

# Lesson 1 Introduction

## Understand Place Value

5.NBT.A.1



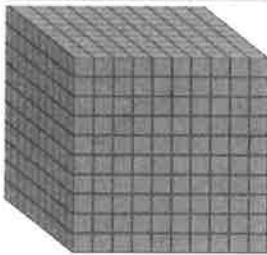



### Think It Through

**How is place value related to the number 10?**



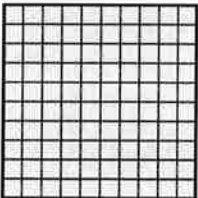
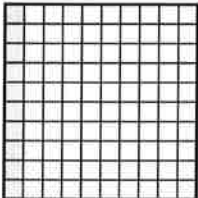
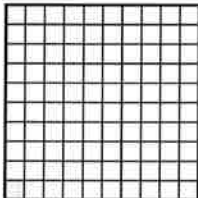
We use a number system called **base ten**. This means that place value in any number is based on a pattern of tens.

Look at the following place-value models for whole numbers.

Thousands	Hundreds	Tens	Ones					
1 thousand is <b>10 times</b> 1 hundred	1 hundred is <b>10 times</b> 1 ten	1 ten is <b>10 times</b> 1 one	1 one					
								
1,000	+	100	+	10	+	1	=	1,111

**Think** Place value in decimals is just like place value in whole numbers.

Look at the following place-value models for decimal numbers.

Ones	Tenths	Hundredths				
1 whole is <b>10 times</b> 1 tenth	1 tenth is <b>10 times</b> 1 hundredth	1 hundredth				
						
1	+	0.1	+	0.01	=	1.11

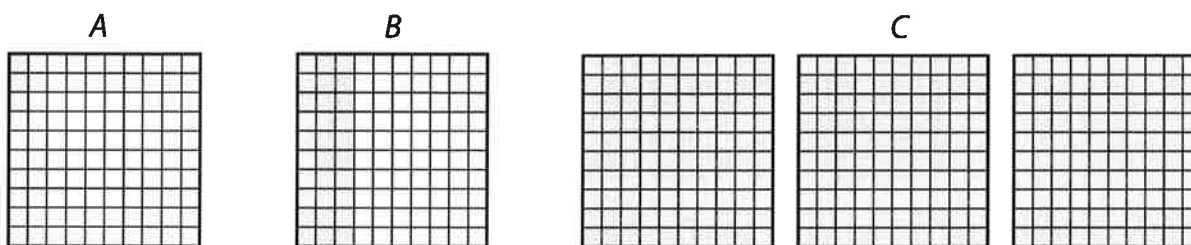
In a decimal number, a digit in one place has ten times the value it would have in the place to its right.

$\times 10$   
 thousands  $\rightarrow$  hundreds  $\rightarrow$  tens  $\rightarrow$  ones  $\rightarrow$  tenths  $\rightarrow$  hundredths



**Circle** all of the numbers in the equation below the chart.

**Let's Explore the Idea** Let's explore place-value patterns with another example using models. Each grid represents 1 whole.



- 2 Label models A, B, and C with a decimal to name the amount shaded.
- 3 The shaded region of Model B is how many times the shaded region of Model A?

The shaded region of Model C is how many times the shaded region of Model B?

- 4 Use the models above to complete the equations.

$$0.03 \times 10 = \underline{\hspace{2cm}}$$

$$0.3 \times 10 = \underline{\hspace{2cm}}$$

$$0.3 \div 10 = \underline{\hspace{2cm}}$$

$$3.0 \div 10 = \underline{\hspace{2cm}}$$

**Now try these two problems.**

- 5 Continue the  $\times 10$  pattern to fill in the blanks.

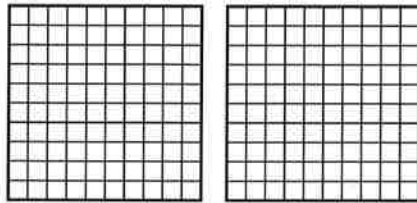
0.003      0.03      0.3                                      300

- 6 Use the  $\div 10$  pattern to fill in the blanks.

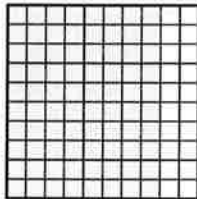
500                      5      0.5      0.05

Talk through these problems as a class, then write your answers below.

- 13 Create** Shade the models below to show how the value of 0.04 is related to the value of 0.4. Then write a division equation to represent the relationship.



- 14 Analyze** Kiran showed 0.08 with the model below.



What is wrong with Kiran's model? What can be done to her model to show 0.08?

- 15 Demonstrate** A meter is one thousandth of a kilometer. Write an equation to show the relationship between 7 meters and 0.007 kilometer.

**Prerequisite:** How do you show decimals with place-value models and charts?

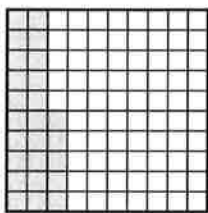


**Study the example modeling a decimal using a place-value model and chart. Then solve problems 1–6.**

### Example

How can you model the decimal 0.25 two different ways?

The grid represents  
1 whole.



