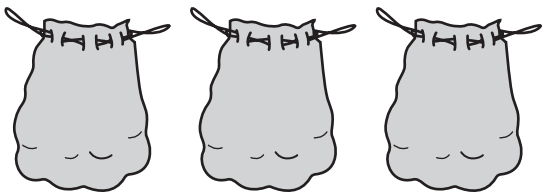
# Lesson 6 Part 1: Introduction
# Multiplication and Division Facts

CCSS
3.OA.A.4
3.OA.C.7

**You understand that multiplication and division are related. Look at this problem to see how this can help you work with division facts.**

Kenny has 24 marbles. He puts the same number of marbles into each of 3 bags. How many marbles are in each bag?



## Explore It

**Use math you already know to solve the problem.**

- Write the division problem you need to solve to answer this question. _____
- Think about this as a multiplication problem.
  How many equal groups are there? _____
- You don't know how many marbles are in each group. How can you write a multiplication fact that says 3 groups of ☐ marbles is 24? _____
- Here are multiplication facts for 3.
  Write the one that matches this problem. _____

| | | | | |
|---|---|---|---|---|
| $3 \times 1 = 3$<br>$3 \times 2 = 6$ | $3 \times 3 = 9$<br>$3 \times 4 = 12$ | $3 \times 5 = 15$<br>$3 \times 6 = 18$ | $3 \times 7 = 21$<br>$3 \times 8 = 24$ | $3 \times 9 = 27$<br>$3 \times 10 = 30$ |

- What number is ☐? _____
- How many marbles are in each bag? _____
- How could you check your answer?

_____

_____

_____



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## Find Out More

**Fact families** are sets of related multiplication and division facts. Here is one example:

$3 \times 8 = 24$ $8 \times 3 = 24$ $24 \div 8 = 3$ $24 \div 3 = 8$

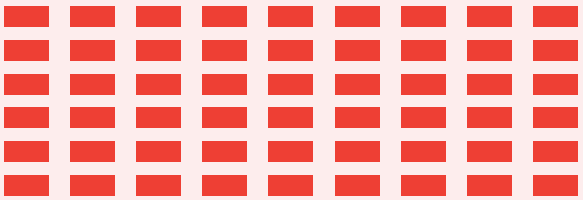
This shows two multiplication facts and two division facts. All the facts use the same three numbers. If you know one fact in the family, then you can find all the others, too.

When you are solving multiplication or division problems, the number that you don't know might be any one of the three numbers in a fact family. You can choose any fact in the family to help you think about the answer.

For example, you might write the fact $6 = \square \div 9$ to solve a problem. Here is the whole fact family:

$\square \div 6 = 9$ $\square \div 9 = 6$ $6 \times 9 = \square$ $9 \times 6 = \square$

Here is an array that shows the numbers in this fact family.



The array shows that $6 \times 9$ and $9 \times 6$ are both equal to 54. If you know one of the multiplication facts, you can complete the division facts: $54 \div 6 = 9$ or $54 \div 9 = 6$.

## Reflect

1 How are the multiplication facts in a fact family alike? How are they different? How are the division facts alike and different?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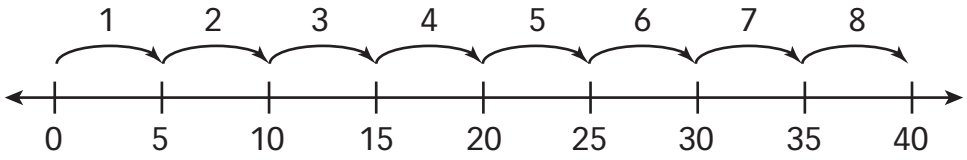
**Read the problem below. Then explore different ways to find a division fact answer.**

Jo knows nickels are worth 5 cents, and she needs 40 cents altogether. She wants to find out how many nickels she needs. Jo writes $40 \div 5 = \square$.

## Picture It

**You can use a number line to help you understand the problem.**

Skip count by 5s to find the answer. Start at 0 and jump by 5s until you get to 40.




## Model It

**You can use fact families and multiplication facts you know.**

Here are the facts in this family:

$5 \times \square = 40$ $\square \times 5 = 40$ $40 \div \square = 5$ $40 \div 5 = \square$

Write the multiplication facts for 5:

| | | | | |
|---|---|---|---|---|
| $5 \times 1 = 5$<br>$5 \times 2 = 10$ | $5 \times 3 = 15$<br>$5 \times 4 = 20$ | $5 \times 5 = 25$<br>$5 \times 6 = 30$ | $5 \times 7 = 35$<br>$5 \times 8 = 40$ | $5 \times 9 = 45$<br>$5 \times 10 = 50$ |

Look for the fact that uses the same numbers. Use that fact to fill in the blanks in the fact family.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## Connect It

**Now you will use fact families to solve another problem like the one on the previous page.**

2 Mo wants to know how many nickels he needs to make 45 cents. He writes 45 ÷ ☐ = 5. What other division fact can he write to model this problem?

