Lesson 5

Understand How Multiplication and Division Are Connected

Name: _____

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

$2 \times 5 = 10$

10 fish put into 2 equal groups

$10 \div 2 = 5$

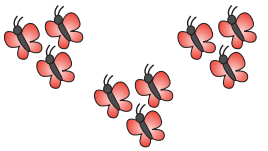
Fill in the blanks.

B 1 ___2___ groups of ___4___ birds

___2___ × ___4___ = ___8___

B 2 ___8___ birds put into ___2___ equal groups

___8___ ÷ ___2___ = ___4___



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

3 × 3 = 9

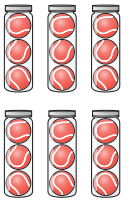
M 4 Write a division sentence to describe the groups of butterflies.

9 ÷ 3 = 3

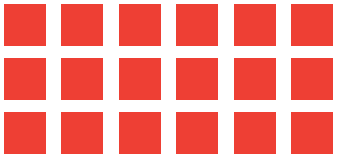
Solve.

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

6 + 3 = 9 9 − 3 = 6	9 × 2 = 18 18 ÷ 2 = 9	6 × 3 = 18 18 ÷ 6 = 3



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



6 × 3 = ___18___ or 3 × 6 = ___18___

M 7 Draw a picture to show 15 cookies divided into 3 equal groups. **Possible drawing:**

C 8 Write a division sentence for problem 7.

15 ÷ 3 = 5

C 9 Write a multiplication sentence for problem 7.

3 × 5 = 15

Vocabulary

divide separate into equal groups.

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

Key

B Basic **M** Medium **C** Challenge

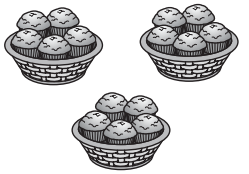
Name: _____

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?
$3 \times ? = 15$
$3 \times \mathbf{5} = 15$

So, Marta puts 5 muffins in each basket.

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

B 2 How many muffins did you put in each row? 5

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

15 ÷ 3 = 5

Use the array to complete the number sentences.

M 4 2 × 6 = 12 and 12 ÷ 2 = 6

M 5 6 × 2 = 12 and 12 ÷ 6 = 2

Vocabulary

divide separate into equal groups.

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

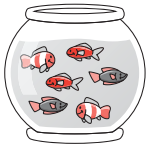
Solve.

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

M 6 There are 18 fish. Each bowl holds 6 fish.

What number sentence shows the number of bowls?

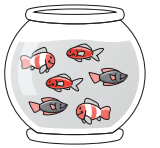
18 ÷ 6 = 3



M 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?

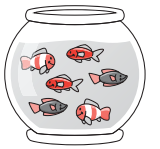
18 ÷ 3 = 6



M 8 There are 3 bowls. 6 fish are in each bowl.

What number sentence shows the total number of fish?

3 × 6 = 18



M 9 There are 6 fish in each bowl. There are 3 bowls.

What number sentence shows the total number of fish?

6 × 3 = 18

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

B 10 6 × 7 = 42 7 × 6 = 42

M 11 6 × 7 = 42 42 = 7 × 6

M 12 42 ÷ 6 = 7 42 ÷ 7 = 6

M 13 6 = 42 ÷ 7 7 = 42 ÷ 6

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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.

Answers will vary. Note whether students incorporate the features they chose in their answer on the next page.

Example

This fact family has four facts.

4 × 3 = 12	12 ÷ 3 = 4
3 × 4 = 12	12 ÷ 4 = 3

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 do. The picture below shows that you can turn the 4 × 3 rectangle on its side to make a rectangle to show 3 × 4.

4 × 3 

3 × 4 

The two multiplication facts in this family are 4 × 3 and 3 × 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 × 3 = 9. When you turn a 3 × 3 rectangle it on its side, it's still 3 × 3. It's not a new fact. The only related division fact is 9 ÷ 3 = 3. This family of facts has only 2 facts, so it is not true that every fact family has 4 facts.

3 × 3 

3 × 3 

Where does the example . . .
- use numbers to explain?
- use words to explain?
- give details?
- answer the question?

Solve the problem. Use what you learned from the model.

These are related multiplication facts.

3 × 5 = 15	5 × 3 = 15

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

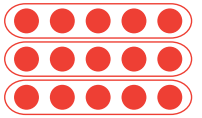
Show your work. Use pictures, words, or numbers to explain your answer.

Sample answer:

You can draw an array to show two related multiplication facts. Then group rows or columns to make two division facts.

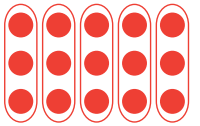
Start with an array that shows the multiplication facts 3 × 5 = 15 and 5 × 3 = 15. Make groups to show 15 ÷ 3 = 5.

3 × 5 = 15
and
15 ÷ 3 = 5



Make different groups to show 15 ÷ 5 = 3.

3 × 5 = 15
and
15 ÷ 5 = 3



It is true. You know that 3 × 5 = 15. You can use those same numbers 3, 5, and 15 to write the whole fact family:

3 × 5 = 15 15 ÷ 5 = 3
5 × 3 = 15 15 ÷ 3 = 5

Did you . . .
- use numbers to explain?
- use words to explain?
- give details?
- answer the question?