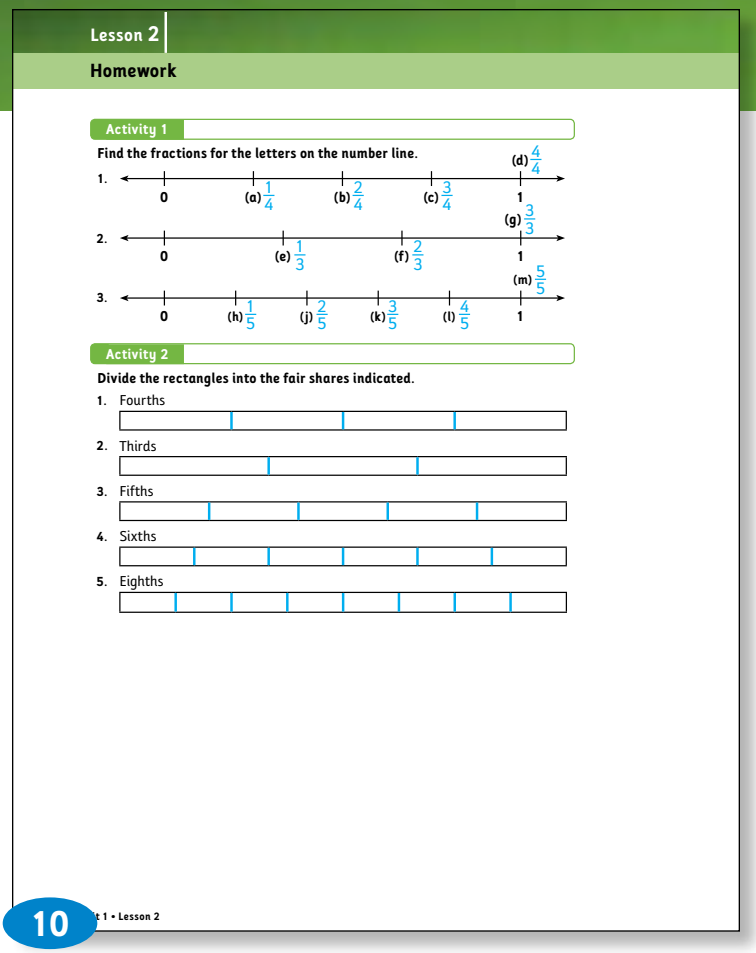
Students divide rectangles into fair shares as instructed. Remind them these fractional parts must have the same area.

Activity 3

Students are given shapes divided into fourths and tell whether or not they are congruent fair shares by answering Y for yes and N for no. If they answer N, they tell why they are not congruent.

Activity 4 • Distributed Practice

Students practice basic computational skills. Tell students that they practice these skills so they do not forget the algorithms and they continue to get better at them.



Lesson 2

Homework

Activity 1

Find the fractions for the letters on the number line.

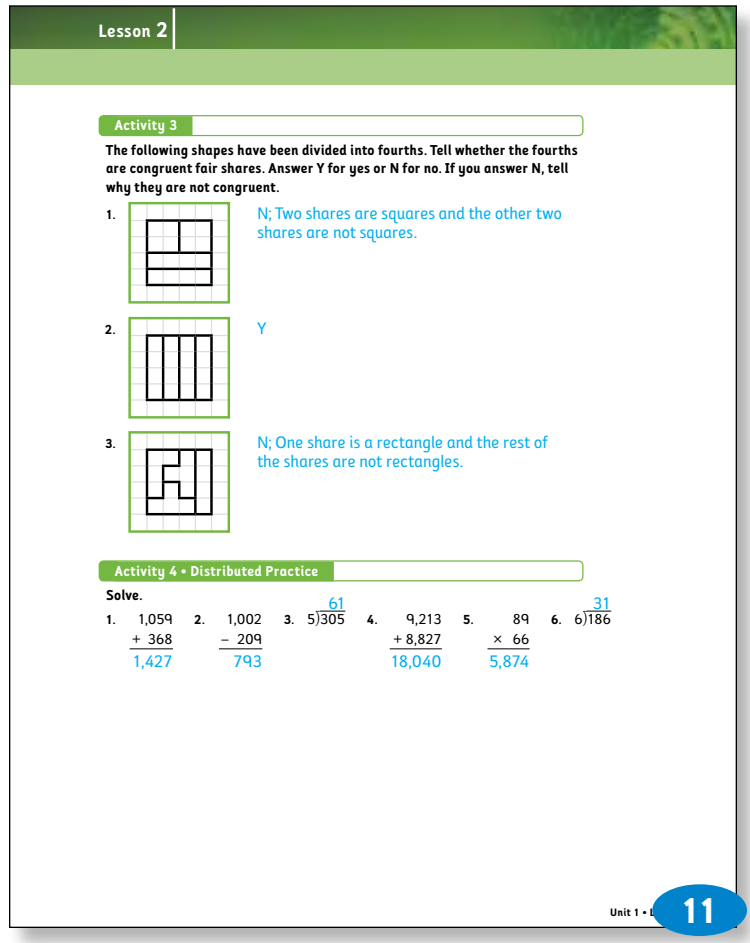
1. 0 (a) $\frac{1}{4}$ (b) $\frac{2}{4}$ (c) $\frac{3}{4}$ 1 (d) $\frac{4}{4}$
2. 0 (e) $\frac{1}{3}$ (f) $\frac{2}{3}$ 1 (g) $\frac{3}{3}$
3. 0 (h) $\frac{1}{5}$ (j) $\frac{2}{5}$ (k) $\frac{3}{5}$ (l) $\frac{4}{5}$ 1 (m) $\frac{5}{5}$

Activity 2

Divide the rectangles into the fair shares indicated.

1. Fourths
2. Thirds
3. Fifths
4. Sixths
5. Eighths

10



Lesson 2

Activity 3

The following shapes have been divided into fourths. Tell whether the fourths are congruent fair shares. Answer Y for yes or N for no. If you answer N, tell why they are not congruent.

1. N; Two shares are squares and the other two shares are not squares.
2. Y
3. N; One share is a rectangle and the rest of the shares are not rectangles.

Activity 4 • Distributed Practice

Solve.

1. 1,059 + 368 = 1,427
2. 1,002 − 209 = 793
3. $5\overline{)305} = 61$
4. 9,213 + 8,827 = 18,040
5. 89 × 66 = 5,874
6. $6\overline{)186} = 31$

11

Lesson 3 ▶Part-to-Whole Relationships

Problem Solving: ▶Representing Fractions with Cuisenaire Rods

Lesson Planner

Vocabulary Development

unit fraction
Cuisenaire rods

Skills Maintenance

Making Fair Shares

Building Number Concepts: ▶Part-to-Whole Relationships

In this lesson, students learn about the importance of the part-to-whole relationship represented by a fraction. They learn that this relationship begins with recognizing the "whole" and then comparing part(s) to the whole. Students are introduced to the unit fraction, which is at the foundation of the conceptual understanding of fractions.

Objective

Students will understand fractions as part-to-whole relationships.

Problem Solving: ▶Representing Fractions with Cuisenaire Rods

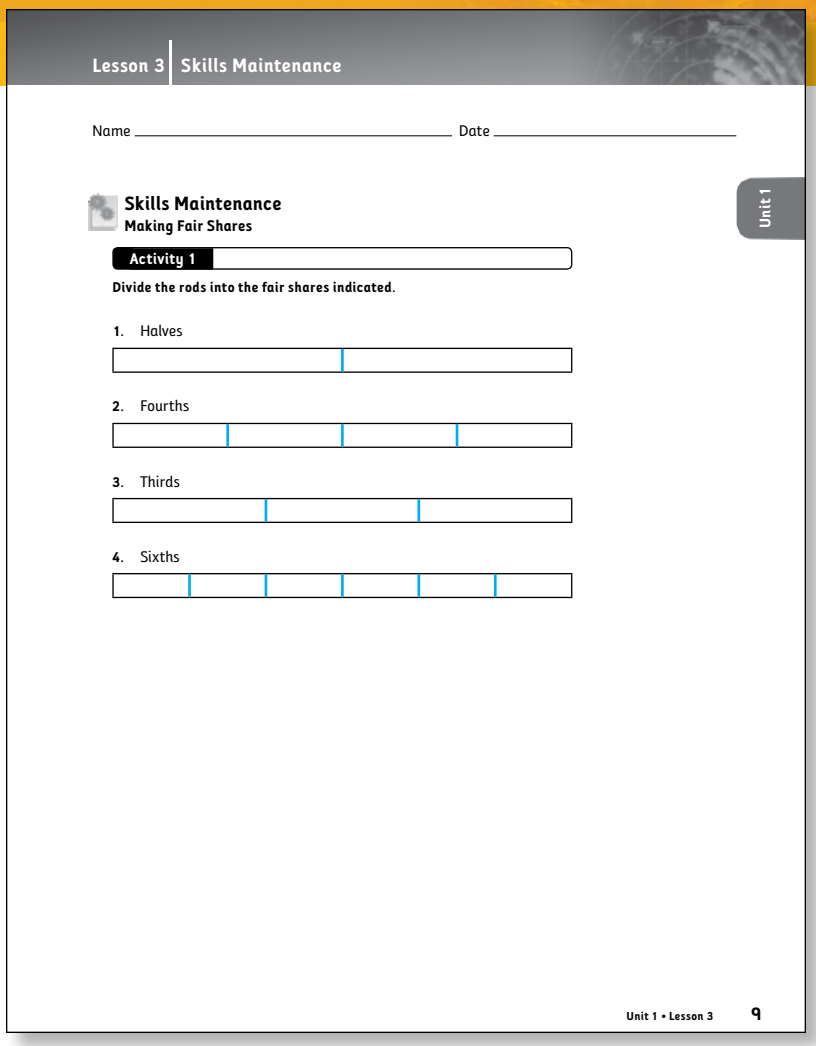
Students are introduced to a new tool for understanding fractions, Cuisenaire rods. These are the Cuisenaire rods that young students use to learn place value. They are a helpful tool for understanding fractions as well. Like the number line, they are linear models.

Objective

Students will use a linear model (Cuisenaire rods) to examine part-to-whole relationships.

Homework

Students fill in missing fractions on a number line, divide rectangles into fair shares, and tell the unit fraction represented by rods. In Distributed Practice, students practice basic computational skills with whole numbers.


Lesson 3 | Skills Maintenance

Name _____ Date _____

Unit 1

Skills Maintenance
Making Fair Shares

Activity 1

Divide the rods into the fair shares indicated.

1. Halves
2. Fourths
3. Thirds
4. Sixths

Unit 1 • Lesson 3 9

Skills Maintenance

Making Fair Shares

(*Interactive Text*, page 9)

Activity 1

Students divide rectangles into fair share segments. Notice the rectangles are called rods in preparation for today's lesson where students are introduced to a new math tool called *Cuisenaire rods*.

Building Number Concepts:
▶ Part-to-Whole Relationships

What is a part-to-whole relationship?

(*Student Text*, pages 12–14)

Connect to Prior Knowledge

Draw three rectangles on the board: one divided into fourths, one divided into thirds, and one divided into halves. Ask students to tell (a) how many equal parts are in each of the shapes, and (b) what the parts are called.

Listen for:

- *When you divide a shape into four equal parts, the parts are called fourths.*
- *When you divide a shape into three equal parts, the parts are called thirds.*
- *When you divide a shape into two equal parts, the parts are called halves.*

Link to Today's Concept

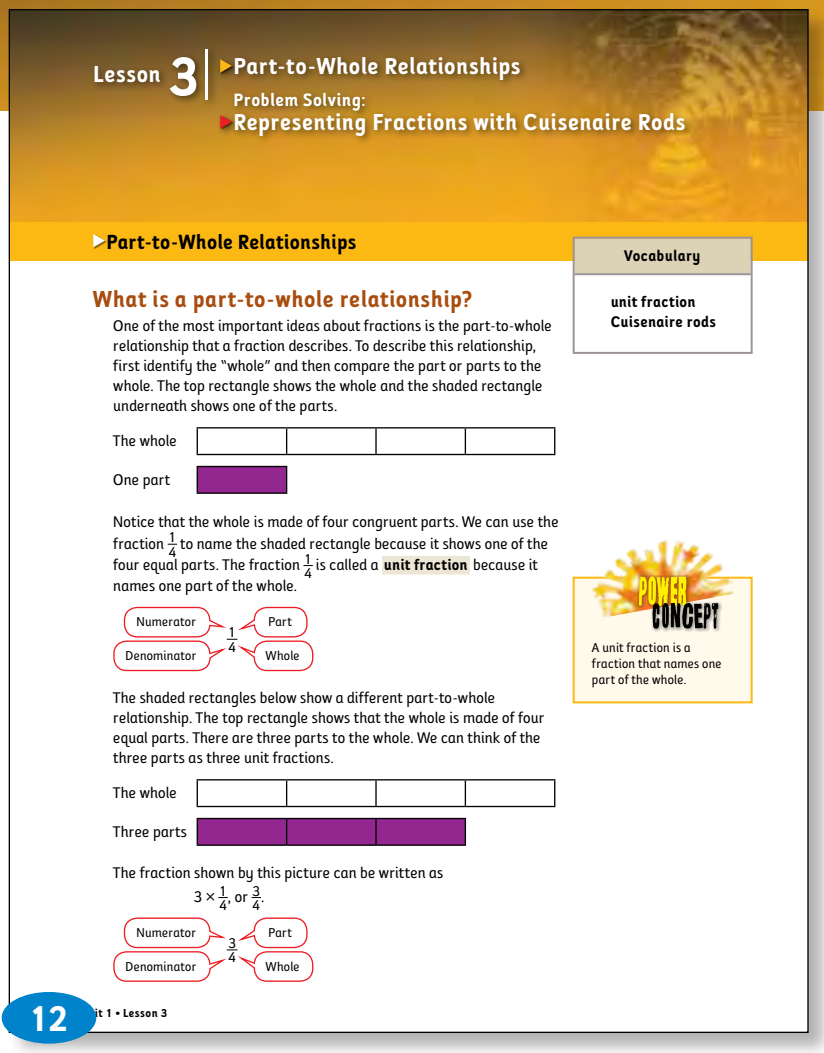
Tell students that this practice of identifying the number of parts in the whole and naming the parts will help with today's lesson when we look more closely at the relationship between the part(s) and the whole.

Demonstrate

Engagement Strategy: Teacher Modeling

Demonstrate how we look at part-to-whole relationships.

- Have students look at page 12 in the *Student Text*. Have them look at the diagram showing "The whole" and "One part." Point out that the whole is made of four equal parts. Have students look at the shaded part. This part represents the fraction $\frac{1}{4}$. We call this a **unit fraction** because it is one part of the whole. The numerator of a unit fraction is always 1.
- Have students look at the next diagram, which shows the whole and three parts. Tell students we have three unit fractions. This fraction is written as $3 \times \frac{1}{4}$, or $\frac{3}{4}$.


Lesson 3 ▶Part-to-Whole Relationships
Problem Solving: ▶Representing Fractions with Cuisenaire Rods

▶Part-to-Whole Relationships

Vocabulary
unit fraction
Cuisenaire rods

What is a part-to-whole relationship?

One of the most important ideas about fractions is the part-to-whole relationship that a fraction describes. To describe this relationship, first identify the "whole" and then compare the part or parts to the whole. The top rectangle shows the whole and the shaded rectangle underneath shows one of the parts.

The whole
One part

Notice that the whole is made of four congruent parts. We can use the fraction $\frac{1}{4}$ to name the shaded rectangle because it shows one of the four equal parts. The fraction $\frac{1}{4}$ is called a **unit fraction** because it names one part of the whole.

Numerator, Denominator, $\frac{1}{4}$, Part, Whole

POWER CONCEPT
A unit fraction is a fraction that names one part of the whole.

The shaded rectangles below show a different part-to-whole relationship. The top rectangle shows that the whole is made of four equal parts. There are three parts to the whole. We can think of the three parts as three unit fractions.

The whole
Three parts

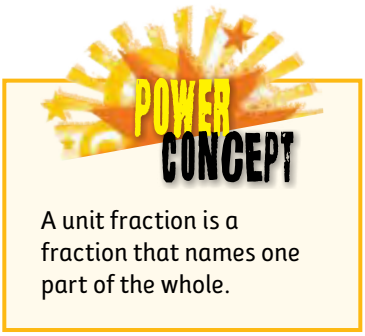
The fraction shown by this picture can be written as $3 \times \frac{1}{4}$, or $\frac{3}{4}$.

