

Objective

To model fractional parts of a set

Materials

- Gizmo: Toy Factory (Set Models of Fractions)

Gizmos Log In Instructions

- Log in to VmathLive™ using the Username and Password provided in VPORT®.
- Select the Gizmos tab.
- Click on the Toy Factory (Set Models of Fractions) Gizmo link.

Lesson Notes

Before beginning the lesson, be sure students have their Student Books and are ready to work at the computers.

Complete problems 1–3 before students log in to the Toy Factory (Set Models of Fractions) Gizmo.

Note that if too many monkeys are created, each additional monkey can be dragged to the OUT chute to delete it.


If students have additional time, have them answer Assessment Questions 1 and 3 in the Gizmo. They can click on the Check Your Answers button to see how well they did on the assessment.

GET READY

Problem 1

When a whole is divided into equal parts, you can use a fraction to name a part of the whole. How many equal parts is the figure divided into? (2) How many parts are shaded? (1) What fraction names the part that is shaded? ($\frac{1}{2}$)

Lesson 9A




Toy Factory (Set Models of Fractions)

Name _____ Class _____ Date _____


Gizmos Log In Instructions
 When you are told, log in to the Gizmos as follows:
 • Log in to VmathLive™ using your Username and Password.
 • Select the Gizmos tab.
 • Click on the Toy Factory (Set Models of Fractions) Gizmo link.

GET READY


Write a fraction for the part that is shaded.

1 

$\frac{1}{2}$

2 

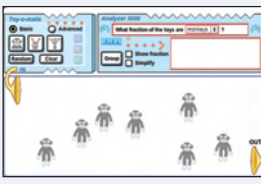
$\frac{3}{4}$

3 

$\frac{2}{5}$

DISCOVER

4 Click on the circle for Basic. Click on the monkey 7 times. Click Show fraction to remove the check mark. Click on the circle for Advanced. Click on red. Click on 3 monkeys to color them red. Click on blue. Color the remaining 4 monkeys blue.



a. Complete the following statement.
 _____ of the _____ total monkeys are blue.

b. Write the completed statement as a fraction.
 _____ of the _____ total monkeys are blue. $\frac{4}{7}$

Click Show fraction to check.

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Problem 2

How many equal parts is the figure divided into? (4) How many parts are shaded? (3) What fraction names the part that is shaded? ($\frac{3}{4}$)

Problem 3

How many equal parts is the figure divided into? (5) How many parts are shaded? (2) What fraction names the part that is shaded? ($\frac{2}{5}$)

DISCOVER

Have students log in to the Toy Factory (Set Models of Fractions) Gizmo using the instructions in the box. Orient students to the Gizmo by reading aloud the description: **Create a set of stuffed animals: monkeys, giraffes, and rabbits. Toys can be painted red, green, or blue. Describe the makeup of the set (animals or colors) with fractions.**

Problem 4

Under Toy-o-matic, click the Basic circle. Click on the monkey 7 times. Be sure to wait for the toy to appear before clicking to make another toy.

Lesson 9A

- 5 Click Clear. Click on the circle for Basic. Click on the monkey 8 times. Uncheck Show fraction. Click on the circle for Advanced. Click on green. Color 5 monkeys green. Click on blue. Color the remaining 3 monkeys blue. Complete the statement and write the fraction.
- 3 of the 8 total monkeys are blue. $\frac{3}{8}$
- Click Show fraction to check.

DISCOVER BOX

Use what you have learned about naming parts of a set to write the fraction for each set described.

5 of the 5 total monkeys are blue.

$$\frac{5}{5}$$

0 of the 5 total monkeys are blue.

$$\frac{0}{5}$$

EXPLORE MORE

Use the Gizmo to show the blue, green, and red monkeys in the problem. Click Show fraction to check that the numbers are correct.