Ones	.	Tenths	Hundredths
0	.	2	5

- 1 Complete the sentences to show the value of the digits in the decimal 0.25 from the example problem above.

The 2 has a value of 2 \_\_\_\_\_, or 0.2.

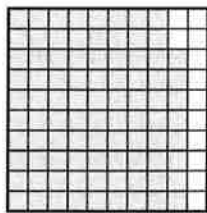
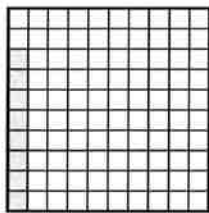
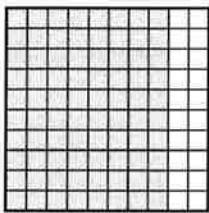
The 5 has a value of 5 \_\_\_\_\_, or 0.05.

- 2 Write the decimal 0.25 in words.

\_\_\_\_\_

- 3 Write a number from the box to complete each model.

0.08	0.88	0.8
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\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

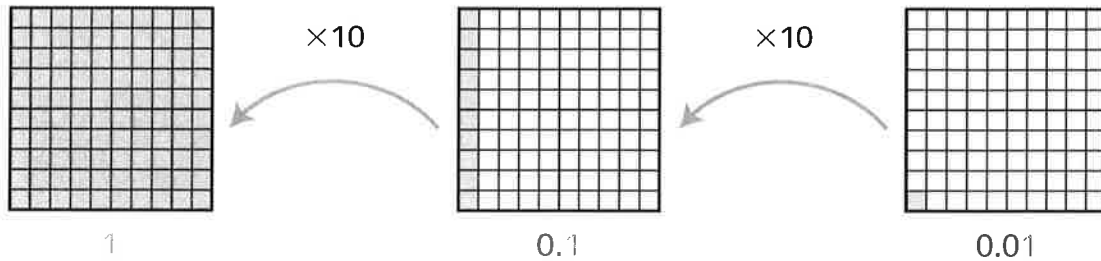


## Work with Place-Value Patterns

**Study how the example shows place-value patterns. Then solve problems 1–8.**

**Example**

Show how the numbers 1, 0.1, and 0.01 are related.



- 1** Use the  $\times 10$  pattern from the example to complete each equation.

$$\underline{\hspace{2cm}} = 1 \times 10$$

$$1 = \underline{\hspace{2cm}} \times 10$$

$$0.1 = \underline{\hspace{2cm}} \times 10$$

- 2** The pattern can also be described using division. Use the grids in the example to complete the equations.

$$10 \div 10 = \underline{\hspace{2cm}}$$

$$1.0 \div 10 = \underline{\hspace{2cm}}$$

$$0.1 \div 10 = \underline{\hspace{2cm}}$$

- 3** Use the  $\div 10$  pattern to fill in the blanks.

$$400 \quad \underline{\hspace{2cm}} \quad \underline{\hspace{2cm}} \quad 0.4 \quad \underline{\hspace{2cm}}$$

- 4** How are the decimals 0.009 and 0.09 related? Explain.

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## Reason and Write

**Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.**

**Example**

Clara knows that each time a digit moves one place to the right in a whole number, the value of the digit is one-tenth as much.

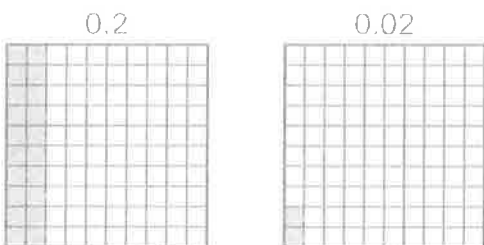
Describe an example you would show to Clara to demonstrate that this is true for decimal numbers also.

**Show your work.** Use pictures, words, or numbers to explain.

I would show Clara an example using the decimal 0.2.

If you move the digit 2 in 0.2 one place to the right, the decimal is now 0.02.

The digit 2 in the decimal 0.02 has a value that is one tenth as much as the digit 2 in the decimal 0.2. I can show this to Clara using models.



0.2 has 20 shaded squares and 0.02 has 2 shaded squares. Since 2 squares are one tenth of 20 squares, the models show that 0.02 is one tenth the value of 0.2.

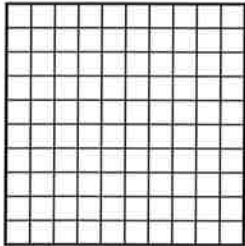
Where does the example ...

- use a picture to explain?
- use words to explain?
- use numbers to explain?



**Ready® Mathematics****Lesson 1 Quiz****Solve the problems.**

- 1** This grid represents 1 whole. Shade the grid to model 0.3.



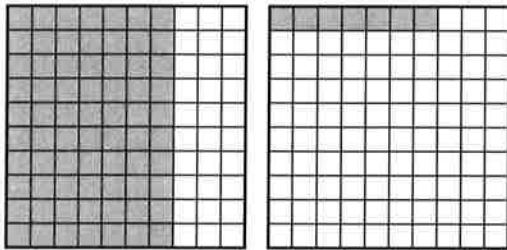
- 2** Fill in the blanks to complete the statements about the numbers 0.04 and 0.004.

