# Multiplication and Division in Word Problems

LESSON 7

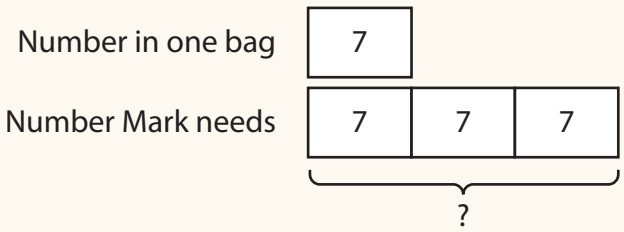
## Dear Family,

### This week your child is learning about multiplication and division in word problems.

Your child will be solving problems like the one below.

*A card store sells bags of 7 markers. Mark needs 3 times that amount. How many markers does Mark need?*

You can use a bar model to help understand the problem.




Then you can use the bar model to write an equation to help understand the problem.

$3 \times$ number of markers in one bag $=$ total markers needed

$3 \times 7 = ?$

Then you can solve the equation.

$3 \times 7 = 21$

So, Mark needs 21 markers.

Invite your child to share what he or she knows about multiplication and division in word problems by doing the following activity together.

# ACTIVITY MULTIPLICATION AND DIVISION IN WORD PROBLEMS

**Do this activity with your child to explore using multiplication and division in word problems.**

***Materials*** number cube, 45 counters, such as pennies, beans, shells, or paper clips

- Have your child roll the number cube first. Your child takes that number of counters and records the number.
  *Example:* Your child rolls a 4 and takes 4 counters.

- Then you roll the number cube. This number tells you how many times the number of your child's counters you take.
  *Example:* You roll a 3. You take 3 times as many counters as your child. You take 12 counters.

- Have your child count to check the number of counters you get in all. Then have your child tell or write a comparison multiplication equation.
  *Example:* $3 \times 4 = 12$

- Finally, write a real-world story to match the multiplication equation.
  *Example:* Tess has 4 seashells. I have 3 times as many seashells as Tess. I have 12 seashells.

- Repeat at least 6 times.

# Explore Multiplication and Division in Word Problems

Previously, you thought about equations that compare numbers using multiplication. In this lesson, you will solve problems by comparing numbers. Use what you know to try to solve the problem below.

**Hannah scored 3 goals last season. She scores 4 times as many goals this season. How many goals does Hannah score this season?**

## Learning Target

- Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison.

**SMP** 1, 2, 3, 4, 5, 6, 7

## TRY IT

## Math Toolkit

- counters and cups
- number lines
- multiplication models
- grid paper
- sticky notes

## DISCUSS IT

**Ask your partner:** Do you agree with me? Why or why not?

**Tell your partner:** I agree with you about . . . because . . .

# CONNECT IT

## 1 LOOK BACK

Explain how you could find how many goals Hannah scores this season.

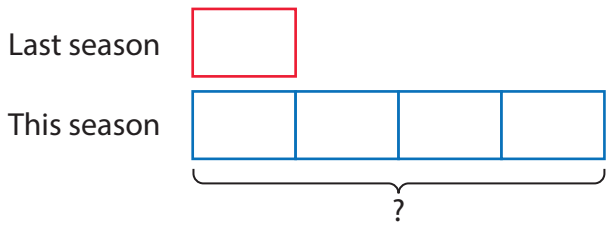
## 2 LOOK AHEAD

You often need to find an unknown number in comparison problems. Suppose you want to solve the problem below.

Hannah's team won 5 games last season and 4 times as many games this season. How many games did the team win this season?

One way to show a comparison such as this is to use a bar model.

**a.** Fill in the boxes to complete the bar model that shows the problem.




**b.** Complete the equation that shows the problem and matches the bar model.

| how many times as many | | number of games won last season | | unknown |
|---|---|---|---|---|
| ..... | × | ..... | = | ? |

**c.** You can use a question mark, ?, as a **symbol** to stand for the **unknown**. What is the unknown number in the problem? Explain how this number answers the question.