- 6 Suppose you put some stuffed monkeys in a bag to give to a charity. Of the total number of monkeys, $\frac{2}{10}$ are blue, $\frac{3}{10}$ are red, and $\frac{5}{10}$ are green.
- How many total monkeys are there? 10 monkeys
- How many monkeys are blue? 2 monkeys
- How many are red? 3 monkeys
- How many are green? 5 monkeys

Under Analyzer 3000, click Show fraction to remove the check mark. Click the Advanced circle. Click on red. Click on 3 monkeys to color them red. Click on blue. Click on the remaining 4 monkeys to color them blue.

Look at the monkeys to complete the statement. (Four of the 7 total monkeys are blue.)

You can use a fraction to name a part of a set. The denominator shows the total number in the set. The numerator shows the part being considered. How is the completed statement written as a fraction? $(\frac{4}{7})$

Under Analyzer 3000, click Show fraction to check your answer.

Problem 5

For problem 5, click Clear or the OUT chute to delete all toys. Under Toy-o-matic, click the Basic circle. Click on the monkey 8 times. Under Analyzer 3000, uncheck Show fraction to remove the check mark. Click Advanced. Click on green. Click on 5 monkeys to color them green. Click on blue. Click on the remaining 3 monkeys to color them blue.

Look at the monkeys to complete the statement. How should the statement read? (Three of the 8 total monkeys are blue.)

How is the completed statement written as a fraction? $(\frac{3}{8})$

Under Analyzer 3000, click Show fraction to check your answer.

DISCOVER BOX

Use what you have learned about naming parts of a set to write the fraction for each set described.

What fraction shows that 5 of 5 total monkeys are blue? $(\frac{5}{5})$

What fraction shows that 0 of 5 total monkeys are blue? $(\frac{0}{5})$

EXPLORE MORE

Problem 6

Use the Gizmo to show the blue, green, and red monkeys in the problem. Click Show fraction to check that the numbers are correct. To change the fraction that is displayed, use the menus to change the question in the Analyzer 3000 box.

How many total monkeys are there? (10) How do you know? (The denominator shows the total number.)

How many monkeys are blue? (2) How do you know? (The numerator tells how many.)

How many monkeys are red? (3) How do you know? (The numerator tells how many.)

How many monkeys are green? (5) How do you know? (The numerator tells how many.)

Lesson 9

Objective

To use fraction names and symbols to describe a fractional part of a set

Preskills	Transparency
Understanding Fractions	D.5.8

Materials

- transparency D.5.9

GET STARTED

Student Book p37

REVIEW PRESKILLS

Problem 1

A fraction is used to name equal parts of a whole. Into how many equal parts has this rectangle been divided? (6) How many parts are shaded? (4) Is 4 the numerator or denominator? (numerator) Write 4 above the fraction bar. How many equal parts are in this rectangle? (6) The bottom number in a fraction is called the denominator and names the number of equal parts into which the whole is divided. Where will 6 be written? (below the fraction bar)

Problem 2

When writing a fraction in words, is the numerator or denominator written first? (numerator) On the first line, write the word *four*. What is written to the right of the numerator? (denominator) How is 6 written as the denominator? (sixths) Read this fraction as *four-sixths*.

MODEL NEW SKILLS

Problem 3

A fraction also can be used to name part of a set. How many total color tiles are in the set? (5) How many of these color tiles are green? (3) The fraction that names the number of green tiles in this set can be written as $\frac{3}{5}$, where 3 is the number of green tiles and 5 is the total number of color tiles.

Naming Fractional Parts of a Set

Name _____ Class _____ Date _____

GET STARTED



2 four sixths



BUILD THE CONCEPT

Billy has 4 footballs and 2 basketballs. What fraction of the balls are footballs?



How many balls are footballs? 4

How many balls are there in all? 6

$\frac{4}{6}$ of the balls are footballs.

