Lesson 5
Understand How Multiplication and Division Are Connected

Prerequisite: How do multiplication and division use equal groups?

Study the example showing a multiplication and a division sentence for equal groups. Then solve problems 1–9.

Example

2 groups of 5 fish

10 fish put into 2 equal groups

2 × 5 = 10

10 ÷ 2 = 5

Fill in the blanks.

1. _____ groups of _____ birds
   _____ × _____ = _____

2. _____ birds put into _____ equal groups
   _____ ÷ _____ = _____

3. Write a multiplication sentence to describe the groups of butterflies.
   __________________________________________

4. Write a division sentence to describe the groups of butterflies.
   __________________________________________
Solve.

5. Which number sentences best show the arrangement of the cans of tennis balls? Circle your choice.

\[
\begin{align*}
6 + 3 &= 9 \\
9 - 3 &= 6 \\
9 	imes 2 &= 18 \\
18 / 2 &= 9 \\
6 	imes 3 &= 18 \\
18 / 6 &= 3
\end{align*}
\]

6. Look at the array. Multiply to tell how many in all.

\[6 \times 3 = ____ \quad \text{or} \quad 3 \times 6 = ____\]

7. Draw a picture to show 15 cookies divided into 3 equal groups.

8. Write a division sentence for problem 7.


Vocabulary

*divide* separate into equal groups.

*array* a set of objects arranged in equal rows and equal columns.
Explore How Multiplication and Division Are Connected

Study the example that shows one way to think about multiplication and division together. Then solve problems 1–13.

**Example**

Marta baked 15 muffins. She puts an equal number of muffins in 3 baskets.

She thinks, 3 times what number equals 15?

\[ 3 \times ? = 15 \]

\[ 3 \times 5 = 15 \]

So, Marta puts 5 muffins in each basket.

1. Draw an array of 15 muffins in 3 rows.

2. How many muffins did you put in each row? _____

3. Fill in the blanks to write a division sentence for the array you drew.

   _____ \(\div\) _____ = _____

**Use the array to complete the number sentences.**

\[ 2 \times _____ = 12 \text{ and } 12 \div 2 = _____ \]

\[ 6 \times _____ = 12 \text{ and } 12 \div 6 = _____ \]

**Vocabulary**

*divide* separate into equal groups.

*array* a set of objects arranged in equal rows and equal columns.
Solve.

Use the numbers 3, 6, and 18 to write an equation for each problem.

6 There are 18 fish. Each bowl holds 6 fish.
   What number sentence shows the number of bowls?
   _____  ____  ____ = ____

7 There are 18 fish. An equal number of fish are in 3 bowls.
   What number sentence shows the number of fish in each bowl?
   _____  ____  ____ = ____

8 There are 3 bowls. 6 fish are in each bowl.
   What number sentence shows the total number of fish?
   _____  ____  ____ = ____

9 There are 6 fish in each bowl. There are 3 bowls.
   What number sentence shows the total number of fish?
   _____  ____  ____ = ____

This array shows that $6 \times 7 = 42$. Use this fact to complete the number sentences.

10 $6 \times 7 = ____$  $7 \times 6 = ____$

11 $6 \times ____ = 42$  $42 = ____ \times 6$

12 $42 \div 6 = ____$  $42 \div ____ = 6$

13 ____ = $42 \div 7$  $7 = 42 \div ____$
Reason and Write

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

Example

This fact family has four facts.

\[
\begin{array}{cc}
4 \times 3 &= 12 \\
3 \times 4 &= 12 \\
12 \div 3 &= 4 \\
12 \div 4 &= 3
\end{array}
\]

Tell why there are four facts in this family. Is it true that there are four facts in every fact family?

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

It is false. Most fact families have four different facts, but not all. The picture below shows that you can turn the 4 \times 3 rectangle on its side to make a rectangle to show 3 \times 4.

The two multiplication facts in this family are 4 \times 3 and 3 \times 4. Each multiplication fact has a division fact, so that’s 4 facts in all.

But if both the factors are the same, there is only one multiplication fact. For example, 3 \times 3 = 9. When you turn a 3 \times 3 rectangle it on its side, it’s still 3 \times 3. It’s not a new fact. The only related division fact is 9 \div 3 = 3. This family of facts has only 2 facts, so it is not true that every fact family has 4 facts.
Solve the problem. Use what you learned from the model.

These are related multiplication facts.

\[
3 \times 5 = 15 \quad 5 \times 3 = 15
\]

Is it true that if you know two related multiplication facts, you can find two related division facts?

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

Did you . . .

• use numbers to explain?
• use words to explain?
• give details?
• answer the question?