## 3 REFLECT

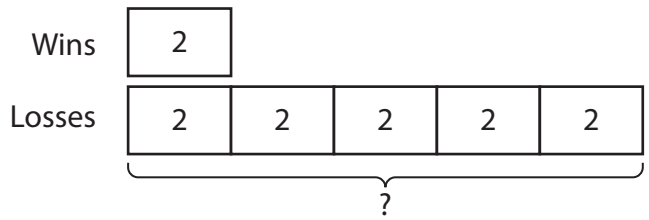
How does the bar model in problem 2 show *4 times as many?*

# Prepare for Multiplication and Division in Word Problems

1 Think about what you know about unknowns in equations. Fill in each box. Use words, numbers, and pictures. Show as many ideas as you can.

| In My Own Words | My Illustrations |
|---|---|
| **unknown** | |
| Examples | Non-Examples |

2 How does the bar model at the right show *5 times as many?* Write an equation with an unknown to match the bar model.



3 Solve the problem. Show your work.

**Joseph picked 6 flowers today. He picked 3 times as many flowers yesterday. How many flowers did Joseph pick yesterday?**

***Solution***

4 Check your answer. Show your work.

# Develop Multiplication in Word Problems

Read and try to solve the problem below.

**Janelle's Market sells bags of 8 oranges. Simone needs 5 times that amount. Write and solve an equation to find the number of oranges that Simone needs.**

## TRY IT

### Math Toolkit

- counters and cups
- number lines
- multiplication models
- grid paper
- sticky notes

## DISCUSS IT

**Ask your partner:** How did you get started?

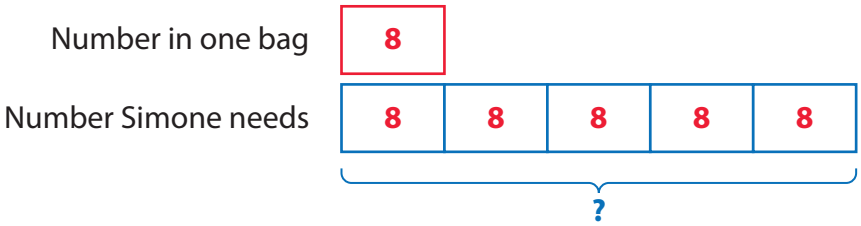
**Tell your partner:** I knew . . . so I . . .

Explore different ways to understand multiplication in word problems.

**Janelle's Market sells bags of 8 oranges. Simone needs 5 times that amount. Write and solve an equation to find the number of oranges that Simone needs.**

## MODEL IT

**You can use a bar model to help understand the problem.**




Skip-count to find the total Simone needs: 8, 16, 24, 32, 40.