Which number is the numerator of this fraction? (3) Which number is the denominator of this fraction? (5) What fraction of the tiles are green? ($\frac{3}{5}$)

Problem 4

In problem 4a, use a fraction to describe the part of the set of circles that is black. Count the number of circles in this picture. How many total circles are in this set? (10) Remember the total number of items is the denominator. How many of these circles are black? (7) Which number is the numerator? (7) What fraction of the circles are black? ($\frac{7}{10}$) Read the fraction as *seven-tenths*.

In problem 4b, use a fraction to describe the part of the set of circles that is yellow. How many circles are in the set? (10) How many of the circles are yellow? (3) Which number is the denominator? (10) What fraction names the number of yellow circles in this set? ($\frac{3}{10}$)

TRY IT TOGETHER

Write a fraction to complete each sentence.



$\frac{4}{7}$ of the tennis balls are yellow.



$\frac{2}{6}$ of the lemons are circled.



$\frac{2}{5}$ of the apples are green.

WORK ON YOUR OWN

Write Fractions of a Set

Using Symbols

1. What fraction of the fruits are pears?



$\frac{2}{3}$ ← number of pears

2. $\frac{2}{3}$ ← total number of fruits

Using Words

Write the number of items that are being considered above the fraction bar. This number is the numerator.

Write the total number of items under the fraction bar. This number is the denominator.



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Billy has a set of sports balls. How many sports balls are in the set in all? (6) How many footballs are in the set? (4) What fraction names the part of the set that is footballs? ($\frac{4}{6}$) How is this fraction read? (four-sixths)

TRY IT TOGETHER

Student Book p38

SCAFFOLD INSTRUCTION

Problem 5

How many tennis balls are in this set? (7) How many of the tennis balls are yellow? (4) Where is the numerator of a fraction written? (above the fraction bar) Where is the denominator written? (below the fraction bar) What is the fraction that names the number of yellow tennis balls in this set? ($\frac{4}{7}$) Read the fraction as *four-sevenths*.

Problem 6

How many lemons are in this set? (6) How many of the lemons are circled? (2) What fraction describes the number of lemons in this set that are circled? ($\frac{2}{6}$) How is this fraction read? (two-sixths)

Problem 7

What is the fraction that describes the number of green apples in this set? ($\frac{2}{5}$) Which number is the denominator of this fraction? (5) Why? (It is the total number of apples in this set.)

USE CORRECTION PROCEDURES

Preskills

Correct errors by reviewing or reteaching how to understand fractions. Use the **HOW TO** process from the lesson transparency listed in the preskills box on page 38.

New Skills

For reteaching:

- Review the Math Coach examples shown in VmathLive in the Fractions of a Collection activity in the Dividing Whole Numbers and Understanding Fractions module.
- Use Reteach Copy Master D.5.9 and the modeled teacher text to show students an alternative method for naming a fractional part of a set. Have students complete the Copy Master.

For additional practice:

- Assign the VmathLive Fractions of a Collection activity in the Dividing Whole Numbers and Understanding Fractions module.
- Have students complete the Extra Practice problems on Student Book page 79.

WORK ON YOUR OWN

Student Book p38

MONITOR INDEPENDENT WORK



Before students begin independent work, review the **HOW TO** process example.

As you review, emphasize the words of mathematics by having students read aloud the words shown at the right for each process step.

Problems 8–19

Have students work independently. Check work and have students total the number correct and record results. Instruct students to record a 6 if they got 11 or 12 correct, a 5 for 10 correct, a 4 for 9 correct, a 3 for 8 correct, a 2 for 6 or 7 correct, and a 1 for 1–5 correct. Use Correction Procedures as needed.

Problem 16 Reminder

Review with students that the total number of items in a set is the denominator, and the number of specific items being considered in the set is the numerator. Remind students that the total number of shapes they draw should equal 9.

Go to VmathLive.com
Module Dividing Whole Numbers and Understanding Fractions
Activity Fractions of a Collection
Lesson 9

SKILL BUILDING: NEW AND REVIEW
Write a fraction that names how many of each set are circled.