Numerator, Denominator, $\frac{3}{4}$, Part, Whole

12 it 1 • Lesson 3

Discuss

Call students' attention to the Power Concept.



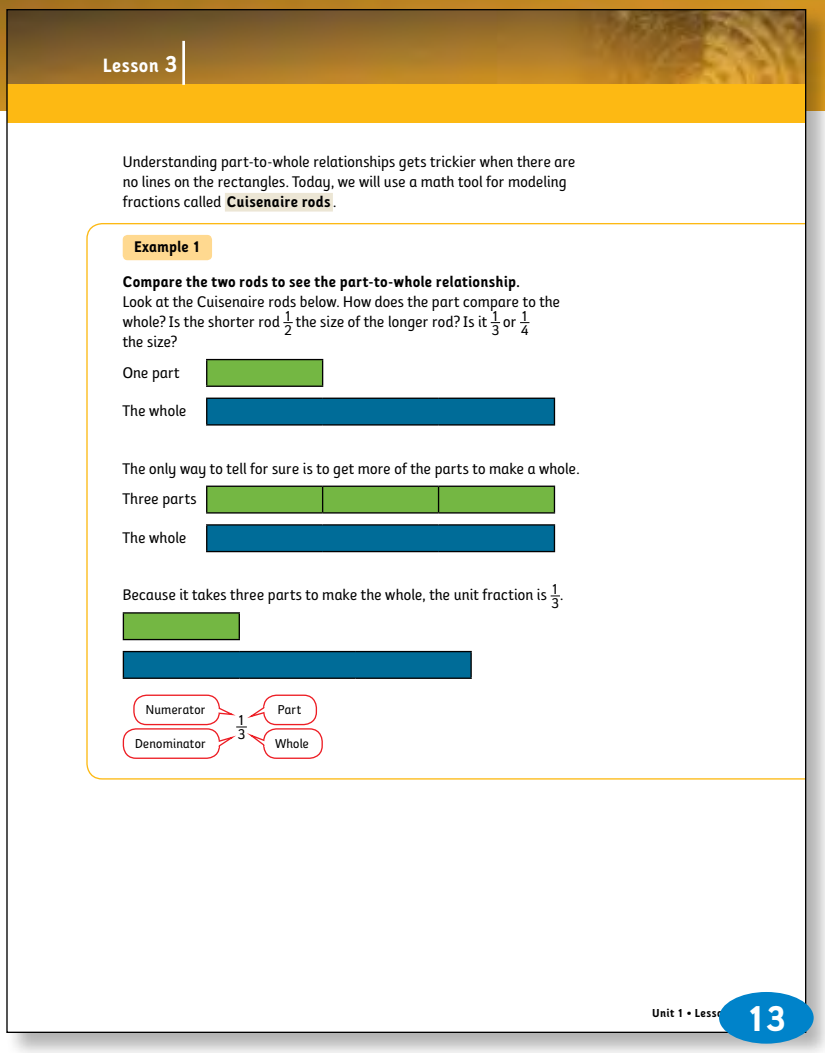
A unit fraction is a fraction that names one part of the whole.

What is a part-to-whole relationship?
(continued)

Demonstrate

- Tell students that they will now work with a new math tool called **Cuisenaire rods**. The chart below shows the length relationships among the various colors of the rods.

Number of units	
1 (white)	
2 (red)	
3 (light green)	
4 (purple)	
5 (yellow)	
6 (dark green)	
7 (black)	
8 (brown)	
9 (blue)	
10 (orange)	



- Distribute a set of Cuisenaire rods to each student. Have students look at **Example 1** at the top of page 13 in the *Student Text*. In this example, there is a smaller light green rod and a larger blue rod. Ask students to think about what fraction is being modeled in the picture. After allowing some time to think and discuss, tell students there is only one way to be sure. They can get more of the parts, or unit fraction, to see how many total parts make up the whole.
- Have students look at the next picture, which shows three parts and the whole. It takes three unit fractions to make the whole. Tell students that the unit fraction is $\frac{1}{3}$. Have students model this relationship with the Cuisenaire rods at their desks.
- Have students look at the final picture in Example 1. The fraction shown by the picture is $\frac{1}{3}$. Review the key vocabulary under the picture.
- Finally, explain to students that it is important not to memorize colors as representing one particular fraction. Their meanings change when we compare them in different ways. The green and blue rods represent $\frac{1}{3}$ in Example 1, but they can each be used with other colors to represent a different part-to-whole relationship. Likewise, other colors may also be used to represent $\frac{1}{3}$. This is shown in Example 2.

What is a part-to-whole relationship? *(continued)*

Demonstrate

- Have students look at **Example 2** at the top of page 14 of the *Student Text*. This example shows one part and the whole. Point out to students that three of the parts are needed to make the whole. It is the same part-to-whole relationship as in Example 1. The Cuisenaire rods are a different size, but the relationship between them remains the same. The one part is one-third of the whole.
- Review key vocabulary at the end of the example. Ask students, "What is the numerator and what does it represent? What is the denominator and what does it represent? What is a unit fraction and why is it important?" Be sure students understand these terms and their importance.
- Summarize the concept students should take away from today's concept building. When working with a part-to-whole relationship, the focus is on how the part compares to the whole. It is that relationship that gives the fraction meaning.

Discuss

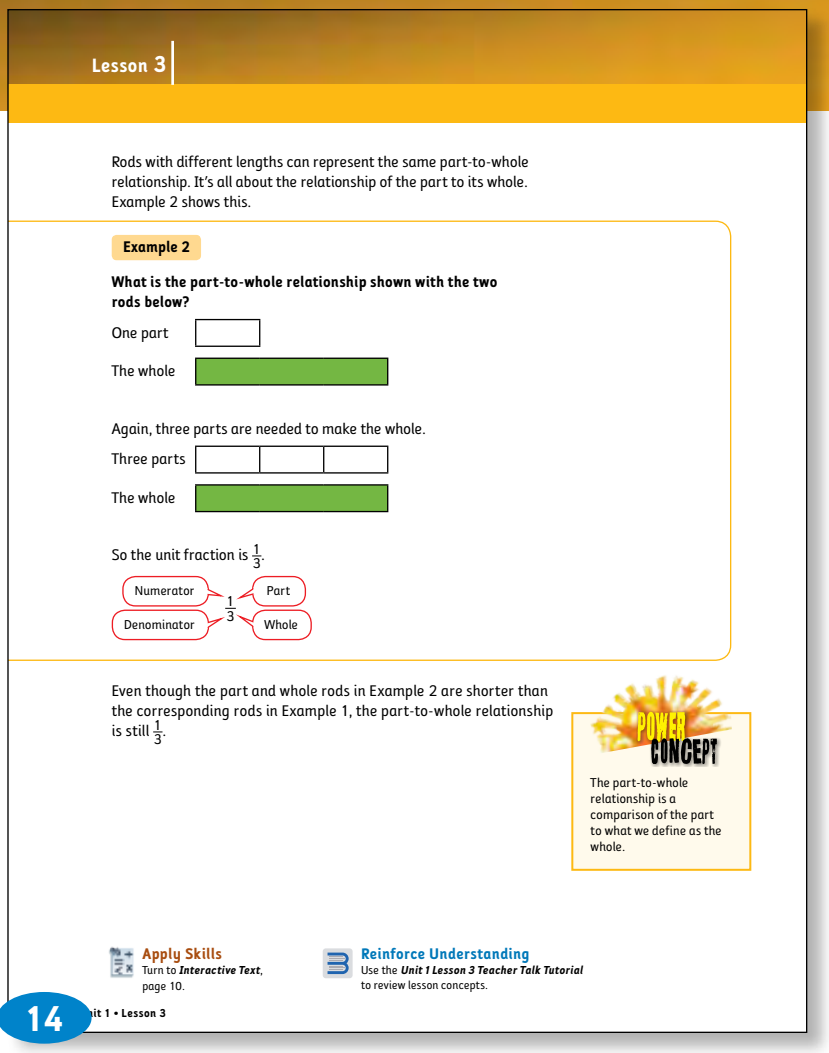
Call students' attention to the Power Concept.

POWER CONCEPT

The part-to-whole relationship is a comparison of the part to what we define as the whole.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 3 Teacher Talk Tutorial*.



Check for Understanding

Engagement Strategy: Think, Think

Draw two purple rods on the board. Label one rod as "the whole." Label the other rod as "$\frac{1}{2}$." Ask students the questions listed below. Allow think time after each question and encourage them to use the rods to help them answer the questions. Then call on one student to answer.

Ask:

Can you give an example of a comparison where the purple rod is the whole? (*When compared to the white rod, the purple rod represents one whole and the white rod represents* $\frac{1}{4}$.)

Can you give an example of a comparison where the purple rod is $\frac{1}{2}$**?** (*When compared to the brown rod, the purple rod represents* $\frac{1}{2}$ *and the brown rod represents one whole.*)

Apply Skills

(*Interactive Text*, pages 10–11)

Have students turn to pages 10 and 11 in the *Interactive Text*, which provides students an opportunity to practice identifying part-to-whole relationships represented by rods.

Activity 1

Students are given two rods representing a unit fraction and the whole and are to name the unit fraction. Remind them to divide up the whole if they cannot see the relationship without the lines.

Activity 2

Students are shown the unit fraction and a second fraction made up of multiple unit fractions. Students complete the multiplication that shows the number of unit fractions in the second fraction and then name the second fraction. A model is provided to help students understand what is expected of them.

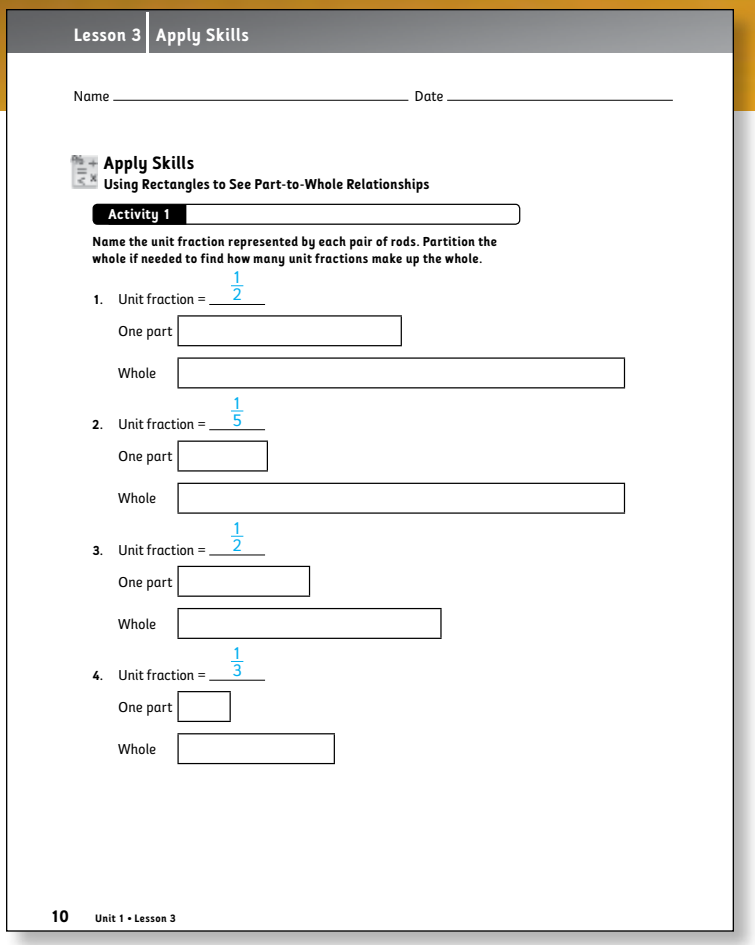
Monitor students' work as they complete these activities.

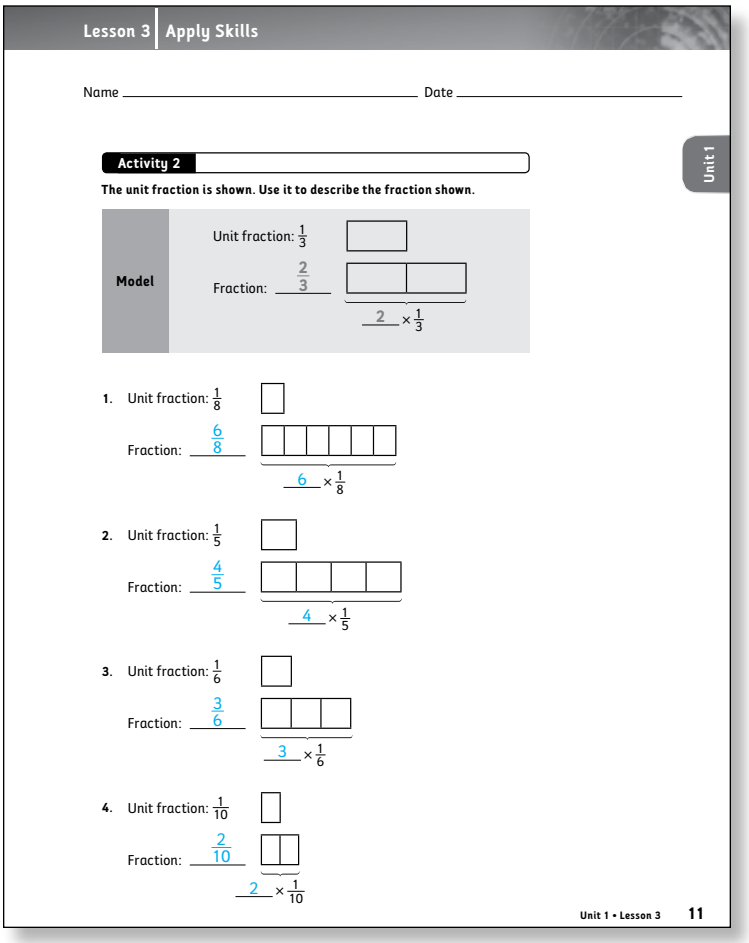
Watch for:

- Can students name a fraction given a model of the unit fraction and the whole?
- Do students understand that there are other fractions using the same whole that are multiples of the unit fraction?
- Can students use a unit fraction to name other fractions that use the same whole?

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 3 Teacher Talk Tutorial*.





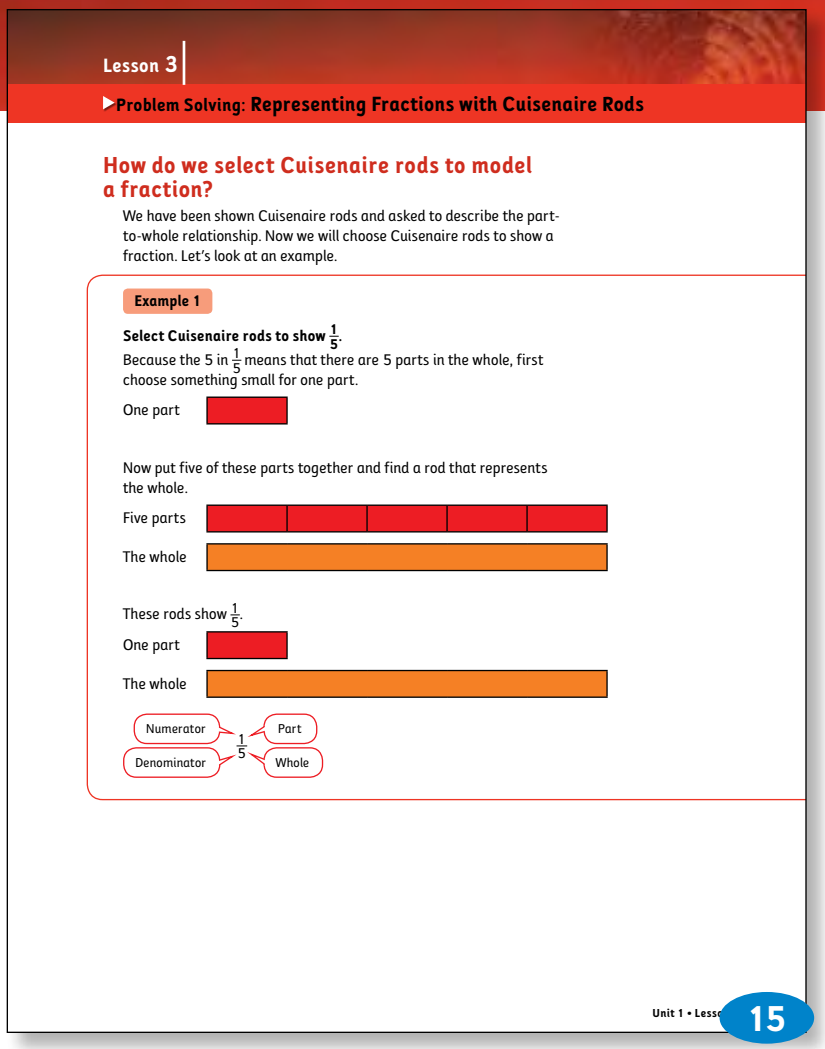
Problem Solving:
▶ Representing Fractions with Cuisenaire Rods

How do we select Cuisenaire rods to model a fraction?