In 0.04, the digit 4 is in the \_\_\_\_\_ place.

In 0.004, the digit 4 is in the \_\_\_\_\_ place.

The digit 4 has a greater value in \_\_\_\_\_ because its value is  
\_\_\_\_\_ as much as its value in \_\_\_\_\_.

- 3** Erik draws these models to show 0.7 and 0.07.



Which division equation represents the relationship between the numbers?

- A**  $0.7 \div 100 = 0.07$   
**B**  $0.07 \div 100 = 0.7$   
**C**  $0.7 \div 10 = 0.07$   
**D**  $0.07 \div 10 = 0.7$



## Understand Powers of Ten



### Think It Through

**What does it mean to multiply by 10, 100, or 1,000?**



Numbers like 10, 100, or 1,000 that can be written as products of tens are sometimes called **powers of ten**. Multiplying and dividing by powers of ten is related to place value.

Look at the numbers 30, 300, and 3,000 in the place-value chart.

Thousands	Hundreds	Tens	Ones	
			3	
		3	0	$30 = 3 \times 10$
	3	0	0	$300 = 3 \times 100$
3	0	0	0	$3,000 = 3 \times 1,000$

**Think** Patterns can help you understand multiplying by powers of ten.

Look at the multiplication equations that use powers of ten next to the chart above.

$$30 = 3 \times 10$$

$$300 = 3 \times 100, \text{ or } 3 \times 10 \times 10$$

$$3,000 = 3 \times 1,000, \text{ or } 3 \times 10 \times 10 \times 10$$

You can see a pattern when you compare the number of 0s in the factors to the number of 0s in the product. The pattern can help you multiply and divide with powers of 10.



**Let's Explore the Idea** Now explore patterns when multiplying or dividing a decimal by a power of ten.



- 2** Compare the numbers 5.0 and 0.5. How many times 0.5 is 5? Use place value to explain how you know.

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- 3** Compare the numbers 0.5 and 0.05. How many times 0.05 is 0.5? Use place value to explain how you know.

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- 4** Now use place-value reasoning to fill in the blanks in the place-value chart below. Look for useful patterns as you work.

Ones	.	Tenths	Hundredths	Thousandths
0	.	0	0	5
	.			
	.			
	.			

$$0.005 \times 10$$

$$0.005 \times 10 \times 10$$

$$0.005 \times 10 \times 10 \times 10$$

Remember that division is the inverse of multiplication. Use understanding of division and place value to fill in the blanks in the place-value chart below. Look for useful patterns as you work.

Ones	.	Tenths	Hundredths	Thousandths
7	.	0	0	0
	.			
	.			
	.			

$$7 \div 10$$

$$7 \div 100$$

$$7 \div 1,000$$

**Connect** Ideas About Powers of Ten

**Talk through these problems as a class, then write your answers below.**

- 11 Compare** Use this place-value chart to describe the relationship between  $0.8 \div 10^2$  and  $0.8 \times 10^2$ .

Tens	Ones	.	Tenths	Hundredths	Thousandths	
8	0	.	0	0	0	$0.8 \times 10^2$
	8	.	0	0	0	$0.8 \times 10^1$
	0	.	8	0	0	0.8
	0	.	0	8	0	$0.8 \div 10^1$
	0	.	0	0	8	$0.8 \div 10^2$

- 12 Inspect** Marisa said that multiplying 8.0 by  $10^6$  would increase the value of the 8 because there would be 6 more zeros to the right of the decimal point. Explain what is wrong in Marisa's statement.

- 13 Illustrate** Show how  $7,000 \div 10^3$  is the same as  $7,000 \div 10 \div 10 \div 10$ .

**Prerequisite:** How can you multiply and divide decimals by 10?

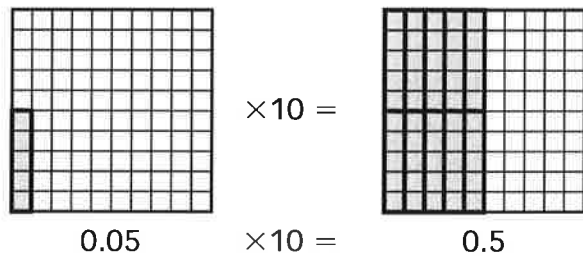


**Study the example problem showing multiplying a decimal by 10. Then solve problems 1–6.**

### Example

Find  $0.05 \times 10$ . Check your answer using a model.

When you multiply the value of a digit by 10, the digit moves one place to the left, so  $0.05 \times 10 = 0.5$ .



**1** Use the example to help you complete each equation.

a.  $0.005 \times 10 = \underline{\hspace{2cm}}$

b.  $0.05 \times \underline{\hspace{2cm}} = 0.5$

c.  $\underline{\hspace{2cm}} \times 10 = 5$

d.  $5 \times 10 = \underline{\hspace{2cm}}$

**2** How could you rewrite  $0.05 \times 10 = 0.5$  as a division equation? Explain how you know.

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## Multiply and Divide with Powers of Ten

**Study the example showing how the decimal point moves when you multiply a decimal number by a power of ten. Then solve problems 1–7.**

**Example**Find  $100 \times 0.004$ .

Break 100 into the product of 10s.