8 $\frac{5}{8}$ 9 $\frac{3}{6}$ 10 $\frac{1}{4}$

11 $\frac{2}{4}$ 12 $\frac{1}{2}$ 13 $\frac{4}{6}$

Write the fraction that names each shaded part.

14 $\frac{2}{5}$ 15 $\frac{4}{6}$

PROBLEM-SOLVING: NEW AND REVIEW
Solve each problem.

16 Kelly has 9 shapes in her bag. Three-ninths of the shapes are circles, $\frac{2}{9}$ are squares, and $\frac{4}{9}$ are triangles. Draw a picture to show how many circles, squares, and triangles are in Kelly's bag.

17 Write $\frac{3}{5}$ using words. **three-fifths**

18 Mrs. Alvarez makes 10 sandwiches. She makes 7 of the sandwiches with wheat bread. What fraction of the sandwiches are made with wheat bread? $\frac{7}{10}$

19 Susie made 5 steak subs and 3 meatball subs. What fraction of the subs are steak subs?
 $5 + 3 = 8$; 8 subs in all; $\frac{5}{8}$

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Problem 19 Reminder

Before students write the fraction, they must add the numbers of steak and meatball subs to find the total number of subs.

CHECK UP

Student Book p40

ASSESS INFORMALLY

Error Analysis

Check work and record results. Use the error analysis to determine which skills need review, reteaching, or extra practice.

If student answered 1a or 2b: The student selected the incorrect fractional part of the set. Explain that the fraction chosen does not represent the correct part of the set. Use Correction Procedures in D.5.9 to reteach how to name a fractional part of a set.

Lesson 9

CHECK UP

Answer each question.

- 1 Jorge has 3 red shirts and 1 white shirt. What fraction of his shirts are red?
- a. $\frac{1}{4}$ b. $\frac{2}{4}$
 c. $\frac{4}{3}$ d. $\frac{3}{4}$
- 2 The store owner has 8 bikes. There are 3 ten-speed bikes and 5 five-speed bikes. Which fraction shows how many of the bikes are ten-speed bikes?
- a. $\frac{8}{3}$ b. $\frac{5}{8}$
 c. $\frac{3}{10}$ d. $\frac{3}{8}$

- 3 Which answer choice in problem 2 is the least reasonable? Explain. **c; it has a denominator greater than the total number of bikes in the store.**



EXPLAIN

Ely has 5 shirts for school. The shirts are either white or blue. He has 2 white shirts. What fraction of the shirts are white?

Ely has 5 shirts in all. Two of the shirts are white, so $\frac{2}{5}$ of his shirts are white.



- 4 Morgan has 8 toy trucks. He lends 3 toy trucks to his brother. What fraction of his toy trucks does Morgan have left?
- $8 - 3 = 5$; 5 trucks left; Morgan has $\frac{5}{8}$ of his trucks left.**



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Lesson 9 • Naming Fractional Parts of a Set

If student answered 1c or 2a: The student confused the numerator and the denominator. Use Correction Procedures in D.5.8 to reteach understanding fractions.

**If student answered problem 3 incorrectly:**

Review the meaning of the denominator of a fraction. Remind the student that the denominator names the total number of items in a given set. The denominator cannot be greater than the total number of items in the set.



As you review the Explain It problem together, understand that the correct answer is only part of the solution. Appropriate math vocabulary, a logical method for solving the problem, and the justification of a reasonable answer complete the student response. Explain It problem answers can be used as part of a daily math journal.

DIFFERENTIATION

Additional Resources

**VmathLive**

Module: Dividing Whole Numbers and Understanding Fractions
 Activity: Fractions of a Collection

Vmath Reteach

Copy Master D.5.9 page 115
 Instructional Support page 31

Extra Practice

Student Book page 79

English Language Learners

Write the term *numerator* on the board. Write the word *number* under *numerator*, lining up the beginning letters. Explain to students that the numerator of a fraction is the *number* of items in a set being considered. Point out how the beginning of each term is the same, and tell students to use this tip to remember the meaning of numerator.