(*Student Text*, pages 15–16)

Demonstrate

- Tell students that they will now select the Cuisenaire rods to model fractions. Until now, they have been describing the relationship given a model. It is a different skill to model a relationship given the fraction.
- Have students look at **Example 1** on page 15 of the *Student Text*. Ask students to identify the denominator of the fraction $\frac{1}{5}$. Ask students to name the fractional parts when the unit fraction is $\frac{1}{5}$. (*The parts are called fifths.*) Remind students that it will take five $\frac{1}{5}$ unit fractions to make one whole. Because we need five of the unit fractions, choose a relatively small color, such as white or red. Explain that the red rod shown in the example is only one color that would work.
- Have students look at the next picture in the example. The red rod has been repeated five times. Tell students to look for the color that is the same length as five red rods. The orange rod is the same length as five red rods. Have students model the picture at their desks.
- Have students look at the last picture in the example. Tell them that this picture shows a representation for $\frac{1}{5}$. The one red rod represents the part and the one orange rod represents the whole.

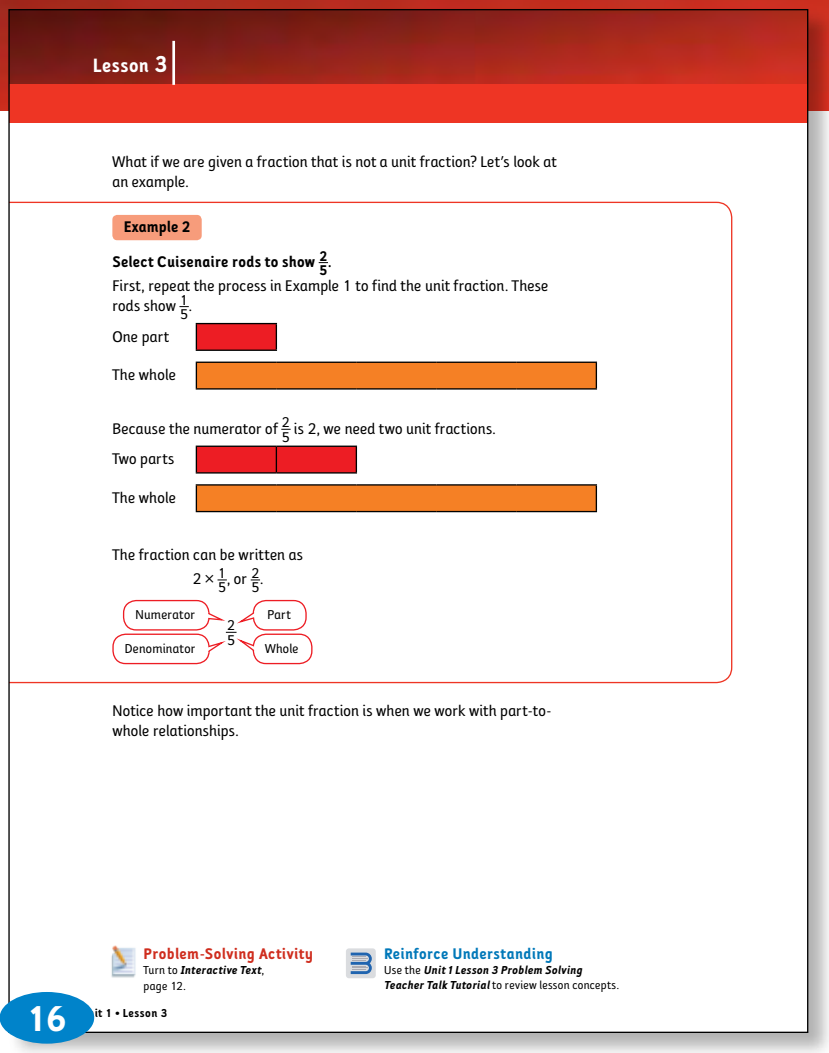


- Review the key vocabulary at the end of the example. Have students name the numerator, the denominator, and the unit fraction. Then have them explain the meaning of these terms.
- Explain to students that they need to know how to model fractions other than unit fractions. Example 2 shows how to do this.

How do we select Cuisenaire rods to model a fraction? *(continued)*

Demonstrate

- Have students look at **Example 2** on page 16 of the *Student Text*. In this example, students are shown how to model the fraction $\frac{2}{5}$.
- Have students look at the denominator of $\frac{2}{5}$ first. Explain that this helps to determine which rods to use. The denominator is the same as the denominator in Example 1. In Example 1, we modeled the unit fraction $\frac{1}{5}$ with a red rod. Use the red rod to represent the unit fraction and the orange rod for the whole.
- Ask students to look at the fraction to be modeled. The fraction $\frac{2}{5}$, NOT $\frac{1}{5}$, is being modeled. Ask students to name how many more red rods are needed to model $\frac{2}{5}$. Because two unit fractions are needed, the fraction can be written as $2 \times \frac{1}{5}$, or $\frac{2}{5}$.
- Have students look at the next picture in Example 2. The picture shows a representation for $\frac{2}{5}$. Two of the red rods and one orange rod represent the fraction $\frac{2}{5}$. Have students model $\frac{2}{5}$ at their desk. Be sure they have two red rods and one orange rod to model the fraction $\frac{2}{5}$.
- Review the vocabulary at the end of the example. These key terms are critical to conceptual understanding of part-to-whole relationships.



Check for Understanding

Engagement Strategy: Look About

Have students model the fraction $\frac{3}{5}$ at their desks. Tell them to look about the classroom and get help from other students if they are having any difficulties. Circulate around the room and be sure students have used three red rods and one orange rod to model $\frac{3}{5}$.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 3 Problem Solving Teacher Talk Tutorial*.

Problem-Solving Activity
(*Interactive Text*, page 12)

Now students have an opportunity to model fractions. Have them work independently, in pairs, or in groups for this activity. In fact, higher-functioning students could be paired with lower-functioning students for this task.

Have students turn to page 12 in the *Interactive Text*, which provides students an opportunity to model fractions using Cuisenaire rods. They are given five different fractions to model. After they model the fractions with the rods, they are to sketch a picture. Have students color them with colored pencils or write the color name inside the rectangle in the picture.

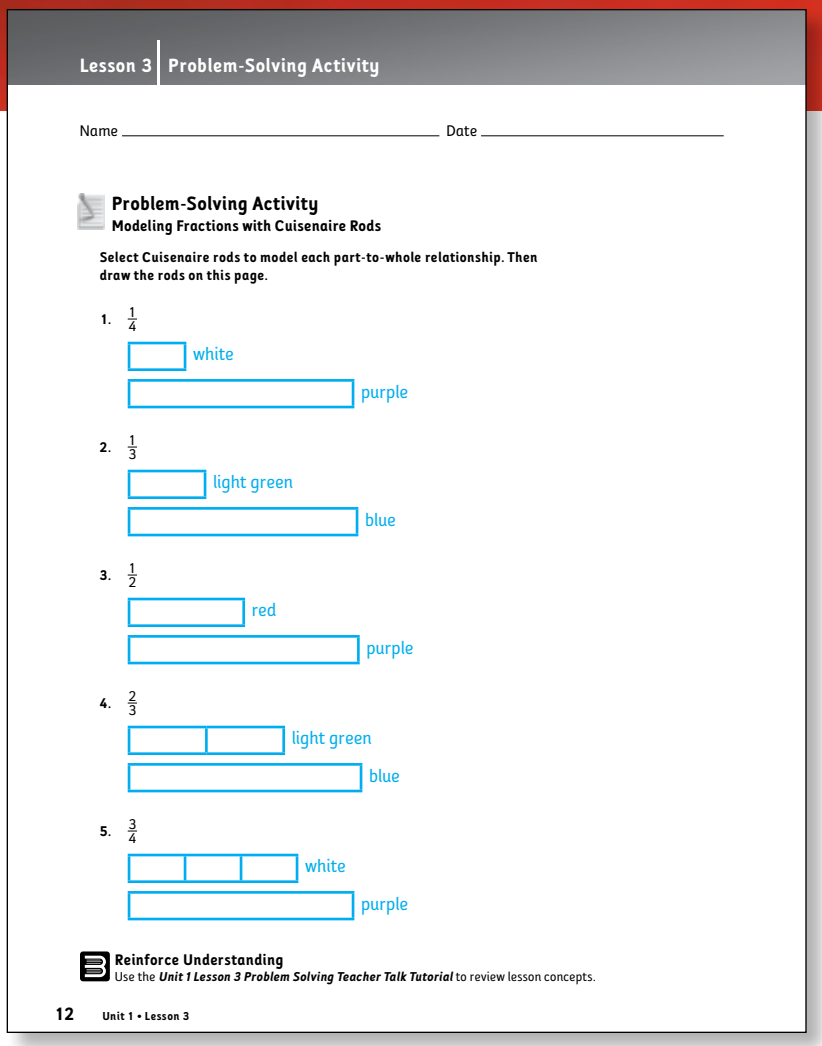
Monitor students' work as they complete this activity.

Watch for:

- Do students know the first step in modeling the unit fractions: look at the denominator and name the fractional units? Can they find a rod for the unit fraction?
- Once they determine the unit fraction, can students find a rod to represent the whole?
- Can students model the two non-unit fractions $\frac{2}{3}$ and $\frac{3}{4}$? Do they understand they have to first find a unit fraction and iterate it the number of times shown in the numerator?

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 3 Problem Solving Teacher Talk Tutorial*.



Lesson 3 | Problem-Solving Activity

Name _____ Date _____

Problem-Solving Activity
Modeling Fractions with Cuisenaire Rods

Select Cuisenaire rods to model each part-to-whole relationship. Then draw the rods on this page.

1. $\frac{1}{4}$
   white
   purple
2. $\frac{1}{3}$
   light green
   blue
3. $\frac{1}{2}$
   red
   purple
4. $\frac{2}{3}$
   light green
   blue
5. $\frac{3}{4}$
   white
   purple

Reinforce Understanding
Use the ***Unit 1 Lesson 3 Problem Solving Teacher Talk Tutorial*** to review lesson concepts.

12 Unit 1 • Lesson 3

Homework

Go over the instructions on pages 17–18 of the *Student Text* for each part of the homework.

Activity 1

Students fill in missing fractions on number lines.

Activity 2

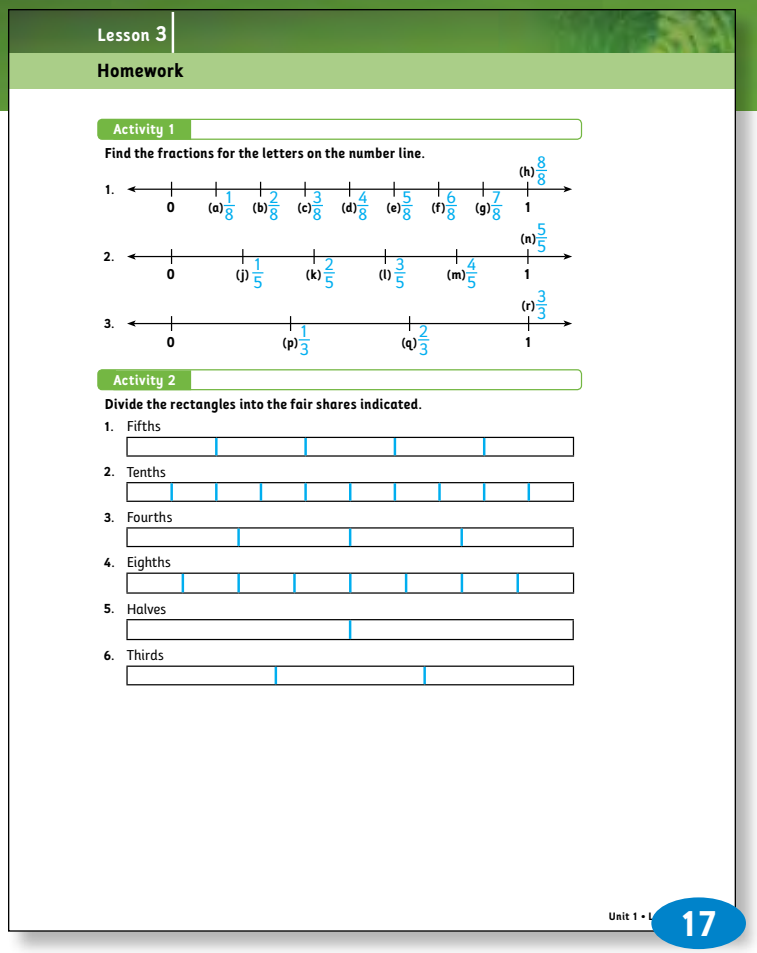
Students divide rectangles into equal parts as instructed. Remind them these fractional parts must be fair shares.

Activity 3

Students tell the unit fraction represented by two rods.

Activity 4 • Distributed Practice

Students practice basic computational skills. Tell students that they practice these skills so they do not forget the algorithms and they continue to get better at them.



Lesson 3

Homework

Activity 1

Find the fractions for the letters on the number line.

1. 0 (a) $\frac{1}{8}$ (b) $\frac{2}{8}$ (c) $\frac{3}{8}$ (d) $\frac{4}{8}$ (e) $\frac{5}{8}$ (f) $\frac{6}{8}$ (g) $\frac{7}{8}$ 1 (h) $\frac{8}{8}$
2. 0 (j) $\frac{1}{5}$ (k) $\frac{2}{5}$ (l) $\frac{3}{5}$ (m) $\frac{4}{5}$ 1 (n) $\frac{5}{5}$
3. 0 (p) $\frac{1}{3}$ (q) $\frac{2}{3}$ 1 (r) $\frac{3}{3}$

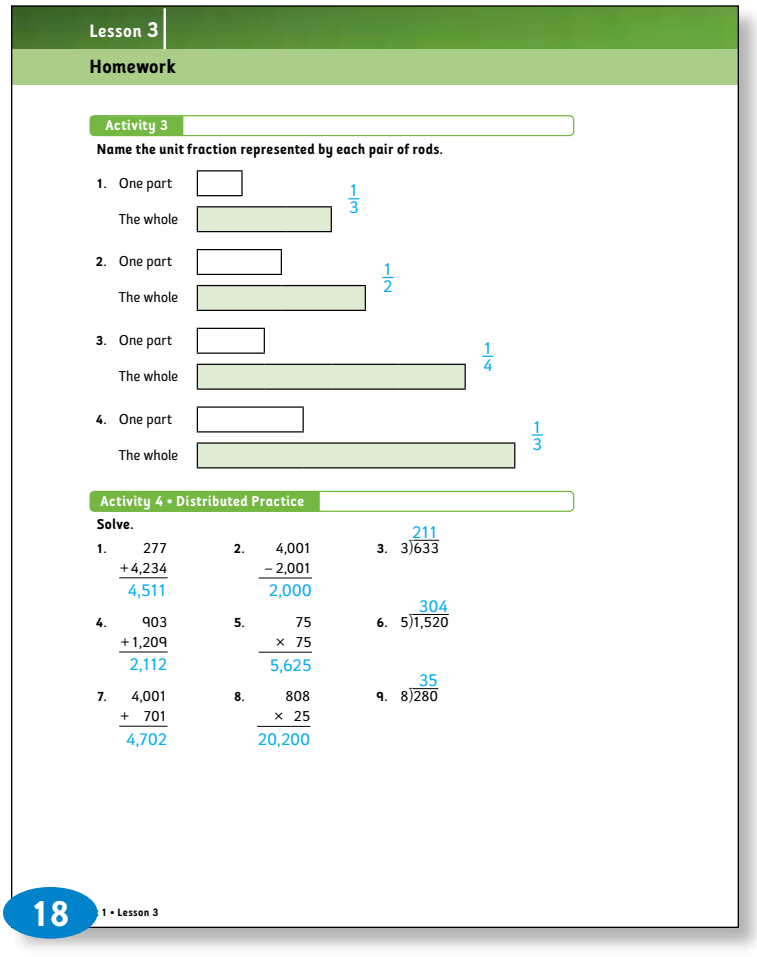
Activity 2

Divide the rectangles into the fair shares indicated.