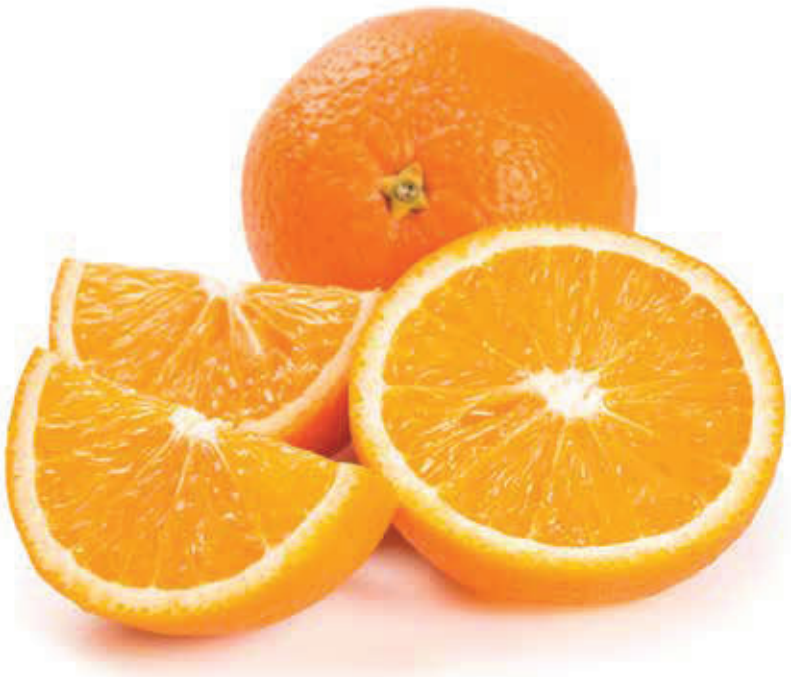
## MODEL IT

**You can use the bar model to make an equation to help understand the problem.**

5 × **oranges in one bag** = **total oranges needed**

The number of oranges in one bag is known (**8**). The total number of oranges needed is unknown.

$5 \times 8 = \square$



# CONNECT IT

**Now you will use the problem from the previous page to help you understand how to use multiplication in word problems.**

1. You do not know how many oranges Simone needs. What symbol on the bar model shows how many she needs?

2. How does the bar model show how many oranges are in one bag?

3. How does the bar model show how many oranges Simone needs?

4. How can you find *5 times as many* as 8?

5. Write an equation using numbers to show how many oranges Simone needs.

   Simone needs ..... oranges.

6. Explain how you can write a multiplication equation from a bar model.

## 7 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for showing a comparison between the numbers to solve the word problem? Explain.

# APPLY IT

**Use what you just learned to solve these problems.**

8 Neil and Vincent collect cans. Neil collects 10 cans. Vincent collects 3 times as many cans as Neil. Write an equation with an unknown to find the number of cans Vincent collects. Then solve the equation. Show your work.

***Solution***

9 Mimi eats 6 times as many raisins as Mary. Mary eats 9 raisins. Write an equation with an unknown to find the number of raisins Mimi eats. Then solve the equation. Show your work.

***Solution***

10 Tyler runs 4 laps around the track. Jorge runs 8 times as many laps as Tyler. How many laps does Jorge run? Which equation can help you answer the question?

Ⓐ $8 + 4 = ?$

Ⓑ $8 - 4 = ?$

Ⓒ $8 \times 4 = ?$

Ⓓ $8 \div 4 = ?$

# Practice Multiplication in Word Problems

**Study the Example showing one way to use multiplication to solve a word problem. Then solve problems 1–5.**

## EXAMPLE

Sue swims 4 laps in a pool. Andy swims 5 times as many laps as Sue. How many laps does Andy swim?

Number of laps Sue swims: **4**

Number of laps Andy swims: **4** **4** **4** **4** **4**

?

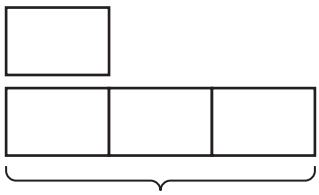
$5 \times 4 = \square$

$5 \times 4 = 20$

Andy swims 20 laps.

**1** Adam has 9 pennies. Ryan has 3 times as many pennies as Adam. How many pennies does Ryan have?

Label the bar model.



Write an equation.
Use ☐ for the unknown. _____ × _____ = _____

Solve the equation. _____

Write the answer. Ryan has _____ pennies.