Students with Special Needs

Give students a set of red, yellow, and blue snap cubes. Have students count the total number of cubes in the set and write this number as the denominator under a fraction bar. Have students place all the red snap cubes above the fraction bar. Tell students that a fraction can name the part of the set that is red. Count the number of red snap cubes and write this number as the numerator. Have students read the fraction and describe the set. For example, $\frac{3}{8}$ of the set is red. Students can name the part of the set that is blue or yellow by repeating the previous steps. Providing a concrete model of a fraction will help students grasp the concept of fractions that name part of a set.

Objective

To use fraction strips to model, find, and write equivalent fractions

Materials

- Copy Master: Fraction Strips
- colored pencils or crayons
- scissors



Lesson Notes

Before beginning the lesson, be sure students have their Student Books, copies of Copy Master: Fraction Strips, colored pencils or crayons, and scissors.

In this lesson, students use fraction strips to learn about equivalent fractions. They will compare fraction strips to see whether they represent equivalent fractions. Then they will learn how to model equivalent fractions.

Before starting the lesson, help students become familiar with fraction strips. Using the Copy Master: Fraction Strips, complete the following with students:

- Show students the strip for 1 whole. Tell students that every complete strip is the same length as the strip for 1 whole, but other strips are divided into equal parts.
- Point out that the fraction strip for halves is divided into 2 equal parts with $\frac{1}{2}$ shown on each part.
- Discuss other fraction strips. Tell students they will work with pictures of fraction strips in which sections are shaded to indicate fractions. For example, 2 of 4 sections shaded indicates $\frac{2}{4}$.

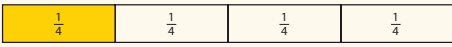
Review fraction concepts with students. They should be familiar with the terms *numerator* and *denominator* and understand that a fraction is a number that shows a part of a whole. While working problem 3, write the word *equivalent* on the board so students spell it correctly.


Lesson 10A

Finding Equivalent Fractions Using Fraction Strips

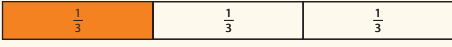
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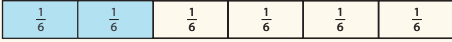
GET READY

1  $\frac{1}{4}$

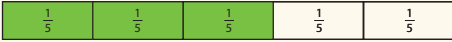
2  $\frac{2}{3}$

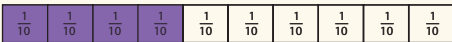
DISCOVER

3  $\frac{1}{3}$

 $\frac{2}{6}$

equivalent

4  $\frac{2}{5}$

 $\frac{4}{10}$

not equivalent

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GET READY

Problem 1

Problem 1 shows a fraction strip. This fraction strip shows 1 shaded part of 4 equal parts of the whole. How many sections are shaded? (1) This part of the fraction is called the numerator. How many equal sections does the strip have? (4) This part of the fraction is called the denominator. What fraction does this strip show? ($\frac{1}{4}$)

Problem 2

Problem 2 shows another fraction strip. This fraction strip shows 2 shaded parts out of 3 equal parts of the whole. What is the numerator of the fraction? (2) What is the denominator? (3) What fraction does this strip show? ($\frac{2}{3}$)

DISCOVER

Problem 3

Look at the top fraction strip in problem 3. Shade 1 part of the whole strip orange in your Student Book. What fraction does it show? ($\frac{1}{3}$) How do you know? (It is divided into 3 equal parts with 1 part shaded.) Now look at the fraction strip underneath it. Shade 2 parts of the whole

Lesson 10A

5 $\frac{1}{2} = \frac{2}{4}$

6 $\frac{6}{8} = \frac{9}{12}$

DISCOVER BOX

The fractions below are all equivalent.

$$\frac{1}{2}, \frac{2}{4}, \frac{3}{6}, \frac{4}{8}, \frac{5}{10}$$

What pattern do you see in the numerators?