1. Fifths
2. Tenths
3. Fourths
4. Eighths
5. Halves
6. Thirds

Unit 1 • L

17



Lesson 3

Homework

Activity 3

Name the unit fraction represented by each pair of rods.

1. One part
   The whole $\frac{1}{3}$
2. One part
   The whole $\frac{1}{2}$
3. One part
   The whole $\frac{1}{4}$
4. One part
   The whole $\frac{1}{3}$

Activity 4 • Distributed Practice

Solve.

1. 277 + 4,234 = 4,511
2. 4,001 − 2,001 = 2,000
3. $3\overline{)633}$ = 211
4. 903 + 1,209 = 2,112
5. 75 × 75 = 5,625
6. $5\overline{)1{,}520}$ = 304
7. 4,001 + 701 = 4,702
8. 808 × 25 = 20,200
9. $8\overline{)280}$ = 35

18

1 • Lesson 3

Lesson 4

Working from the Whole to the Part

Problem Solving:
Finding the Part in Shapes on a Grid

Lesson Planner

Skills Maintenance

Fractional Parts

Building Number Concepts:

Working from the Whole to the Part

In this lesson, students focus on finding a part when given the whole. It's important that students gain flexibility in working with fractions. This means they need to practice working from whole to part, from part to whole, and even from part to another part.

Objective

Students will find a part when given the whole.

Problem Solving:

Finding the Part in Shapes on a Grid

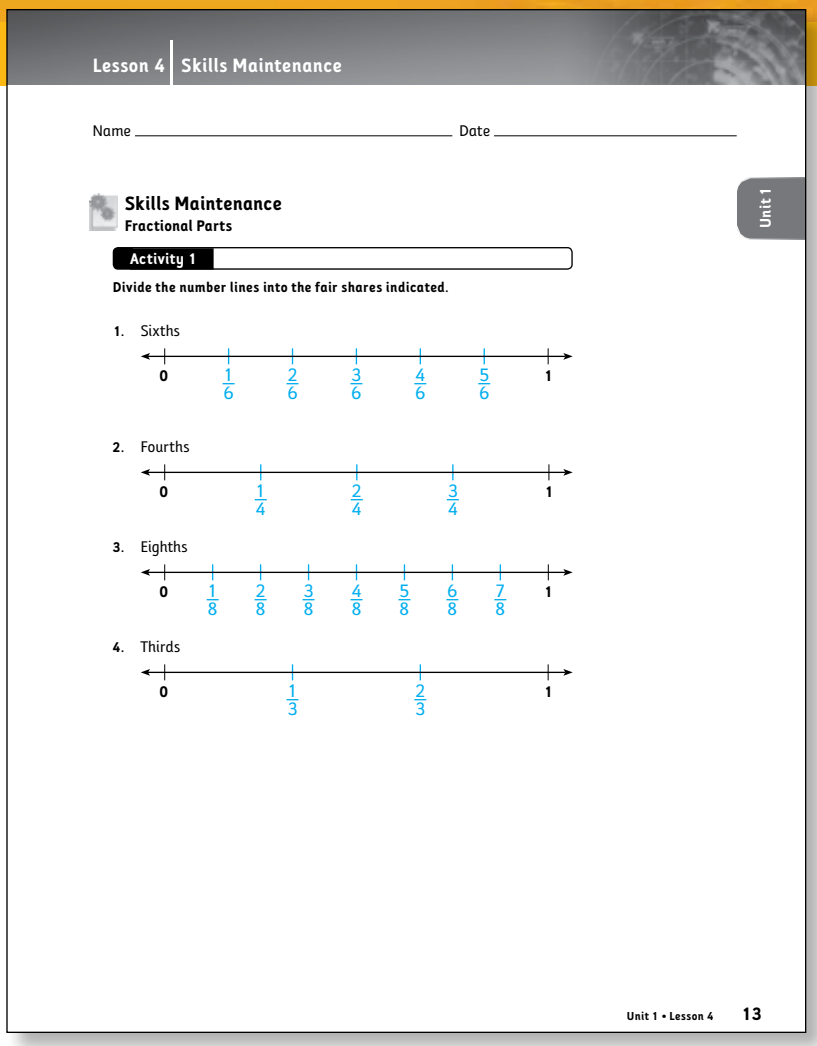
It is important that students be given multiple representations in order to gain a deep understanding of fractions. The shapes on a grid in today's problem solving provide another visual model. All of these representations combined develop a deep conceptual understanding of the part-to-whole relationships that are represented by fractions.

Objective

Students will use area models (shapes on a grid) to find a part when given the whole.

Homework

Students fill in missing fractions on a number line, divide rectangles into fair shares, and identify parts in area models. In Distributed Practice, students practice basic computational skills with whole numbers.



Lesson 4 | Skills Maintenance

Name _____ Date _____

Unit 1

Skills Maintenance
Fractional Parts

Activity 1

Divide the number lines into the fair shares indicated.

1. Sixths

2. Fourths

3. Eighths

4. Thirds

Unit 1 • Lesson 4 13

Skills Maintenance

Fractional Parts

(*Interactive Text*, page 13)

Activity 1

Students divide number lines into fractional parts as instructed. Remind students that the parts need to be fair shares. They may draw them freehand, but they need to be careful that they look like equal parts.

Building Number Concepts:
▶ Working from the Whole to the Part

How do we find a part when given the whole?

(*Student Text*, pages 19–20)

Connect to Prior Knowledge

Begin by drawing two different rods on the board: the top rod should represent the part $\frac{1}{2}$ and the bottom rod should represent the whole. Label the top rod "one part" and label the bottom rod "whole." Remind students that we worked with rods like this in the previous lesson. Ask students to describe the part-to-whole relationship represented by these two rods.

Listen for:

- *The top rod is the part. It represents $\frac{1}{2}$.*
- *The bottom rod is the whole. You need two of the parts to make the whole.*
- *Two parts are the same as one whole. That's how you know the rods represent $\frac{1}{2}$.*

Link to Today's Concept

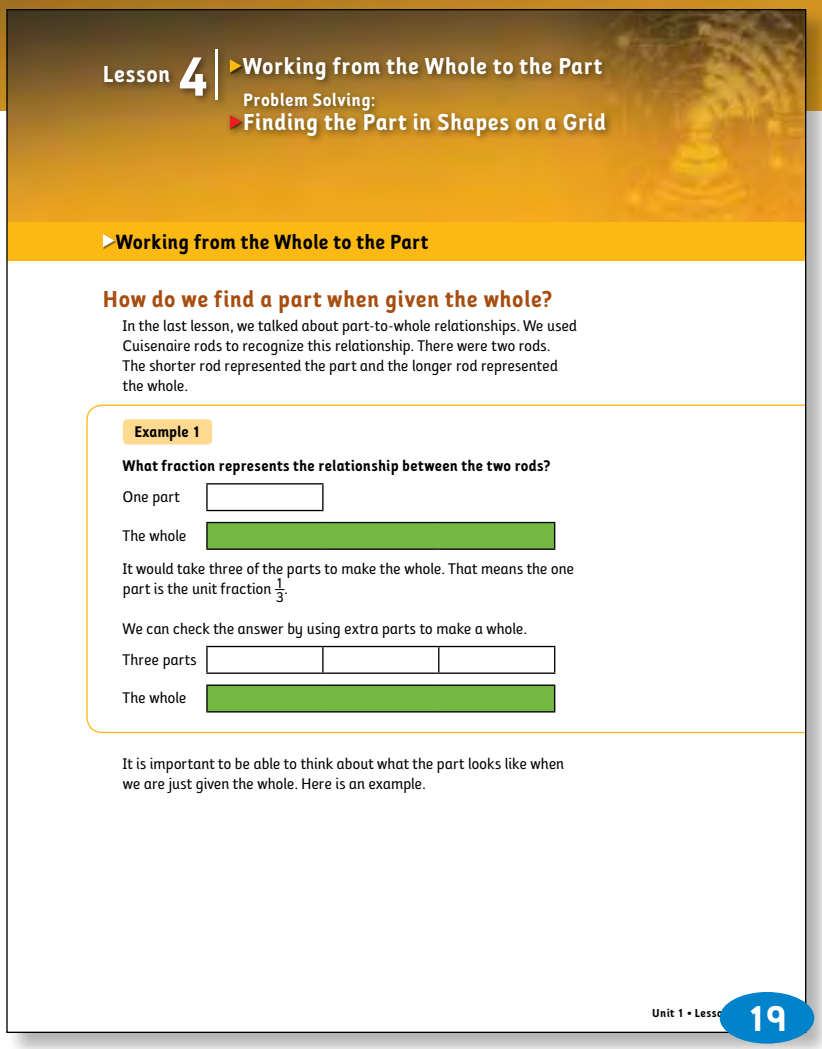
Tell students that they have been using two Cuisenaire rods, one to represent the part and the other to represent the whole. Explain that today they will be given one Cuisenaire rod that represents the whole and they are to find the part.

Demonstrate

Engagement Strategy: Teacher Modeling

Demonstrate how to find a part when given the whole.

- Distribute Cuisenaire rods to each student. Have students look at page 19 of the *Student Text*. Remind them about part-to-whole relationships and how important this concept is when working with fractions.
- Have students look at the top picture in **Example 1**. Ask students, "What fraction is represented by these two rods?" We know that the top rod is one part and the bottom rod is the whole. We need to know how many of the parts make up the whole. Ask students to model the problem at their desks with their Cuisenaire rods.
- Have students look at the second picture in the example. Does their model match this picture? It took three of the parts to make up the whole. The fraction represented by the two rods is $\frac{1}{3}$.


Lesson 4 ▶Working from the Whole to the Part
Problem Solving:
▶Finding the Part in Shapes on a Grid

▶Working from the Whole to the Part

How do we find a part when given the whole?

In the last lesson, we talked about part-to-whole relationships. We used Cuisenaire rods to recognize this relationship. There were two rods. The shorter rod represented the part and the longer rod represented the whole.

Example 1

What fraction represents the relationship between the two rods?

One part

The whole

It would take three of the parts to make the whole. That means the one part is the unit fraction $\frac{1}{3}$.

We can check the answer by using extra parts to make a whole.

Three parts

The whole

It is important to be able to think about what the part looks like when we are just given the whole. Here is an example.

Unit 1 • Lesso 19

How do we find a part when given the whole? *(continued)*

- Have students look at **Example 2** on page 20 of the *Student Text*. This example shows a word problem that demonstrates the importance of having a good understanding of fractions. Kari cuts a board into pieces for a window frame. Kari only needs $\frac{1}{4}$ of the board. She measures it, but she wants to have a clear idea of what she can expect $\frac{1}{4}$ of the board to look like before she makes the cut.

Discuss

Call students' attention to the Power Concept.

POWER CONCEPT

Visualizing the part from the whole helps us to understand fractions.

Demonstrate

- Look at the drawings of this problem on page 20 of the *Student Text*. The first drawing shows the whole. Ask students to think about ways to divide the board into fourths. Remind them of the "halving" strategy they learned with number lines.
- Have students look at the second drawing, which shows the board divided into halves. The third drawing shows fourths.
- In the story problem, Kari has an important skill. She can see the unit fraction $\frac{1}{4}$ based on the whole because she has seen many different visuals of $\frac{1}{4}$.

Check for Understanding

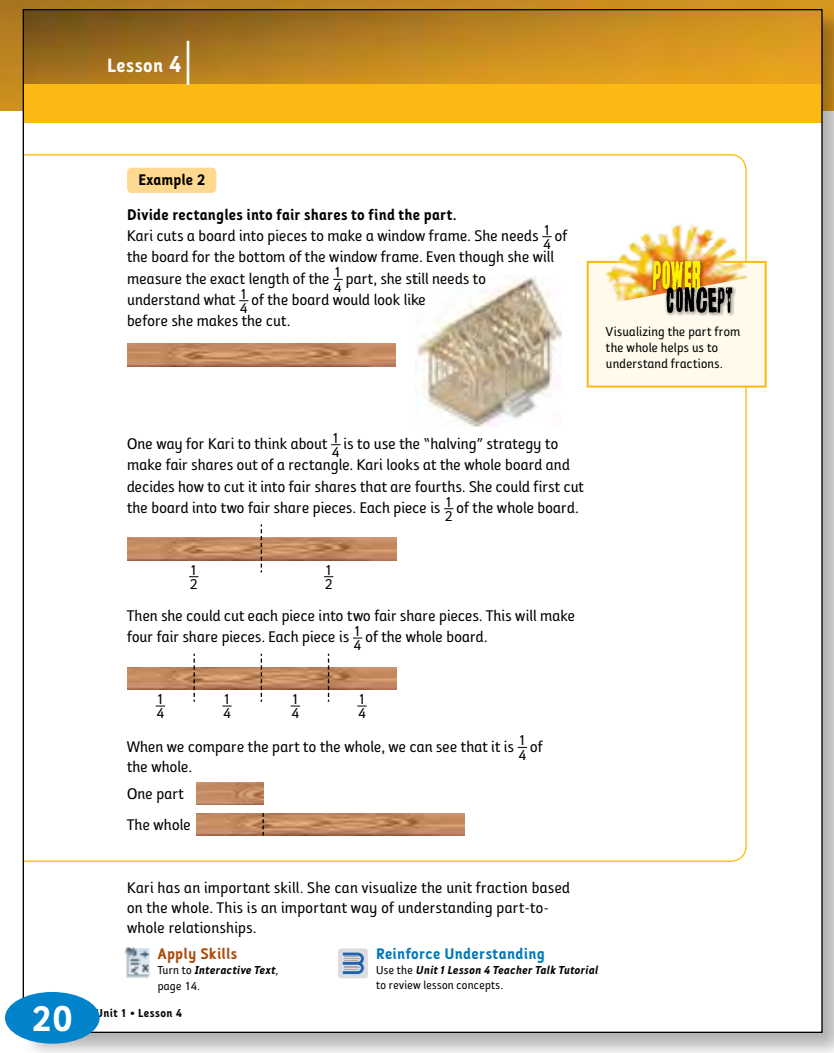
Engagement Strategy: Pair/Share

Distribute dry erase boards. Have students work with a partner. Tell students to draw a rectangle of any size on their dry erase boards, then exchange boards with their partners. Have each partner draw $\frac{1}{3}$ on the rectangle given them. Have partners compare their drawings and discuss them. Circulate around the room and monitor the discussions.

Listen for:

- *I pictured the rectangle divided into three equal parts and then shaded one part because that's $\frac{1}{3}$.*
- *I think my answer is wrong because my $\frac{1}{3}$ looks different from my partner's $\frac{1}{3}$.*

Review answers with the whole class. Point out that it is okay for the $\frac{1}{3}$ picture on one student's board to look different from the $\frac{1}{3}$ picture on his or her partner's board. It's because they are part of a differently sized whole.



Apply Skills
(*Interactive Text*, page 14)

Have students turn to page 14 in the *Interactive Text*, which provides students an opportunity to practice finding the part when they are given the whole.

Activity 1

Students are given the whole in each problem. They are to use the whole to draw fractional parts as instructed. Students are given problems involving halves, thirds, and fourths.