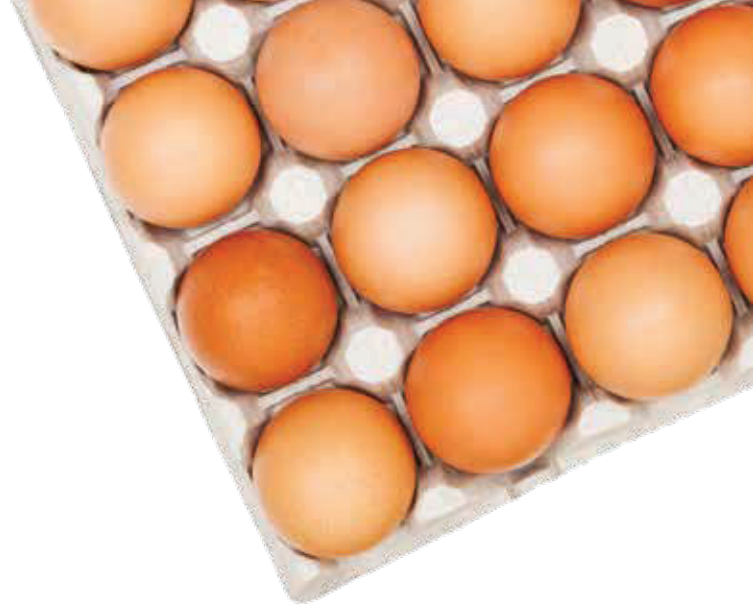
**Vocabulary**

**unknown** the value you need to find to solve a problem.

**2** Jade picks 5 pounds of berries. She needs 3 times that amount to make jam. How many pounds of berries does Jade need to make jam?

Skip-count to find the amount Jade needs: 5, _____, _____.

Jade needs _____.



3 Look at how a student solved the problem below.

A cook uses 6 eggs at lunch. He used 3 times as many eggs at breakfast. How many eggs did the cook use at breakfast?

Skip-count: 6, 12, 18, 24
The cook used 24 eggs at breakfast.

What did the student do wrong?

4 Look at problem 3. Draw a bar model. Use the model to write and solve an equation to find the correct answer.

The cook used _____ at breakfast.

5 Which problems can be solved using the equation $8 \times 2 = m$?

Ⓐ Ali reads 8 books in June. She reads half as many books in July. How many books does Ali read in July?

Ⓑ Cal is twice as old as his sister. His sister is 8 years old. How old is Cal?

Ⓒ A muffin costs $2. Dylan buys 8 muffins. How much does Dylan spend on muffins?

Ⓓ Jordan has 8 apples and 2 oranges. How many pieces of fruit does she have altogether?

Ⓔ Lee buys 8 muffins. He gives 2 muffins to a friend. How many muffins does Lee have now?

# Develop Division in Word Problems

Read and try to solve the problem below.

**Juan finds 3 times as many shells at the beach as Jeremy finds. Juan finds 24 shells. Write and solve an equation to find the number of shells Jeremy finds.**

## TRY IT

### Math Toolkit

- counters and cups
- number lines
- multiplication models
- grid paper
- sticky notes

## DISCUSS IT

**Ask your partner:** Can you explain that again?

**Tell your partner:** At first, I thought . . .

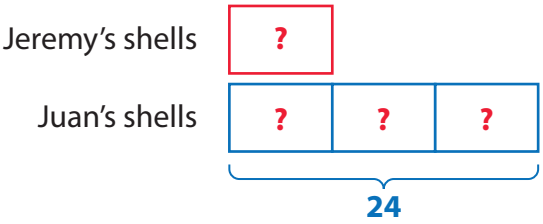
Explore different ways to understand division in word problems.

**Juan finds 3 times as many shells at the beach as Jeremy finds. Juan finds 24 shells. Write and solve an equation to find the number of shells Jeremy finds.**

## MODEL IT

**You can use a bar model to help understand the problem.**

Jeremy finds one group of shells.
Juan finds 3 times as many shells as Jeremy.




Divide 24 by 3 to find the number of shells in each group.

## MODEL IT

**You can use the bar model to make an equation to help understand the problem.**

$3 \times$ **Jeremy's shells** $=$ **Juan's shells**

The number of shells Juan finds is known (24).
The number of shells Jeremy finds is not known (*s*).

$3 \times s = 24$

# CONNECT IT

**Now you will use the problem from the previous page to help you understand how to use division in word problems.**

1. You do not know the number of shells Jeremy finds. What part of the bar model shows the number of shells Jeremy finds?

2. How does the bar model show how many shells Juan finds?

3. How does the bar model show that 24 is 3 times another number?

4. How can you find what number times 3 is 24?

5. Write a division equation using numbers to show how many shells Jeremy finds.

   Jeremy finds _____ shells.