The decimal point moves one place to the right for each factor of ten.

$$\begin{aligned}
 100 \times 0.004 &= 10 \times \underbrace{10 \times 0.004}_{= 10 \times 0.04} \\
 &= \underbrace{10 \times 0.04}_{= 0.4}
 \end{aligned}$$

$$100 \times 0.004 = 0.4$$

**1** Write the missing power of ten.

a.  $0.04 \times \underline{\hspace{1cm}} = 0.4$        $0.004 \times \underline{\hspace{1cm}} = 4$

b.  $\underline{\hspace{1cm}} \times 0.006 = 0.6$        $\underline{\hspace{1cm}} \times 0.006 = 6$

c.  $0.007 \times \underline{\hspace{1cm}} = 7$        $0.07 \times \underline{\hspace{1cm}} = 7$

**2** When you multiply a decimal by a power of ten, what is the relationship between the number of places the decimal point moves and the number of zeros in the power of ten? Give an example.

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**3** Complete the equations.

a.  $0.03 \times 1,000 = \underline{\hspace{1cm}}$

b.  $0.008 \times 100 = \underline{\hspace{1cm}}$

**Vocabulary**

**power of ten** a number that can be written as a product of tens.

$$10 = 10$$

$$100 = 10 \times 10$$

$$1,000 = 10 \times 10 \times 10$$

## Reason and Write

**Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.**

**Example**

Becca was finding the products of decimals and powers of ten.

Here is what Becca wrote for two problems:

$$0.07 \times 10^2 = 70 \quad 0.07 \times 10^3 = 700$$

What did Becca do correctly? What did she do wrong?  
What can you tell her to help her multiply correctly with powers of ten the next time?

**Show your work.** Use pictures, words, or numbers to explain.

Becca moved the decimal point the correct way, to the right for multiplying by a power of ten. She showed that the value of 0.07 increases when you multiply by a power of ten.

Her mistake is that she multiplied by the wrong number of 10s, or didn't move the decimal point the correct number of places.

She should have multiplied by two tens, or 100, for  $10^2$ , and three tens, or 1,000, for  $10^3$ , like this:

$$0.07 \times 10^2 = 0.07 \times 100 = 7$$

$$0.07 \times 10^3 = 0.07 \times 1,000 = 70$$

I would tell her to remember that the exponent shows the number of zeros in the power of ten that you multiply by. This number of zeros is also the number of places that you move the decimal point to the right.

Where does the example ...

- answer each question?
- use words to explain?
- use pictures or numbers to explain?



**Ready® Mathematics**
**Lesson 2 Quiz**

**Solve the problems.**

- 1** Use place-value reasoning and patterns to write numbers that match the multiplication problem to the right of each table row.

Ones	.	Tenths	Hundredths	Thousandths	
0	.	0	0	7	
_____	.	_____	_____	_____	$0.007 \times 10$
_____	.	_____	_____	_____	$0.007 \times 10 \times 10$
_____	.	_____	_____	_____	$0.007 \times 10 \times 10 \times 10$

- 2** Sabrina wants to use powers of ten to write numbers in different forms. She wrote these statements. Decide whether each of her statements is true or false.

Choose *True* or *False* for each statement.

- a.  $100 = 10$  to the third power ☐ True ☐ False
- b.  $10 \times 10 \times 10 = 1,000$  ☐ True ☐ False
- c.  $10$  to the fourth power  $= 10 \times 10 \times 10 \times 10$  ☐ True ☐ False
- d.  $2 \times 10 = 2 \times 10^1$  ☐ True ☐ False

- 3** Caleb claims that when you multiply a number by 10, you can just write a 0 at the right end of the number. Caleb gives the example  $6 \times 10$  to prove his claim is always true. Noah does not agree with Caleb. He gives the example  $0.6 \times 10$  to prove that Caleb's claim is not always true.

Who is correct? Explain your answer.

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## Understand Products of Fractions

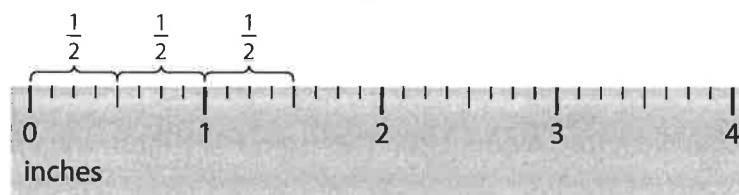


### Think It Through

**What does it mean to multiply a fraction by a whole number?**



The ruler below shows three  $\frac{1}{2}$ -inch segments. You can represent this as  $3 \times \frac{1}{2}$ .

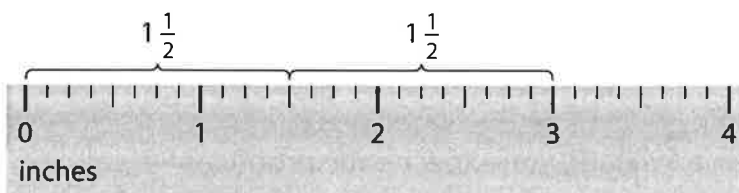


You have learned different ways to think about fractions and also about multiplication. Below are other ways to think about  $3 \times \frac{1}{2}$  inch.