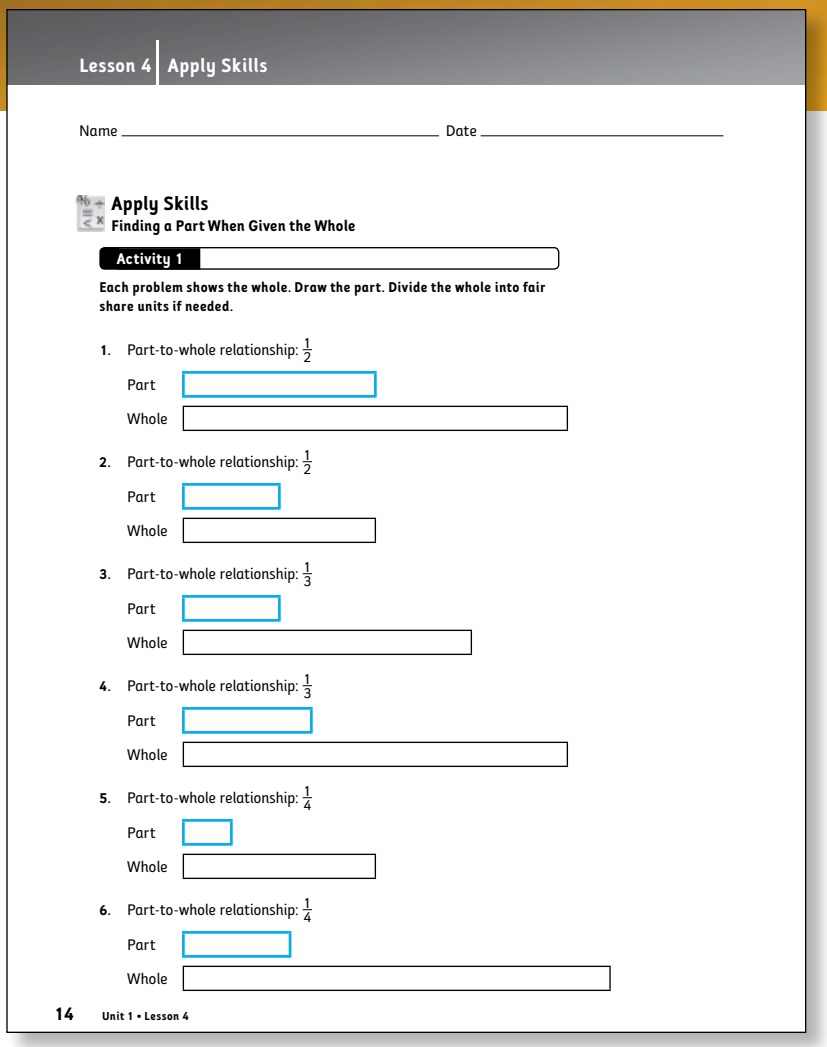
Monitor students' work as they complete this activity.

Watch for:

- Can students draw the part when they are given the whole?
- Do students understand that a fractional part may look different depending on the size of the whole?

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 4 Teacher Talk Tutorial*.



Lesson 4 | Apply Skills

Name _____ Date _____

Apply Skills
Finding a Part When Given the Whole

Activity 1

Each problem shows the whole. Draw the part. Divide the whole into fair share units if needed.

1. Part-to-whole relationship: $\frac{1}{2}$
   Part
   Whole
2. Part-to-whole relationship: $\frac{1}{2}$
   Part
   Whole
3. Part-to-whole relationship: $\frac{1}{3}$
   Part
   Whole
4. Part-to-whole relationship: $\frac{1}{3}$
   Part
   Whole
5. Part-to-whole relationship: $\frac{1}{4}$
   Part
   Whole
6. Part-to-whole relationship: $\frac{1}{4}$
   Part
   Whole

14 Unit 1 • Lesson 4

Problem Solving:
▶ Finding the Part in Shapes on a Grid

How do we find the part when the whole is a shape?

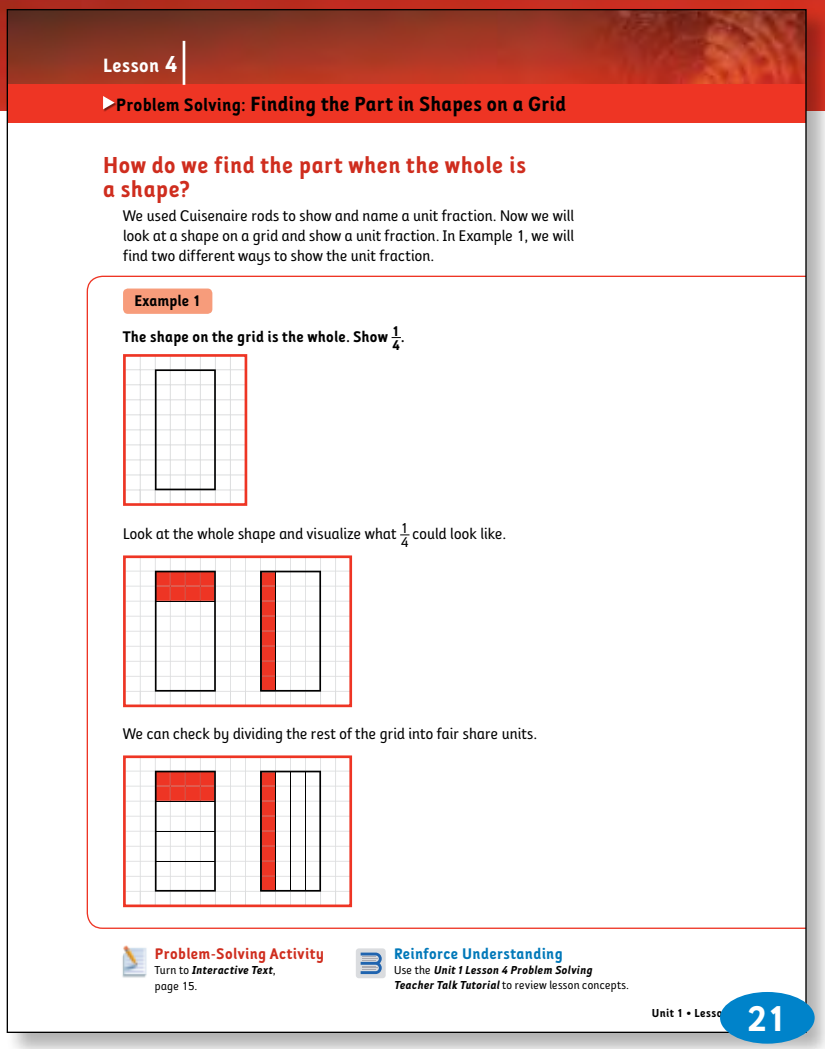
(*Student Text*, page 21)

Demonstrate

- Tell students that Cuisenaire rods are one way to visualize part-to-whole relationships. Now they will look at shapes on a grid to find the part.
- Have students look at **Example 1** on page 21 of the *Student Text*. In this example, students are asked to draw the fraction $\frac{1}{4}$ given a shape on a grid that is the whole.
- Have students look at the second grid. There are two different pictures of what $\frac{1}{4}$ could look like. The first picture shows a horizontal line that divides the shape into two parts. The red shading shows $\frac{1}{4}$. The second picture shows a vertical line that divides the shape into two parts. Again, the red shading shows $\frac{1}{4}$.
- Ask students how they can check to see if the shaded parts show the fair share $\frac{1}{4}$. Look at the third grid on page 21. These pictures show each rectangle divided into fourths. Each part is a fair share $\frac{1}{4}$ because each part has the same area, 8 square units. The part shaded red shows $\frac{1}{4}$. Tell students that it is okay to draw in the fair share parts in a shape to show the fraction.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 4 Problem Solving Teacher Talk Tutorial*.


Lesson 4

▶Problem Solving: Finding the Part in Shapes on a Grid

How do we find the part when the whole is a shape?

We used Cuisenaire rods to show and name a unit fraction. Now we will look at a shape on a grid and show a unit fraction. In Example 1, we will find two different ways to show the unit fraction.

Example 1

The shape on the grid is the whole. Show $\frac{1}{4}$.

Look at the whole shape and visualize what $\frac{1}{4}$ could look like.

We can check by dividing the rest of the grid into fair share units.

Problem-Solving Activity
Turn to *Interactive Text*, page 15.

Reinforce Understanding
Use the *Unit 1 Lesson 4 Problem Solving Teacher Talk Tutorial* to review lesson concepts.

Unit 1 • Lesso 21

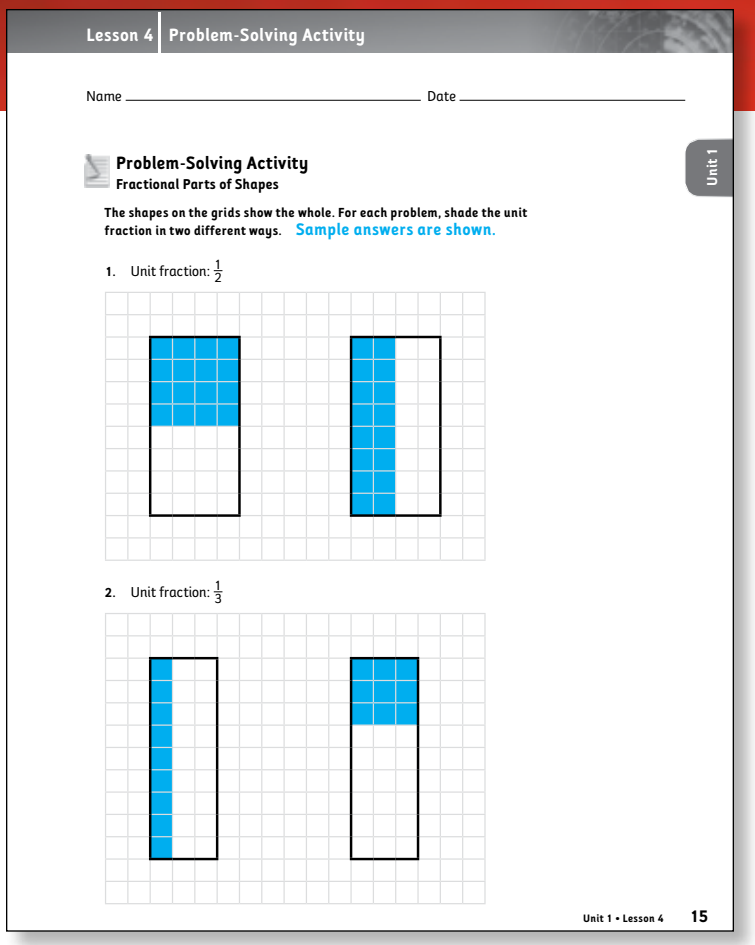
Problem-Solving Activity
(*Interactive Text*, pages 15–16)

Have students turn to pages 15 and 16 in the *Interactive Text*, which provides students an opportunity to model finding the part when given the whole as a shape on a grid. Students are to show two different ways to model a fraction.

Monitor students' work as they complete this activity.

Watch for:

- Can students divide the shape into the number of parts given by the unit fraction?
- Can students find two unique ways to model the unit fraction?
- Do students need to completely divide the shape into equal parts or can they imagine the fractional part without drawing all the other parts?



Lesson 4 | Problem-Solving Activity

Name _____ Date _____

Unit 1

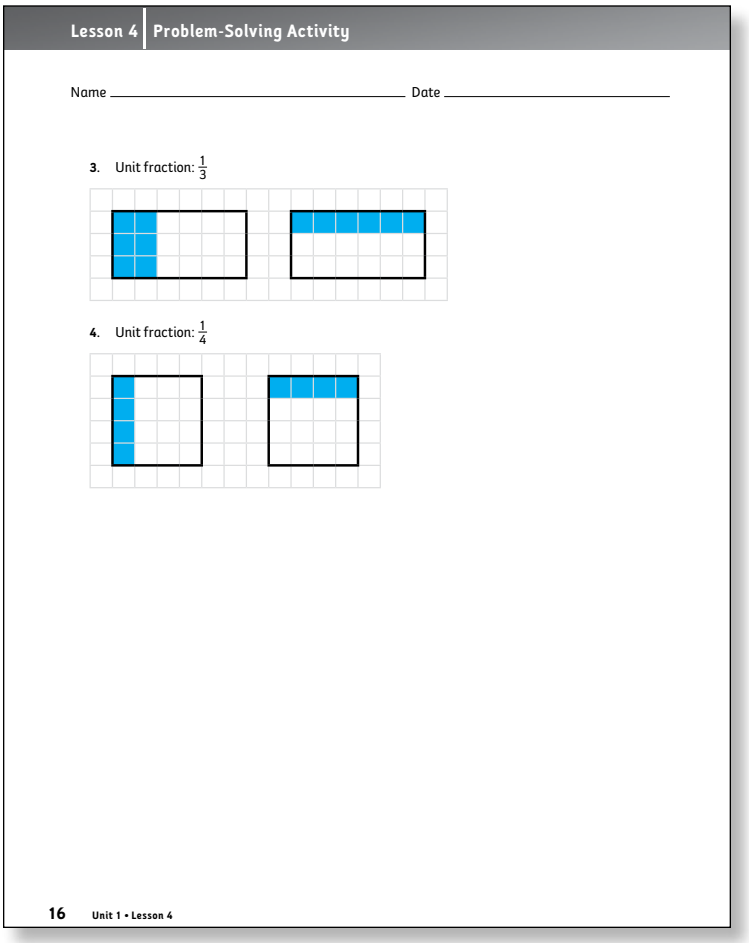
Problem-Solving Activity
Fractional Parts of Shapes

The shapes on the grids show the whole. For each problem, shade the unit fraction in two different ways. Sample answers are shown.

1. Unit fraction: $\frac{1}{2}$

2. Unit fraction: $\frac{1}{3}$

Unit 1 • Lesson 4 15



Lesson 4 | Problem-Solving Activity

Name _____ Date _____

3. Unit fraction: $\frac{1}{3}$

4. Unit fraction: $\frac{1}{4}$

16 Unit 1 • Lesson 4

Challenge Problem
Error Analysis

(*Interactive Text*, pages 17)

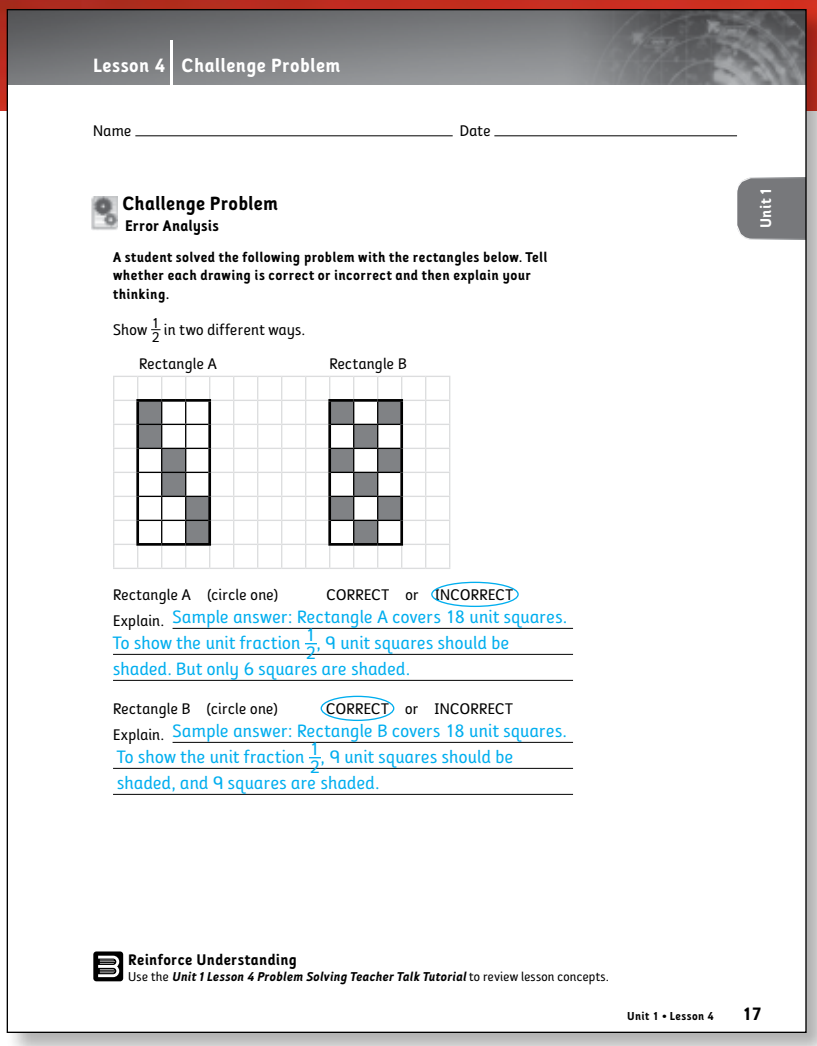
If time allows, have students turn to page 17 in the *Interactive Text*. In this problem, students are to analyze an answer to a problem and tell whether the answer is correct or incorrect. Have students explain their thinking.