6. Explain how you can write a division equation from a model.

## 7 REFLECT

Look back at your **Try It**, strategies by classmates, and **Model Its**. Which models or strategies do you like best for solving the *times as many* word problem? Explain.

# APPLY IT

**Use what you just learned to solve these problems.**

8 Monique and Wint read the same book. Monique reads 63 pages one weekend. She reads 7 times as many pages as Wint. Write an equation with an unknown to find the number of pages Wint reads. Then solve the equation. Show your work.

***Solution***

9 The winning baseball team scores 4 times as many runs as its opponent. The winning team scores 8 runs. Write an equation with an unknown to find the number of runs its opponent scores. Then solve the equation. Show your work.

***Solution***

10 Kianna sells 40 tickets to the school play. She sells 2 times as many tickets as Reese. How many tickets, $t$, does Reese sell? Which equation can help you find the value of $t$?

Ⓐ $40 + 2 = t$

Ⓑ $40 - 2 = t$

Ⓒ $40 \times 2 = t$

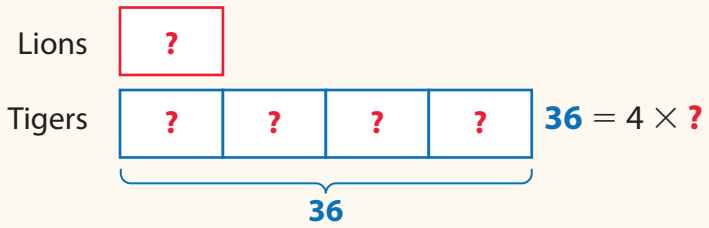
Ⓓ $40 \div 2 = t$

# Practice Division in Word Problems

**Study the Example showing a way to use division to solve a word problem. Then solve problems 1–5.**

## EXAMPLE

The Tigers score 36 points. They score 4 times as many points as the Lions. How many points do the Lions score?




**36** ÷ 4 = **?**

36 ÷ 4 = 9

The Lions score 9 points.

1 Charlie and Gabe collect cans to recycle. Charlie collects 5 times as many cans as Gabe. Charlie collects 50 cans. Draw a bar model to compare the number of cans each boy collects.

2 Look at the model you drew in problem 1. Write and solve an equation to show how many cans Gabe collects. Show your work.

***Solution***

## Vocabulary

**divide** to separate into equal groups and find the number in each group or the number of groups.

**division** an operation used to separate a number of items into equal-sized groups.

3 Tell whether each equation is solved correctly.

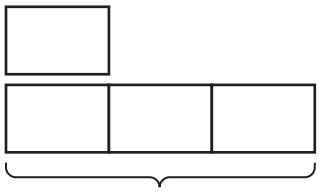
| | Yes | No |
|---|---|---|
| $6 = 2 \times ?$ $? = 12$ | Ⓐ | Ⓑ |
| $7 \times h = 28$ $h = 4$ | Ⓒ | Ⓓ |
| $2 = p \div 5$ $p = 10$ | Ⓔ | Ⓕ |

4 James and Chris are in the school play. James has 42 lines to memorize. That is 6 times as many lines as Chris. Write and solve an equation to find the number of lines Chris has to memorize. Show your work.

***Solution***

5 Choose numbers from the tiles below to fill in the bar model. Use the model to write an equation with an unknown. Then solve the equation.

| 24 | 12 | 8 | 6 | 4 | 3 | 2 | 1 |
|---|---|---|---|---|---|---|---|



***Equation***

***Solution***

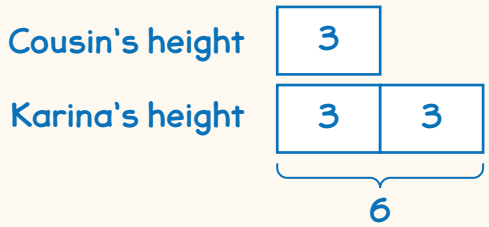
# Refine Multiplication and Division in Word Problems

**Complete the Example below. Then solve problems 1–9.**

## EXAMPLE

**Karina is 6 feet tall. Her cousin is 3 feet tall. How many times as tall as her cousin is Karina?**

Look at how you could show your work using a bar model.