The numerators go up by ones.

What pattern do you see in the denominators?

The denominators go up by twos.

Predict the next fraction in the list. Explain how you chose your fraction, and show how it is equivalent to $\frac{5}{10}$ using fraction strips.

The next fraction is $\frac{6}{12}$ because $5 + 1 = 6$ and $10 + 2 = 12$.

EXPLORE MORE

Use fraction strips to write each equivalent fraction.

7 $\frac{1}{2} = \frac{6}{12}$

8 $\frac{2}{8} = \frac{1}{4}$

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Hands-On Lesson 10A • Finding Equivalent Fractions Using Fraction Strips

strip blue in your Student Book. What fraction does it show? ($\frac{2}{6}$) Compare the shaded areas on the fraction strips. Is the same amount shaded on both fraction strips? (yes) When the shaded amount on two fraction strips is the same, the fractions are equivalent. The fraction $\frac{1}{3}$ is equivalent to the fraction $\frac{2}{6}$. Write *equivalent* on the line.

Problem 4

Look at the top fraction strip in problem 4. Shade 3 parts of the whole strip green in your Student Book. What fraction does it show? ($\frac{3}{5}$) Now look at the fraction strip underneath it. Shade 4 parts of the whole strip purple in your Student Book. What fraction does it show? ($\frac{4}{10}$) Compare the shaded areas on the fraction strips. Is the same amount shaded on both fraction strips? (no) When the shaded amount on two fraction strips is not the same, the fractions are not equivalent. The fraction $\frac{3}{5}$ is not equivalent to the fraction $\frac{4}{10}$. Write *not equivalent* on the line.

Problem 5

What fraction is given in problem 5? ($\frac{1}{2}$) Place a halves fraction strip on your desk. Shade 1 part of the whole strip pink. What fraction does it show? ($\frac{1}{2}$) Now look at the denominator of the second fraction. Place a fourths fraction strip on your desk under the halves fraction strip. How many parts of the fourths fraction strip need to be shaded

to be the same as the shaded part of the halves fraction strip? (2) When fractions are equivalent, you can write a number sentence. The first fraction is $\frac{1}{2}$. The second fraction is $\frac{2}{4}$. This number sentence is read as *one-half equals two-fourths*.

Problem 6

What fraction is given in problem 6? ($\frac{6}{8}$) Place an eighths fraction strip on your desk. Shade 6 parts of the whole strip yellow. What fraction does it show? ($\frac{6}{8}$) Now look at the denominator of the second fraction. What is it? (12) Place a twelfths fraction strip on your desk. How many parts of the whole twelfths fraction strip need to be shaded to be the same as the shaded part of the eighths fraction strip? (9) What fraction should be written? ($\frac{9}{12}$) This number sentence is read as *six-eighths equals nine-twelfths*.

DISCOVER BOX

Read the fractions with students. Look at the numerator of the fractions. Is there a pattern in the numerators of the fractions? (yes) Explain the pattern you see. (The numerators go up by ones.) Now look at the denominators of the fractions. Explain the pattern you see in the numbers 2, 4, 6, 8, 10. (The denominators go up by twos.) What is the next fraction in the list? ($\frac{6}{12}$ because $5 + 1 = 6$ and $10 + 2 = 12$) Use a tenths fraction strip and a twelfths fraction strip to show $\frac{5}{10}$ is equivalent to $\frac{6}{12}$. Shade 5 parts of the tenths strip. How many parts of the twelfths strip need to be shaded? (6) Are the fractions $\frac{5}{10}$ and $\frac{6}{12}$ equivalent? (yes)

EXPLORE MORE

Problems 7 and 8

Provide students with another copy of Copy Master: Fraction Strips. Now that students understand how to use fraction strips to model and find equivalent fractions, they can solve these problems.