Watch for:

- Do students know to count the areas of the parts to determine whether they are equal parts?
- Can students identify that Rectangle A is INCORRECT? There are two parts, shaded and unshaded, but they do not have equal areas; one is 6 square units and the other is 12 square units.
- Can students identify that Rectangle B is CORRECT? There are two parts, shaded and unshaded, and they have equal areas; 9 square units.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 4 Problem Solving Teacher Talk Tutorial*.



Lesson 4 | Challenge Problem

Name _____ Date _____

Unit 1

Challenge Problem
Error Analysis

A student solved the following problem with the rectangles below. Tell whether each drawing is correct or incorrect and then explain your thinking.

Show $\frac{1}{2}$ in two different ways.

Rectangle A Rectangle B

Rectangle A (circle one) CORRECT or (INCORRECT)
Explain. Sample answer: Rectangle A covers 18 unit squares. To show the unit fraction $\frac{1}{2}$, 9 unit squares should be shaded. But only 6 squares are shaded.

Rectangle B (circle one) (CORRECT) or INCORRECT
Explain. Sample answer: Rectangle B covers 18 unit squares. To show the unit fraction $\frac{1}{2}$, 9 unit squares should be shaded, and 9 squares are shaded.

Reinforce Understanding
Use the ***Unit 1 Lesson 4 Problem Solving Teacher Talk Tutorial*** to review lesson concepts.

Unit 1 • Lesson 4 17

Homework

Go over the instructions on pages 22 and 23 of the *Student Text* for each part of the homework.

Activity 1

Students fill in missing fractions on number lines. Point out that they need to name at least one fraction greater than 1 for each number line. This is in preparation for future lessons involving improper fractions.

Activity 2

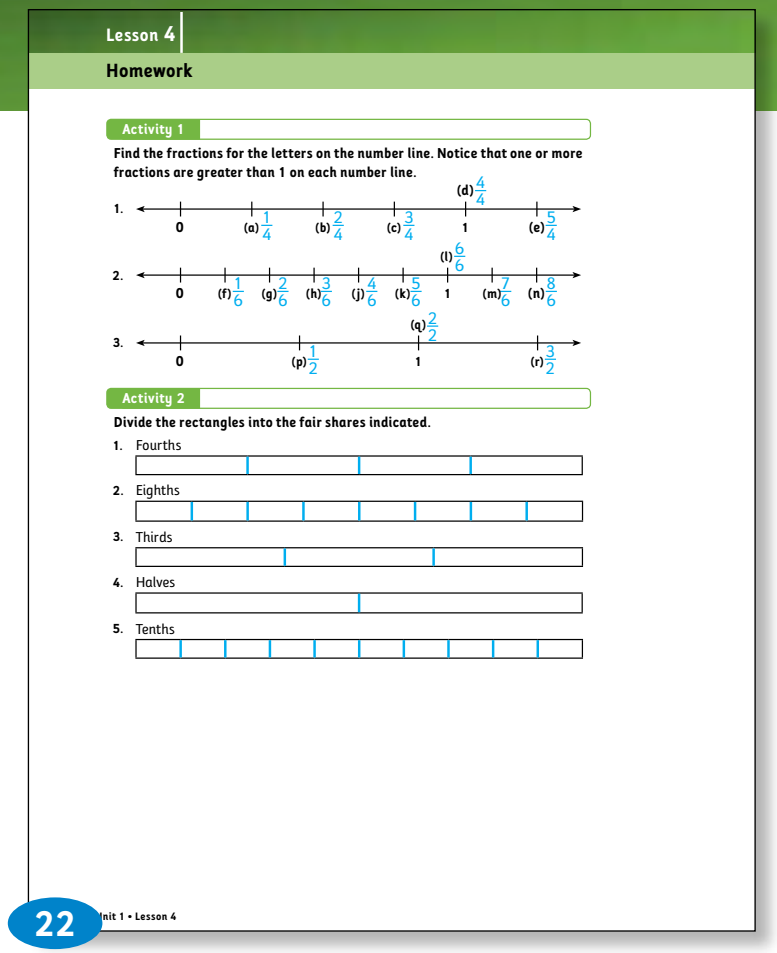
Students divide rectangles into the parts as instructed. Remind them these fractional parts must be fair shares.

Activity 3

Students tell the fraction represented by the shaded part of a shape on a grid.

Activity 4 • Distributed Practice

Students practice basic computational skills. Tell students that they practice these skills so they do not forget the algorithms and they continue to get better at them.



Lesson 4

Homework

Activity 1

Find the fractions for the letters on the number line. Notice that one or more fractions are greater than 1 on each number line.

1. 0 (a) $\frac{1}{4}$ (b) $\frac{2}{4}$ (c) $\frac{3}{4}$ 1 (d) $\frac{4}{4}$ (e) $\frac{5}{4}$

2. 0 (f) $\frac{1}{6}$ (g) $\frac{2}{6}$ (h) $\frac{3}{6}$ (j) $\frac{4}{6}$ (k) $\frac{5}{6}$ 1 (l) $\frac{6}{6}$ (m) $\frac{7}{6}$ (n) $\frac{8}{6}$

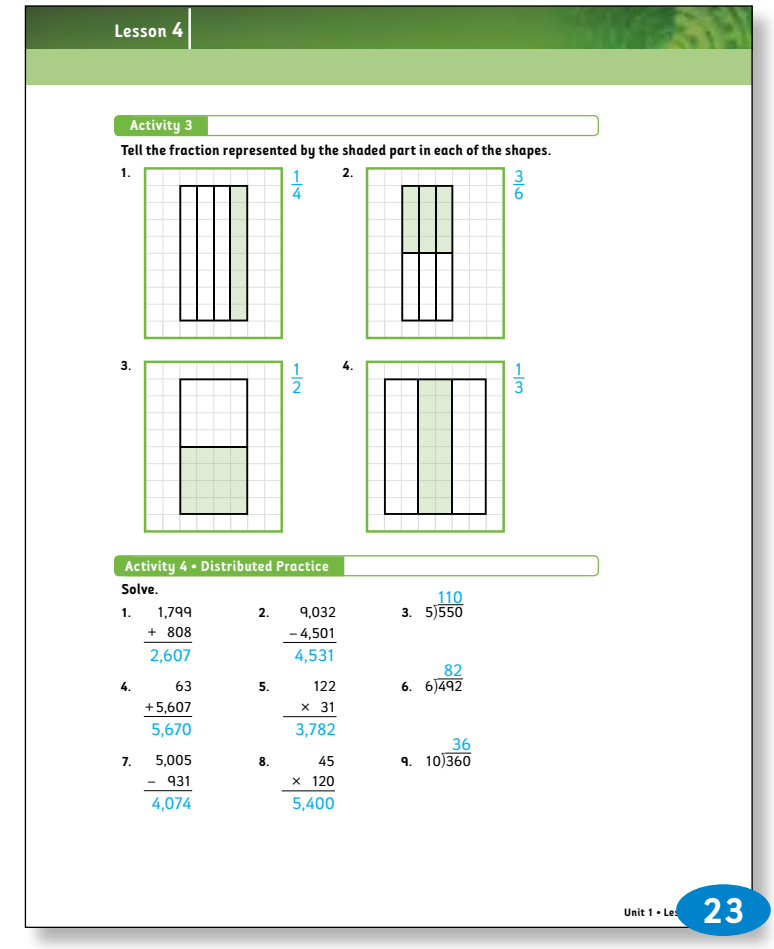
3. 0 (p) $\frac{1}{2}$ 1 (q) $\frac{2}{2}$ (r) $\frac{3}{2}$

Activity 2

Divide the rectangles into the fair shares indicated.

1. Fourths
2. Eighths
3. Thirds
4. Halves
5. Tenths

22 Unit 1 • Lesson 4



Lesson 4

Activity 3

Tell the fraction represented by the shaded part in each of the shapes.

1. $\frac{1}{4}$
2. $\frac{3}{6}$
3. $\frac{1}{2}$
4. $\frac{1}{3}$

Activity 4 • Distributed Practice

Solve.

1. 1,799 + 808 = 2,607
2. 9,032 − 4,501 = 4,531
3. $5\overline{)550}$ = 110
4. 63 + 5,607 = 5,670
5. 122 × 31 = 3,782
6. $6\overline{)492}$ = 82
7. 5,005 − 931 = 4,074
8. 45 × 120 = 5,400
9. $10\overline{)360}$ = 36

Unit 1 • Lesson 4 23

Lesson 5 Going Beyond the Unit Fraction

Monitoring Progress: Quiz 1

Lesson Planner

Skills Maintenance

Fractional Parts

Building Number Concepts: Going Beyond the Unit Fraction

In this lesson, students learn how to model other fractions besides unit fractions. As discussed in the last lesson, it's important that students gain flexibility in working with fractions. The next step in that flexibility practice is modeling more than one part given a whole. Students will see the importance of knowing how to model the unit fraction in order to identify multiple parts in the same whole.

Objective

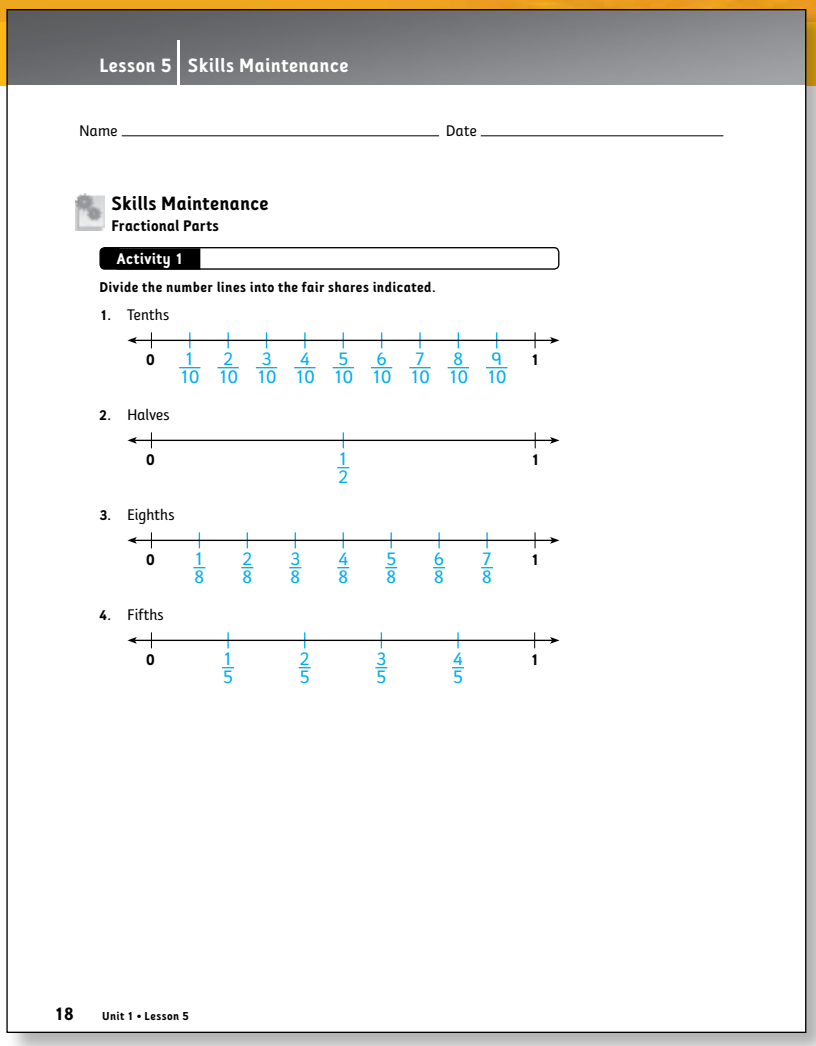
Students will understand and use unit fractions to find other fractions when given the whole.

Monitoring Progress: Quiz 1

Distribute the quiz and remind students that the questions involve material covered in the previous lessons of the unit.

Homework

Students fill in missing fractions on a number line, divide rectangles into fair shares, and draw a model for a fraction using rods. In the Distributed Practice, students practice basic computational skills with whole numbers.



Lesson 5 | Skills Maintenance

Name _____ Date _____

Skills Maintenance
Fractional Parts

Activity 1

Divide the number lines into the fair shares indicated.

1. Tenths

2. Halves

3. Eighths

4. Fifths

18 Unit 1 • Lesson 5

Skills Maintenance

Fractional Parts

(*Interactive Text*, page 18)

Activity 1

Students divide number lines into fractional parts as instructed. Remind students that the parts need to be fair shares. They may draw them freehand, but they need to be careful that they look like equal parts.

Building Number Concepts:
▶ Going Beyond the Unit Fraction

How do we model fractions other than unit fractions when given the whole?

(*Student Text*, pages 24–26)

Connect to Prior Knowledge

Draw a rectangle on the board. Complete a freehand sketch by drawing a rectangle above it so that the model represents $\frac{1}{2}$. Label the model as $\frac{1}{4}$. Ask students if this drawing is accurate. Does the sketch show $\frac{1}{4}$? Ask students how they can check the model to be sure. What would $\frac{3}{4}$ look like?

Listen for:

- *The sketch is wrong. It shows $\frac{1}{2}$ instead of $\frac{1}{4}$.*
- *You could divide the whole into four equal parts to see what $\frac{1}{4}$ looks like.*
- *Because $\frac{1}{4}$ is a unit fraction, you can find $\frac{3}{4}$ by showing three of the $\frac{1}{4}$.*

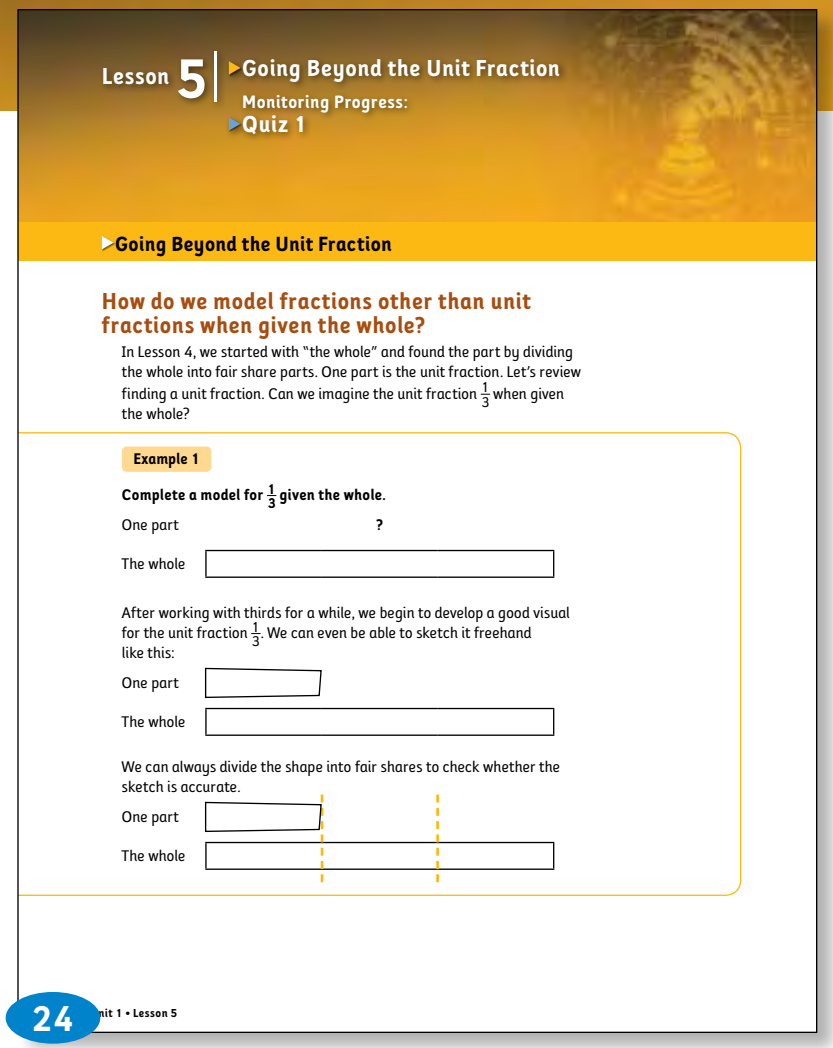
Link to Today's Concept

Tell students that in today's lesson, we are going to practice visualizing and sketching a fraction when we are given the whole. Explain that we build visuals for common fractions when we practice working with them. But if we are ever in doubt, we can always divide the whole into equal parts. It is helpful to be able to sketch unit fractions. We just repeat them to get other fractions such as $\frac{3}{4}$.