$\square \times 3 = 6; \square = 2$

***Solution*** .....

There are twice as many boxes in the model for Karina's height as there are for her cousin's height.

**PAIR/SHARE**
How else could you solve this problem?

## APPLY IT

1 A small shrimp taco has 5 shrimp. There are 3 times as many shrimp in a large taco. How many shrimp are in a large taco? Write and solve an equation to find the answer. Show your work.

What does it mean when the problem says *3 times as many?*

***Solution*** .....

**PAIR/SHARE**
Did you and your partner write the same or different equations?

**2** Christina reads 7 pages in a magazine. She reads 5 times as many pages in a book. How many pages does Christina read altogether? Show your work.

I think this problem has more than one step.

### PAIR/SHARE

How can you check your answer?

***Solution***

**3** Aida swims 7 laps in a pool. Kaya swims 28 laps. How many times the number of laps Aida swims does Kaya swim?

Ⓐ 4

Ⓑ 21

Ⓒ 35

Ⓓ 196

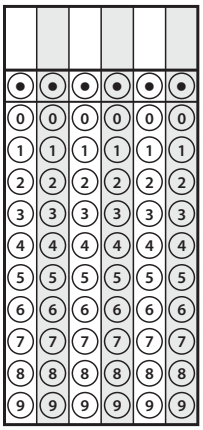
Jae Ho chose Ⓓ as the correct answer. How did he get that answer?

I can use multiplication or division to solve this problem.

### PAIR/SHARE

How did you and your partner know what operation to use?

**4** Kyle sells 20 boxes of fruit for a fundraiser. Omar sells 2 times as many boxes of fruit as Kyle sells. What is the total number of boxes that Kyle and Omar sell?



**5** Raoul bikes 7 miles one week. Jackson bikes 28 miles the same week. How many times as many miles as Raoul bikes does Jackson bike? Which equation can help you answer the question?

Ⓐ $28 - 7 = \square$

Ⓑ $28 \div 7 = \square$

Ⓒ $7 \times 28 = \square$

Ⓓ $7 + 28 = \square$

**6** Which problems can be solved using the equation $3 \times 9 = a$?

Ⓐ Pam is 9 years old. She is 3 times as old as Kate. How old is Kate?

Ⓑ Marco makes 9 apple tortes. He uses 3 apples for each torte. How many apples does he use?

Ⓒ Three groups of actors perform in plays at a festival. There are 9 actors in each group. How many actors perform in plays?

Ⓓ An art class meets 3 times a week for 9 weeks. How many times does the art class meet?

Ⓔ Judy finds 3 acorns. Aaron finds 3 times as many acorns as Judy. How many acorns does Aaron find?

**7** Maria has 32 postcards. Henry has $h$ postcards. Maria has 4 times as many postcards as Henry. Select all the correct statements.

Ⓐ The number of postcards Henry has can be represented by the expression $32 \div 4$.

Ⓑ Henry has 6 postcards.

Ⓒ The number of postcards Henry has can be found by solving the equation $32 = 4 \times h$.

Ⓓ Henry has 8 postcards.

Ⓔ The number of postcards Henry has can be represented by the expression $32 \times 4$.

**8** Viet learns 25 new spelling words. That is 5 times as many words as Max learns. How many words does Max learn? Draw a bar model to find the number of words Max learns. Show your work.

Max learns _____ new spelling words.

**9** MATH JOURNAL

Sarah writes 4 songs. Ronnie writes 6 more songs than Sarah. Paul writes 2 times as many songs as Sarah.

Find the number of songs Ronnie and Paul each write. Can you use multiplication as a comparison to find the number of songs each boy writes? Explain.

SELF CHECK Go back to the Unit 2 Opener and see what you can check off.