- Three  $\frac{1}{2}$ -inch sections is  $\frac{3}{2}$  inches.
- Three  $\frac{1}{2}$ -inch sections is 1 whole inch plus  $\frac{1}{2}$  inch, or  $1\frac{1}{2}$  inches.
- $\frac{3}{2}$  inches is 3 times as long as  $\frac{1}{2}$  inch.

**Think** What does it mean to multiply a whole number by a fraction?

The ruler below shows a 3-inch segment divided into 2 equal parts. That's the same as multiplying 3 by  $\frac{1}{2}$ . You can represent this as  $\frac{1}{2} \times 3$ .



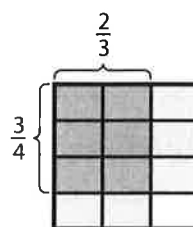
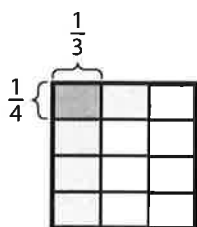
Below are ways to think about  $\frac{1}{2} \times 3$ .

- When 3 is divided into 2 equal parts,  $\frac{1}{2} \times 3$  is one part.
- When 3 is divided into 2 equal parts, each part is  $1\frac{1}{2}$  or  $\frac{3}{2}$ .
- $\frac{1}{2} \times 3 = 1\frac{1}{2}$



**Shade**  $\frac{1}{2}$  of  
3 inches on the ruler.

**Let's Explore the Idea** Find the product of  $\frac{3}{4} \times \frac{2}{3}$  with an area model.



- 2** Look at the model on the left above.

Each column is what fraction of the whole? \_\_\_\_\_

Each row is what fraction of the whole? \_\_\_\_\_

- 3** The dark blue part shows  $\frac{1}{4}$  of  $\frac{1}{3}$ .

How many parts are in the whole? \_\_\_\_\_

So,  $\frac{1}{4} \times \frac{1}{3}$  is what fraction of the whole? \_\_\_\_\_

- 4** Look at the model on the right above.

Two columns are what fraction of the whole? \_\_\_\_\_

Three rows are what fraction of the whole? \_\_\_\_\_

- 5** The dark blue parts show  $\frac{3}{4}$  of  $\frac{2}{3}$ .

What fraction of the whole is  $\frac{3}{4} \times \frac{2}{3}$ ? \_\_\_\_\_

- 6** What is the product of  $\frac{3}{4} \times \frac{2}{3}$ ? \_\_\_\_\_



## Connect

Talk through these problems as a class. Then write your answers below.

- 13 Describe** Tell what multiplication problem the model shows.

Explain why. \_\_\_\_\_

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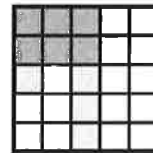
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- 14 Explain** Landon said that  $\frac{2}{3} \times \frac{1}{6} = \frac{5}{6}$ . Tell how Landon found his product, and then explain how to find the correct product. \_\_\_\_\_

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- 15 Create** Complete the multiplication table for the unit fractions  $\frac{1}{2}$ ,  $\frac{1}{3}$ , and  $\frac{1}{4}$ . Identify two patterns in the table.

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

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**Prerequisite:** How do you multiply a fraction by a whole number?

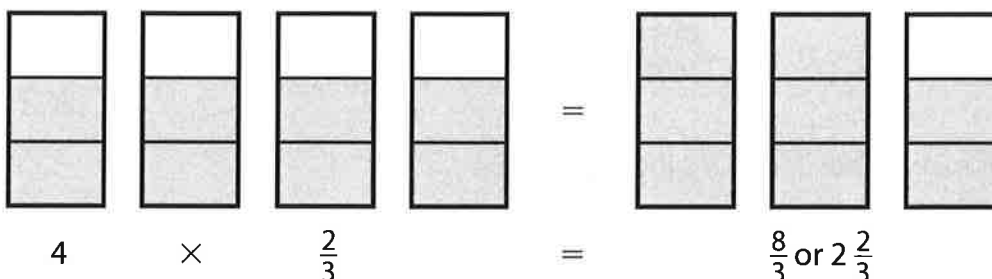


**Study the example showing multiplying a fraction by a whole number. Then solve problems 1–8.**

### Example

Find  $4 \times \frac{2}{3}$ .

$4 \times \frac{2}{3}$  can be modeled as 4 groups of  $\frac{2}{3}$ .



You can count eight shaded  $\frac{1}{3}$  parts. Eight  $\frac{1}{3}$  parts, or  $\frac{8}{3}$ , is the same as  $2 \frac{2}{3}$ .

$$4 \times \frac{2}{3} = 2 \frac{2}{3}$$

- 1** Explain how you can model  $3 \times \frac{2}{4}$ .

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- 2** Draw a model to show  $3 \times \frac{2}{4}$ .

- 3** How many fourths are shaded in your model in problem 2? \_\_\_\_\_

- 4**  $3 \times \frac{2}{4} =$  \_\_\_\_\_

## Multiply a Fraction by a Fraction

**Study the example showing multiplying a fraction by a fraction. Then solve problems 1–6.**

**Example**

Use an area model to find the product  $\frac{2}{3} \times \frac{3}{5}$ .