Demonstrate

Engagement Strategy: Teacher Modeling

Demonstrate how we can sketch a unit fraction and find other fractions when we are given the whole.


Lesson 5 ▶Going Beyond the Unit Fraction
Monitoring Progress: ▶Quiz 1

▶Going Beyond the Unit Fraction

How do we model fractions other than unit fractions when given the whole?

In Lesson 4, we started with "the whole" and found the part by dividing the whole into fair share parts. One part is the unit fraction. Let's review finding a unit fraction. Can we imagine the unit fraction $\frac{1}{3}$ when given the whole?

Example 1

Complete a model for $\frac{1}{3}$ given the whole.

One part ?

The whole

After working with thirds for a while, we begin to develop a good visual for the unit fraction $\frac{1}{3}$. We can even be able to sketch it freehand like this:

One part

The whole

We can always divide the shape into fair shares to check whether the sketch is accurate.

One part

The whole

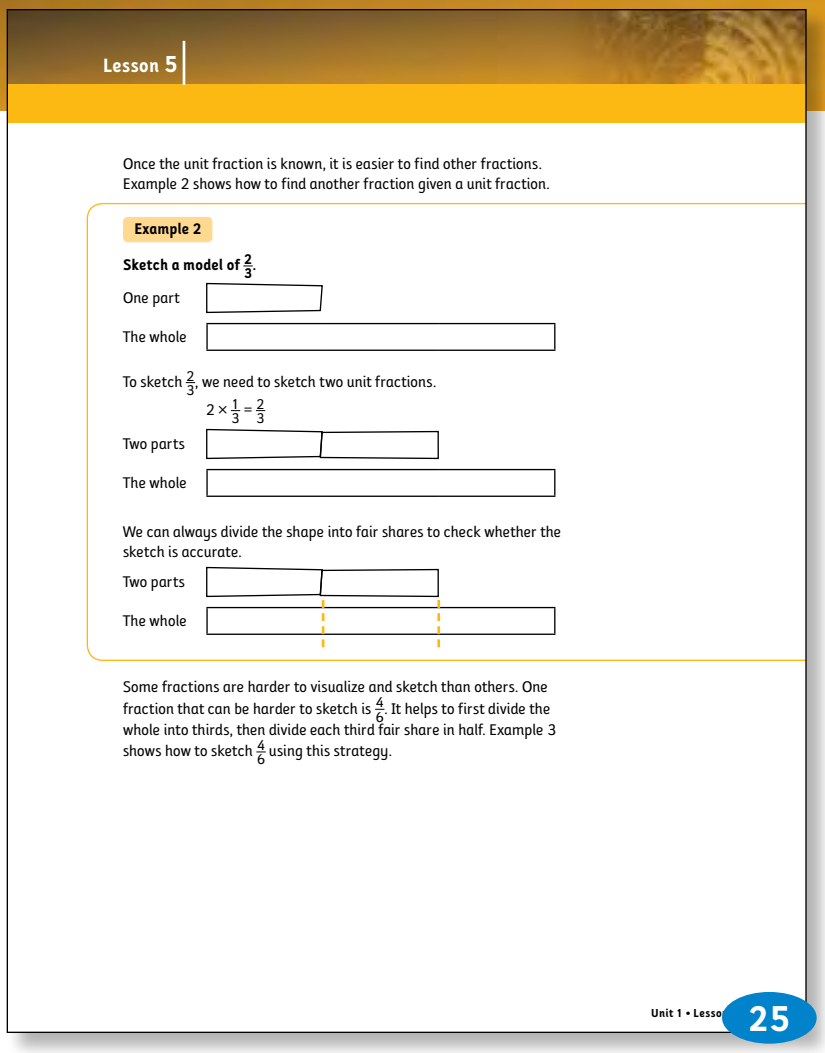
24 nit 1 • Lesson 5

- Have students look at **Example 1** on page 24 in the *Student Text*. Tell students that this is a review of the last lesson where we found a unit fraction from a given whole, except today we are going to start by sketching the one part instead of dividing the whole into equal parts. Tell students that after working with $\frac{1}{3}$ for a while, they will begin to get a visual in their heads.
- Point out that they can always go back to the whole and divide it into equal parts if they are ever unsure about what the part looks like. Be sure they see how close the sketch of $\frac{1}{3}$ is to the fair share portion of $\frac{1}{3}$ when the shape is divided into three equal parts.
- Explain to students that they can model other fractions by repeating the unit fraction.

How do we model fractions other than unit fractions when given the whole? *(continued)*

Demonstrate

- Have students look at **Example 2** on page 25 of the *Student Text*. In this example, students are asked to sketch $\frac{2}{3}$. Tell students that they already have a good visual for the unit fraction $\frac{1}{3}$. To sketch $\frac{2}{3}$, we repeat $\frac{1}{3}$ two times. Remind students that it is okay if they are not able to visualize these fractions yet. They can always divide the whole into equal parts to find the unit fraction. Once students have the unit fraction, they can repeat the unit fraction to get other fractions.
- Tell students that some fractions are really hard to visualize, such as sixths. For those fractions, they can use the "halving" strategy that was used in Lesson 1 to partition number lines. Tell students to go to the visual for thirds and then use the "halving" strategy to get to sixths.


Lesson 5

Once the unit fraction is known, it is easier to find other fractions. Example 2 shows how to find another fraction given a unit fraction.

Example 2

Sketch a model of $\frac{2}{3}$.

One part

The whole

To sketch $\frac{2}{3}$, we need to sketch two unit fractions.

$2 \times \frac{1}{3} = \frac{2}{3}$

Two parts

The whole

We can always divide the shape into fair shares to check whether the sketch is accurate.

Two parts

The whole

Some fractions are harder to visualize and sketch than others. One fraction that can be harder to sketch is $\frac{4}{6}$. It helps to first divide the whole into thirds, then divide each third fair share in half. Example 3 shows how to sketch $\frac{4}{6}$ using this strategy.

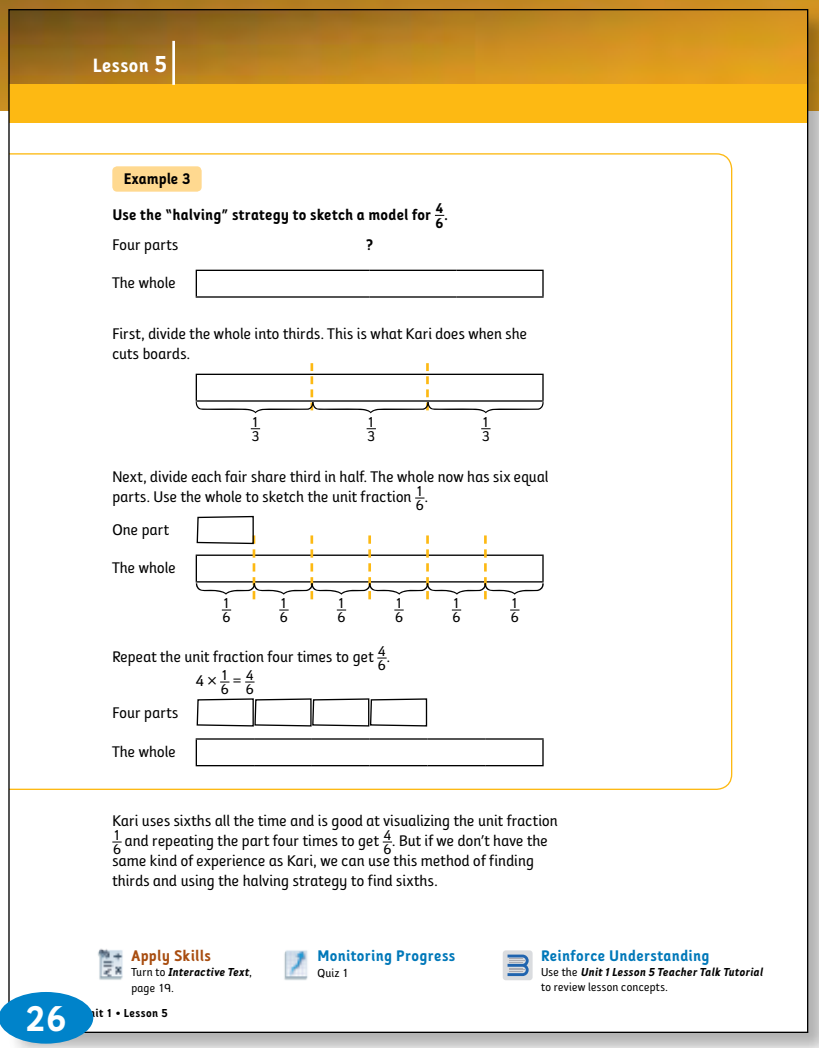
Unit 1 • Lesso

25

How do we model fractions other than unit fractions when given the whole? *(continued)*

Demonstrate

- Have students look at **Example 3** on page 26 of the *Student Text*. In this example, students will sketch the fraction $\frac{4}{6}$. Tell students to think of Kari, who makes window frames, to get some strategies for dividing a shape into sixths. Kari first divides the whole into thirds. This is easy for Kari because she works with thirds a lot. Point out to students that Kari then divides each third in half. This gives her sixths. She can now easily visualize the unit fraction $\frac{1}{6}$.
- Next, tell students that Kari knows to repeat the unit fraction to get other fractions that use the same whole. For the fraction $\frac{4}{6}$, she repeats the unit fraction four times. Call students' attention to the sketch of four unit fractions. This sketch shows $\frac{4}{6}$.
- Explain to students that like Kari, the more they practice working with different fractions and different representations, the better they will get at automatically visualizing them.



Check for Understanding

Engagement Strategy: Look About

Distribute dry erase boards. Have students draw a rectangular shape or rod on the board that represents the whole. Tell students they are to sketch parts above the whole and name the fraction. Tell them to hold up their answers for everyone to see. If students are unsure of the answer, prompt them to look about at other students' drawings to help with their thinking. Review the answers after each fraction.

Begin by having students sketch $\frac{1}{5}$. After they show their answers, tell them to not erase. Have them sketch $\frac{3}{5}$. After showing their answers, instruct them to erase their boards.

Instruct students to draw another rectangle on their boards to represent one whole. Have students sketch $\frac{1}{8}$. After they show their answers, tell them not to erase. Have students sketch $\frac{5}{8}$. Then have them show their answers.

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 5 Teacher Talk Tutorial*.

Apply Skills
(*Interactive Text*, pages 19–20)

Have students turn to pages 19 and 20 in the *Interactive Text*, which provides students an opportunity to practice sketching or drawing the part when they are given the whole.

Activity 1

Students are given a fraction and shown a rectangle that represents one whole. They use the whole to sketch the part. Some fractions are unit fractions and some are not. Remind students to sketch the unit fraction first and repeat it to find the other fractions.

Activity 2

Students are to draw the part when given the whole as a shape on a grid. None of these are unit fractions so they will have to imagine the unit fraction first, and then repeat it inside the shape.

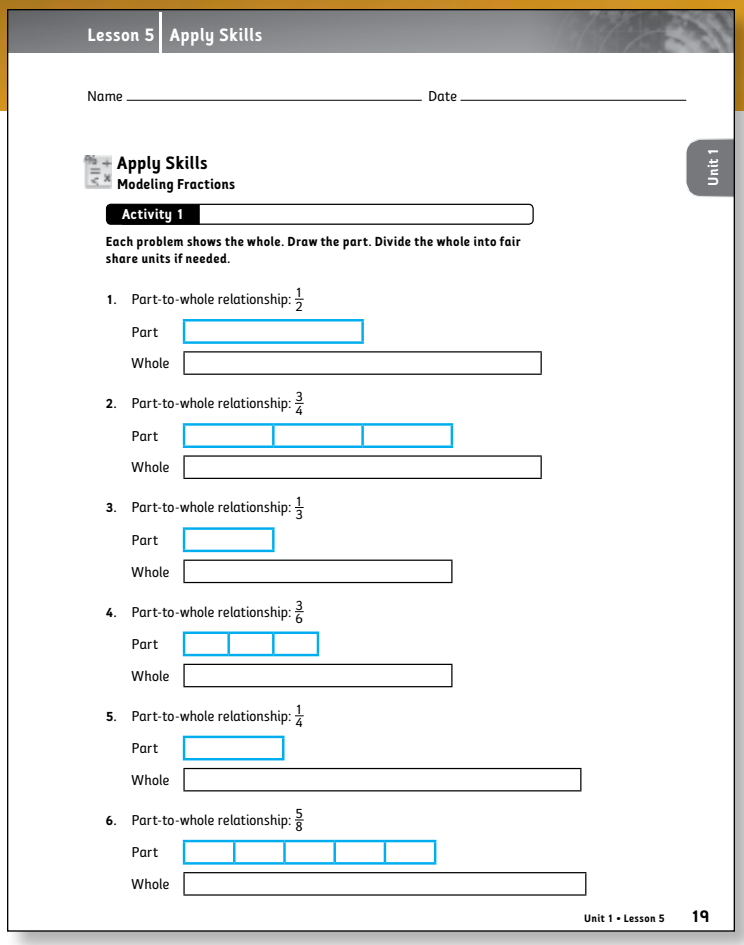
Monitor students' work as they complete these activities.

Watch for:

- Can students sketch a unit fraction when given the whole?
- Can students sketch a non-unit fraction by repeating the unit fraction?
- Can students draw non-unit fractions in shapes on a grid?
- Do students use their knowledge of area to help them show fractions in shapes on grids?

Reinforce Understanding

Remind students that they can review lesson concepts by accessing the online *Unit 1 Lesson 5 Teacher Talk Tutorial*.



Lesson 5 | Apply Skills

Name _____ Date _____

Unit 1

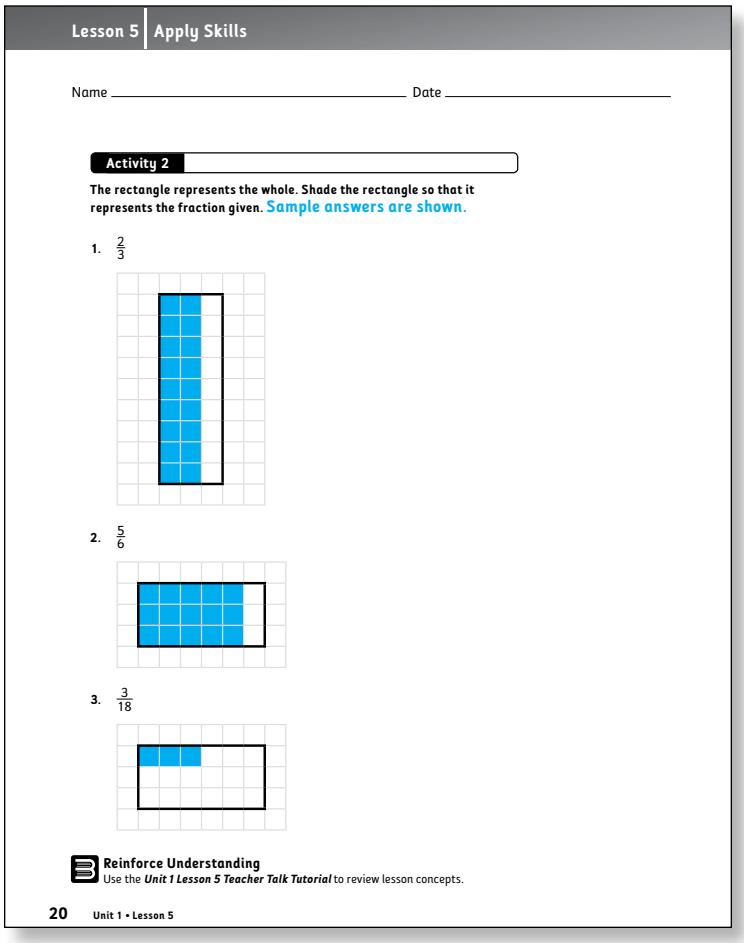
Apply Skills
Modeling Fractions

Activity 1

Each problem shows the whole. Draw the part. Divide the whole into fair share units if needed.