Each row is  $\frac{1}{3}$  of the whole.

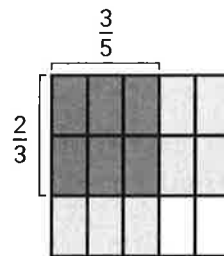
Each column is  $\frac{1}{5}$  of the whole.

The whole is divided into 15 equal parts.

The dark gray parts show  $\frac{2}{3}$  of  $\frac{3}{5}$ .

6 out of 15 parts of the whole are shaded dark gray,  
so the dark gray shows  $\frac{6}{15}$ .

$$\frac{2}{3} \times \frac{3}{5} = \frac{6}{15}$$



- 1** Why are fifteenths shown in the example model?

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- 2** Use the area model in the example to write the product.

$$\frac{1}{3} \times \frac{3}{5} = \underline{\hspace{2cm}}$$

$$\frac{2}{3} \times \frac{4}{5} = \underline{\hspace{2cm}}$$

$$\frac{3}{3} \times \frac{2}{5} = \underline{\hspace{2cm}}$$

- 3** Choose Yes or No to tell whether the denominator of each product is twelfths.

a.  $\frac{1}{2} \times \frac{1}{6}$

☐ Yes

☐ No

b.  $\frac{3}{4} \times \frac{2}{5}$

☐ Yes

☐ No

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

☐ Yes

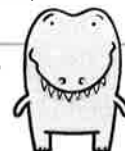
☐ No

d.  $\frac{5}{6} \times \frac{2}{2}$

☐ Yes

☐ No

The denominator of the product is the same as the product of the denominators of the factors.



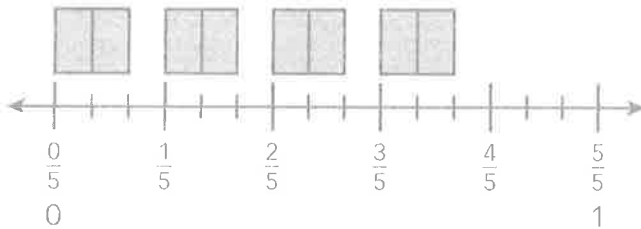
## Reason and Write

**Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.**

**Example**

Draw a model to represent  $\frac{2}{3} \times \frac{4}{5}$ . Find the product and then explain how your model shows the product of  $\frac{2}{3} \times \frac{4}{5}$ .

**Show your work.** Use models, words, and numbers to explain your answer.



I drew a number line from 0 – 1 divided into fifths, to show  $\frac{4}{5}$ . I am multiplying  $\frac{4}{5}$  by  $\frac{2}{3}$  so I divide each fifth into thirds. That makes 15 equal parts in the whole.

Each equal part is 1 fifteenth of the whole.

To show  $\frac{2}{3} \times \frac{4}{5}$ , in each fifth, I shade  $\frac{2}{3}$  of the parts.

Four of the fifths are  $\frac{2}{3}$  shaded. That means there are 2 fifteenths shaded in each section. That is  $2 \times 4$ , or 8 fifteenths shaded in all. So,  $\frac{2}{3} \times \frac{4}{5} = \frac{8}{15}$ .

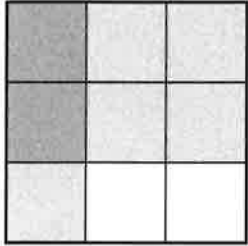
Where does the example ...

- draw a model?
- find the product?
- use words to explain?



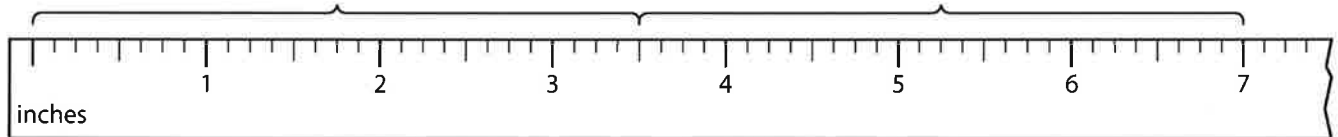
**Ready® Mathematics****Lesson 13 Quiz****Solve the problems.**

- 1** Which multiplication problem does the model show?



- A**  $\frac{7}{9} \times \frac{2}{9} = \frac{5}{9}$
- B**  $\frac{2}{3} \times \frac{4}{6} = \frac{6}{9}$
- C**  $\frac{2}{3} \times \frac{1}{3} = \frac{2}{9}$
- D**  $\frac{2}{9} \times \frac{1}{3} = \frac{2}{27}$

- 2** The ruler below shows a 7-inch segment divided into 2 equal parts. What is the length of one of those parts?



Fill in the blanks in the equation using fractions or mixed numbers to show the length of one of the parts.

\_\_\_\_\_  $\times 7 =$  \_\_\_\_\_

## Understand Volume

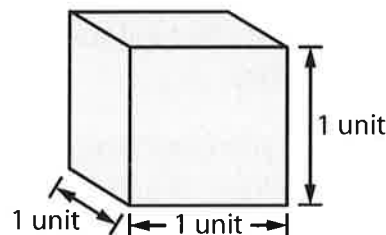
### Think It Through

#### What does volume measure?



The **volume** of a three-dimensional figure is the amount of space contained inside the figure. Volume is measured by the number of cubic units that can be packed into a figure.

A cube with edge lengths of 1 unit is called a unit cube. A unit cube has 1 **cubic unit** of volume.



### Think How is volume different from area?

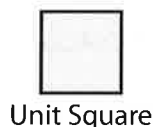
Area is the number of *square units* needed to cover a *plane figure*. Volume is the number of *cubic units* needed to fill a *solid figure*.

A **plane figure** is a two-dimensional figure. To find the area of a plane figure, you need measurements in two dimensions: length and width. One way you can find the area of a plane figure is by covering it in unit squares, without gaps or overlap. A unit square has an area of 1 square unit.

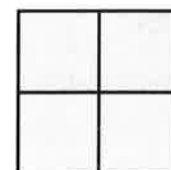
A **solid figure** is a three-dimensional figure. To find the volume of a solid figure, you need measurements in three dimensions: length, width, and height. One way you can find the volume of a solid figure is by packing it with unit cubes, without gaps or overlaps.



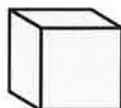
**Circle** the figures below that have volume.



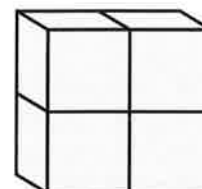
Unit Square



Area = 4 square units



Unit Cube



Volume = 4 cubic units

**Think About**

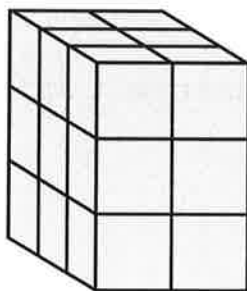
# Finding Volume with Unit Cubes

**Let's Explore the Idea** You can use unit cubes to build or fill a solid figure. The volume of the figure is the number of unit cubes needed to build or fill the solid figure.



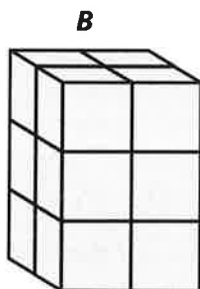
- 2 The measure of each edge length of a unit cube is \_\_\_\_\_.
- 3 The volume of each unit cube is \_\_\_\_\_.

**Alexander stacked unit cubes to build the rectangular prism below. Use the rectangular prism to answer problems 4 and 5.**



- 4 There are \_\_\_\_\_ unit cubes in the bottom layer and there are \_\_\_\_\_ layers. The figure has \_\_\_\_\_ unit cubes.
- 5 The volume of the figure is \_\_\_\_\_ cubic units.

**Now try these two problems. Use the figures below to answer problems 6 and 7. Each figure was built using unit cubes.**



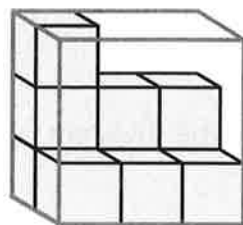
- 6 What is the volume of Figure A? \_\_\_\_\_
- 7 How many of Figure A does it take to fill or build Figure B? \_\_\_\_\_  
What is the volume of Figure B? \_\_\_\_\_

## Connect

## Hints About Volume with Unit Cubes

Talk through these problems as a class. Then write your answers below.

- 13 Infer** Eli is stacking unit cubes in a box. He partially fills the box, pauses, and says, "The volume of this box is 18 cubic units."



Explain how Eli found the volume of the box. \_\_\_\_\_

\_\_\_\_\_

- 14 Explain** Zoe says that a box that is 1 unit wide, 2 units long, and 3 units tall has a greater volume than a box that is 2 units wide, 3 units long, and 1 unit tall. Is she correct? Explain your answer.

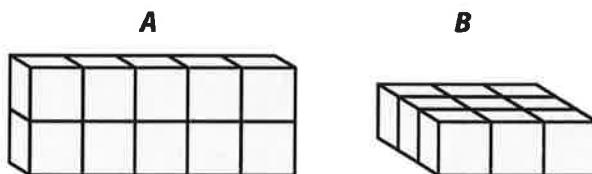
\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

- 15 Compare** Each cube in Figures A and B has a volume of 1 cubic unit. Which figure has less volume, Figure A or Figure B? Explain your answer.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



Name: \_\_\_\_\_

**Prerequisite:** How do you measure the area of a rectangle?



**Study the example problem showing how to find the area of a rectangle. Then solve problems 1–7.**

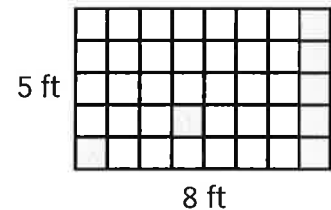
### Example

Nan tiled a 5-foot by 8-foot section of her kitchen floor. Each tile covers 1 square foot. What is the area of the floor that she tiled?

Area is the number of square units a figure covers.  
The floor has 5 rows of tiles.  
There are 8 tiles in each row.

Multiply 5 feet  $\times$  8 feet to find the area of the tiled floor.