1. Part-to-whole relationship: $\frac{1}{2}$
   Part
   Whole
2. Part-to-whole relationship: $\frac{3}{4}$
   Part
   Whole
3. Part-to-whole relationship: $\frac{1}{3}$
   Part
   Whole
4. Part-to-whole relationship: $\frac{3}{6}$
   Part
   Whole
5. Part-to-whole relationship: $\frac{1}{4}$
   Part
   Whole
6. Part-to-whole relationship: $\frac{5}{8}$
   Part
   Whole

Unit 1 • Lesson 5 19



Lesson 5 | Apply Skills

Name _____ Date _____

Activity 2

The rectangle represents the whole. Shade the rectangle so that it represents the fraction given. Sample answers are shown.

1. $\frac{2}{3}$
2. $\frac{5}{6}$
3. $\frac{3}{18}$

Reinforce Understanding
Use the ***Unit 1 Lesson 5 Teacher Talk Tutorial*** to review lesson concepts.

20 Unit 1 • Lesson 5

Monitoring Progress: ▶ Quiz 1

Assess
Quiz 1

- Administer Quiz 1 Form A in the *Assessment Book*, pages 7–9. (If necessary, retest students with Quiz 1 Form B.)

Students	Assess	Differentiate
	Day 1	Day 2
All	Quiz 1 *Form A*	
Scored 80% or above		Extension
Scored Below 80%		Reinforcement

Differentiate

- Review Quiz 1 Form A with class.
- Identify students for Extension or Reinforcement.

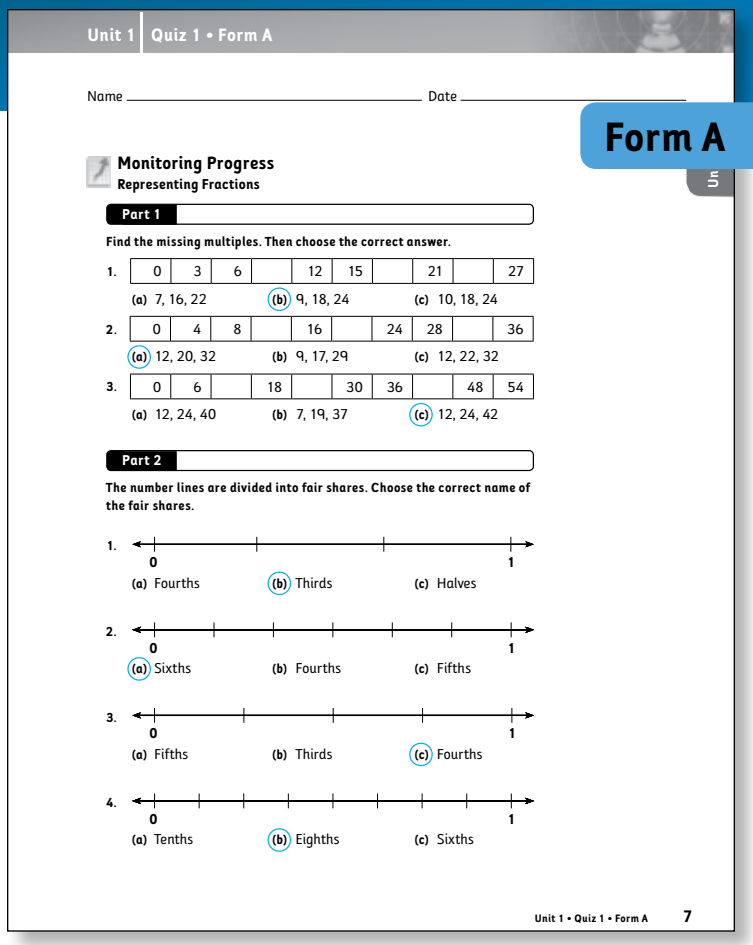
Extension

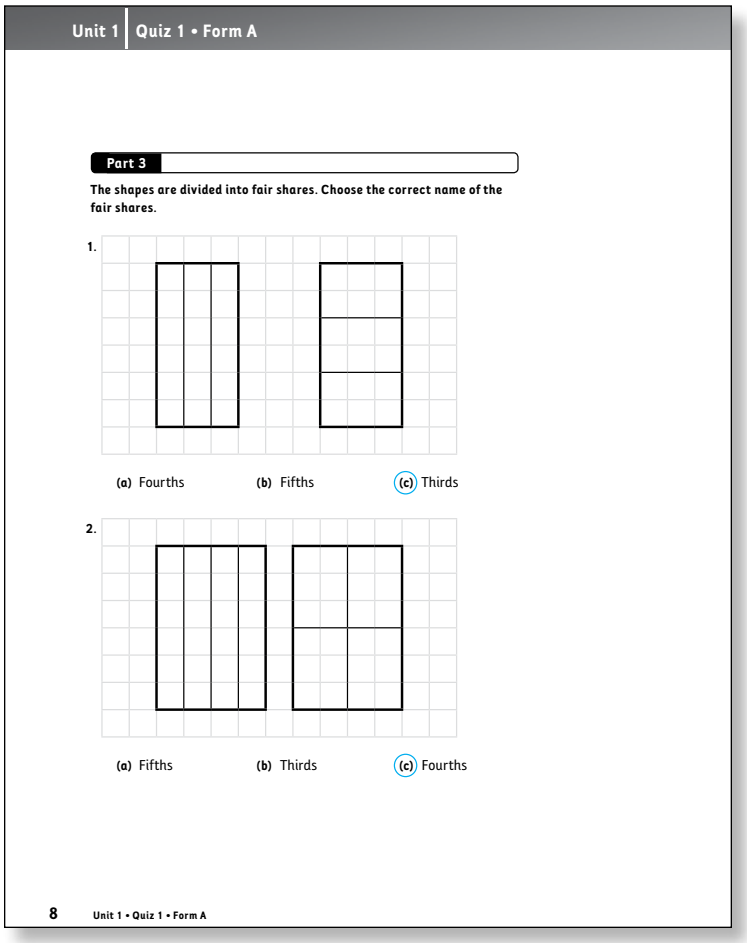
For those students who score 80 percent or better, provide the On Track! Activities from Unit 1, Lessons 1–5.

Reinforcement

For those students who score below 80 percent, provide additional support in one of the following ways:

- Have students access the online tutorial provided in the *Teacher Talk Tutorial*.
- Have students complete the Interactive Reinforcement Exercises for Unit 1, Lessons 1–4.
- Provide teacher-directed reteaching of unit concepts.





Name _____ Date _____

Unit 1

Part 4

A part-to-whole relationship is given. Choose the part that goes with the whole.

1. Part-to-whole relationship: $\frac{1}{3}$

   Whole
   (a)
   (b)
   (c)

2. Part-to-whole relationship: $\frac{1}{4}$

   Whole
   (a)
   (b)
   (c)

3. Part-to-whole relationship: $\frac{1}{5}$

   Whole
   (a)
   (b)
   (c)

4. Part-to-whole relationship: $\frac{1}{8}$

   Whole
   (a)
   (b)
   (c)

Name _____ Date _____

Form B

Monitoring Progress
Representing Fractions

Part 1

Find the missing multiples. Then choose the correct answer.

1. | 0 | 2 | 4 | | 8 | 10 | | 14 | 16 | |
   (a) 6, 12, 20 (b) 6, 8, 10 (c) 6, 12, 18

2. | 0 | 5 | | 15 | 20 | | 30 | | 40 | 45 |
   (a) 10, 25, 35 (b) 15, 25, 35 (c) 10, 15, 20

3. | 0 | 8 | 16 | | | 40 | 48 | | 64 | 72 |
   (a) 24, 32, 40 (b) 24, 32, 56 (c) 28, 32, 36

Part 2

The number lines are divided into fair shares. Choose the correct name of the fair shares.

1. 0 — 1
   (a) Sixths (b) Fourths (c) Fifths

2. 0 — 1
   (a) Fourths (b) Thirds (c) Halves

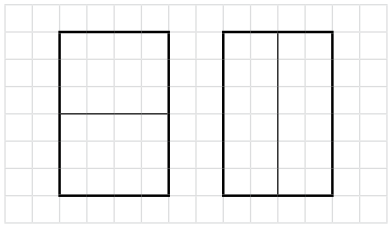
3. 0 — 1
   (a) Fourths (b) Thirds (c) Halves

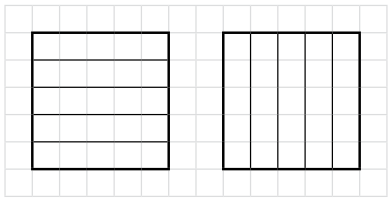
4. 0 — 1
   (a) Tenths (b) Eighths (c) Sixths

Name _____ Date _____

Part 3

The shapes are divided into fair shares. Choose the correct name of the fair shares.

1. 
   (a) Thirds (b) Halves (c) Fourths

2. 
   (a) Fifths (b) Fourths (c) Thirds

Name _____ Date _____

Part 4

A part-to-whole relationship is given. Choose the part that goes with the whole.

1. Part-to-whole relationship: $\frac{1}{6}$

   Whole
   (a)
   (b)
   (c)

2. Part-to-whole relationship: $\frac{1}{2}$

   Whole
   (a)
   (b)
   (c)

3. Part-to-whole relationship: $\frac{1}{3}$

   Whole
   (a)
   (b)
   (c)

4. Part-to-whole relationship: $\frac{1}{5}$

   Whole
   (a)
   (b)
   (c)

Homework

Go over the instructions on pages 27 and 28 of the *Student Text* for each part of the homework.

Activity 1

Students fill in missing fractions on number lines.

Activity 2

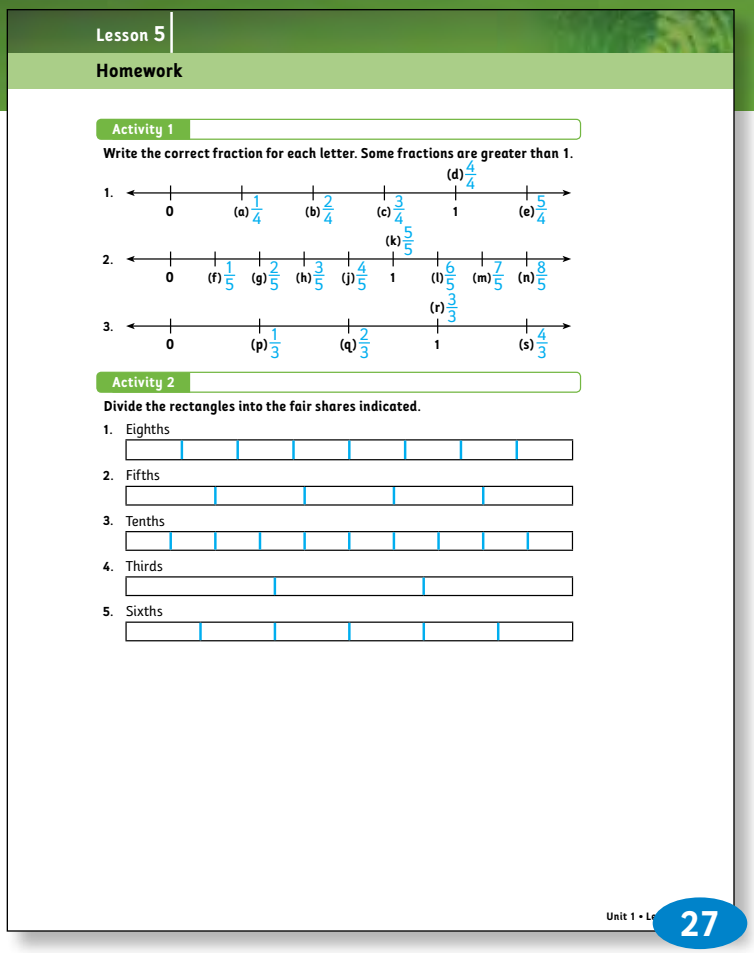
Students divide rectangles into parts as instructed. Remind them these fractional parts must be fair shares.

Activity 3

Students draw a rod that represents one whole. Then they are to sketch the fractions as directed.

Activity 4 • Distributed Practice

Students practice basic computational skills. Tell students that they practice these skills so they do not forget the algorithms and they continue to get better at them.



Lesson 5

Homework

Activity 1

Write the correct fraction for each letter. Some fractions are greater than 1.

1. 0 (a) $\frac{1}{4}$ (b) $\frac{2}{4}$ (c) $\frac{3}{4}$ 1 (d) $\frac{4}{4}$ (e) $\frac{5}{4}$

2. 0 (f) $\frac{1}{5}$ (g) $\frac{2}{5}$ (h) $\frac{3}{5}$ (j) $\frac{4}{5}$ 1 (k) $\frac{5}{5}$ (l) $\frac{6}{5}$ (m) $\frac{7}{5}$ (n) $\frac{8}{5}$

3. 0 (p) $\frac{1}{3}$ (q) $\frac{2}{3}$ 1 (r) $\frac{3}{3}$ (s) $\frac{4}{3}$

Activity 2

Divide the rectangles into the fair shares indicated.

1. Eighths
2. Fifths
3. Tenths
4. Thirds
5. Sixths

Unit 1 • Le

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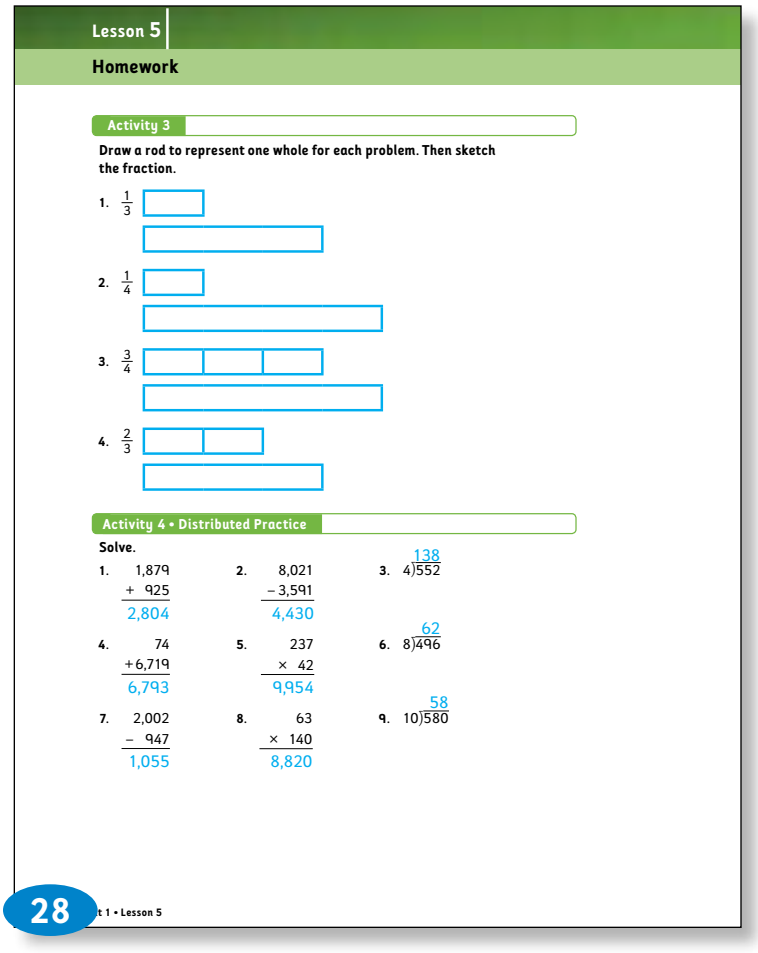

Lesson 5

Homework

Activity 3

Draw a rod to represent one whole for each problem. Then sketch the fraction.

1. $\frac{1}{3}$
2. $\frac{1}{4}$
3. $\frac{3}{4}$
4. $\frac{2}{3}$

Activity 4 • Distributed Practice

Solve.

1. 1,879 + 925 = 2,804
2. 8,021 − 3,591 = 4,430
3. $4\overline{)552}$ = 138
4. 74 + 6,719 = 6,793
5. 237 × 42 = 9,954
6. $8\overline{)496}$ = 62
7. 2,002 − 947 = 1,055
8. 63 × 140 = 8,820
9. $10\overline{)580}$ = 58

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t 1 • Lesson 5