Area = 5 feet  $\times$  8 feet = 40 square feet

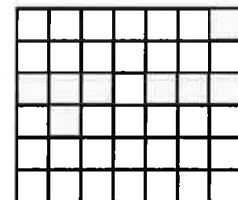


- 1** Each square in the rectangle on the right covers 1 square centimeter.

There are \_\_\_\_\_ rows of squares.

There are \_\_\_\_\_ squares in each row.

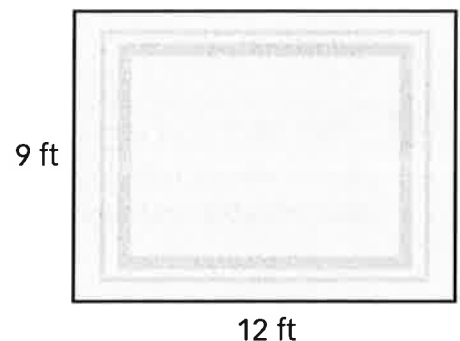
The area of the rectangle is \_\_\_\_\_ square centimeters.



- 2** What is the area of the rug at the right?

**Show your work.**

**Solution:** \_\_\_\_\_



- 3** The infield of a baseball field is a square with sides that are 90 feet. What is the area of the infield?

\_\_\_\_\_

## Find Volume with Unit Cubes

**Study the example problem showing how to use unit cubes to find the volume of a rectangular prism. Then solve problems 1–8.**

**Example**

Peter stacked unit cubes to build this rectangular prism.  
What is the volume of the figure?

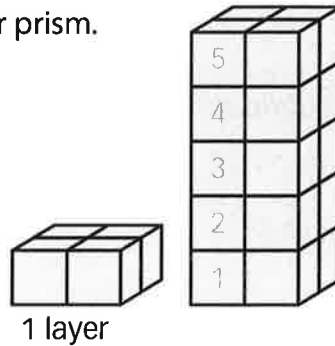
There are 4 unit cubes in 1 layer.

There are 5 layers.

$$4 + 4 + 4 + 4 + 4 = 20 \text{ unit cubes}$$

$$5 \times 4 = 20 \text{ unit cubes}$$

$$\text{Volume} = 20 \text{ cubic units}$$

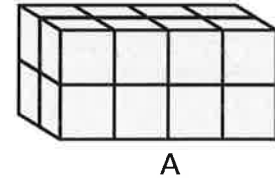


- 1** Look at figure A and fill in the blanks below.

There are \_\_\_\_\_ layers and \_\_\_\_\_ cubic units in each layer.

The volume of this figure is

$$\underline{\hspace{1cm}} \times \underline{\hspace{1cm}} = \underline{\hspace{1cm}} \text{ cubic units.}$$



A

- 2** What is the volume of figure B? Tell how you know.

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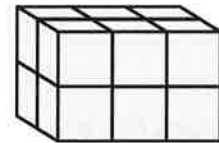
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B

- 3** Elena stacks 2 layers of 4 unit cubes to fill a small box.

How many cubes are in the box? \_\_\_\_\_

What is the volume of Elena's box? \_\_\_\_\_

**Vocabulary**

**cubic unit** a cube,  
1 unit on each edge,  
used to measure volume.

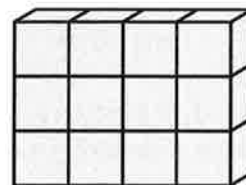
**volume** the amount of  
space inside a solid  
figure.

## Reason and Write

**Study the example. Underline two parts that you think make it a particularly good answer and a helpful example.**

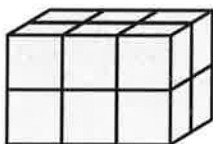
**Example**

Niles built this rectangular prism with unit cubes. Then he took apart the prism and built a different prism with the same number of cubes. Draw a picture of the second prism that Niles could have made.



Describe the number of layers and the number of cubes in each layer of both prisms. Write a statement to compare the volume of the prisms.

**Show your work.** Use pictures, words, or numbers to explain your answer.



The first prism that Niles built has 3 layers and 4 cubes in each layer.

The second prism that Niles built has 2 layers and 6 cubes in each layer.

$3 \times 4 = 12$  and  $2 \times 6 = 12$ . Both prisms are made of 12 unit cubes, so both have a volume of 12 cubic units.

The volume of both prisms is the same.

Where does the example ...

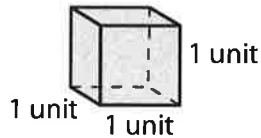
- show a drawing?
- describe the number of layers and number of cubes in each layer?
- compare the volume of each prism?



**Ready® Mathematics****Lesson 24 Quiz**

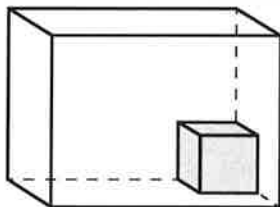
**Solve the problems.**

- 1** A unit cube is shown below.



Which of these can best be measured using unit cubes?

- A** volume
  - B** area
  - C** weight
  - D** temperature
- 2** Which unit of measurement can be used to express the volume of this prism?



- A** square units
- B** unit squares
- C** cubic units
- D** degrees