3 What two multiplication facts are in the same fact family? Write multiplication facts with unknowns.

4 Look at the list of multiplication facts for 5 on the previous page. Which fact will help Mo answer his division problem? _____

5 Explain how you know which multiplication fact you can use to help you find any division fact.

## Try It

**Use what you just learned about fact families and the relationship between multiplication and division to solve these problems.**

6 Write the missing product. Then complete this fact family.

2 × 3 = ☐ _____ _____ _____

7 Write two multiplication facts Brice can use to solve ☐ ÷ 3 = 7.


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**Read the problems below. Then explore different ways to use a multiplication table to solve multiplication and division problems.**

Find the missing numbers.

$2 \times ____ = 10$ $24 \div 6 = ____$ $6 \times ____ = 48$ $____ \div 9 = 8$

## Picture It

**You can use a multiplication table to solve multiplication and division problems.**

A multiplication table shows all of the multiplication and division facts.

| | **0** | **1** | **2** | **3** | **4** | **5** | **6** | **7** | **8** | **9** |
|---|---|---|---|---|---|---|---|---|---|---|
| **0** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **1** | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| **2** | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| **3** | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 |
| **4** | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| **5** | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| **6** | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 |
| **7** | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 |
| **8** | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 |
| **9** | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 |

## Model It

**Use the table above to complete the fact family.**

The multiplication table shows the three numbers that belong in a fact family. Look at the row for 2. Go across to find 10. Then look up that column to find the third number in the fact family. Then fill in the blanks in the fact family.

$2 \times ____ = 10$ $10 \div 2 = ____$

$____ \times 2 = 10$ $10 \div ____ = 2$



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## Connect It

**Now you will use the multiplication table to find the answers to the other three problems.**

8 Look at the multiplication table. What are the three numbers in the fact family for $24 \div 6 = ____$? _____

Now fill in the blank: $24 \div 6 =$ _____

9 What are the three numbers in the fact family for $6 \times ____ = 48$? _____

Now fill in the blank: $6 \times$ _____ $= 48$

10 What are the three numbers in the fact family for $____ \div 9 = 8$? _____

Fill in the blank: _____ $\div 9 = 8$

11 Explain how you can use a multiplication table to find the 3 numbers in any fact family.

_____

_____

_____

## Try It

**Use what you just learned about using a multiplication table to solve these problems.**

12 Use the multiplication table to write the equations in the fact family that includes 42 and 6.

_____

13 Fill in the missing number: $56 \div$ _____ $= 8$


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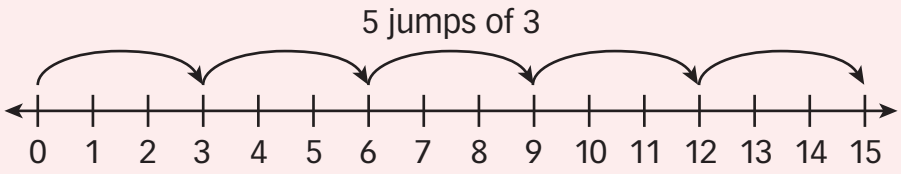
**Study the model below. Then solve problems 14–16.**

*Student Model*

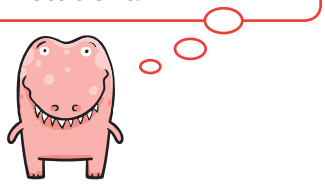
Today some students will give an oral report. The teacher has planned 15 minutes for all the reports. Each student gets 3 minutes. How many students are giving reports?
Solve $3 \times \square = 15$

***Look at how you could show your work using a number line.***




*Solution:* **5 students**

*Each jump on the number line stands for 1 student.*



**Pair/Share**

What other equations can be used to solve this problem?

**14** There are 35 students in the math club. They break into groups of 5 to work on a project. How many groups are there?
Solve $35 \div \square = 5$.

*How can you find the third number in this fact family?*

**Pair/Share**

What are the other facts that belong to this fact family?

*Solution:* _____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**15** Each package contains 4 party favors. Sheila buys 9 packages. How many party favors does she buy? Solve $4 \times 9 = \square$.

*Solution:* _____

*Are you looking for a factor or a product?*

**Pair/Share**

Explain how you solved this problem.

**16** Mrs. Tobin needs 30 juice boxes for her class. The juice boxes come in packages of 6. How many packages does she need? Solve $30 \div 6 = \square$. Circle the letter of the correct answer.

**A** 4

**B** 5

**C** 6

**D** 36

Pia chose **D** as the correct answer. How did she get that answer?

_____

_____

_____

*Do you know a multiplication fact that can help you solve this problem?*

**Pair/Share**

Does Pia's answer make sense?



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**Solve the problems.**

**1** Which does NOT belong to the same fact family as 12 ÷ ☐ = 4?

**A** 12 ÷ 3 = ☐

**B** ☐ × 2 = 12

**C** 4 × ☐ = 12

**D** 12 ÷ 4 = ☐

**2** Which multiplication fact can you use to solve 5 = 20 ÷ ☐?

**A** 5 × 5 = 25

**B** 4 × 5 = 20

**C** 5 + 15 = 20

**D** 6 × 4 = 24

**3** Jan and Jon pick 18 apples. They share them equally. Which facts can be used to find the number of apples each person gets? Circle the letter for all that apply.

**A** 6 × 3 = 18

**B** 2 × 9 = 18

**C** 18 ÷ 2 = 9

**D** 18 ÷ 3 = 6

**E** 18 ÷ 9 = 2



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**4** For items 4a–4d, choose *Yes* or *No* to show whether putting the number 8 in the box would make the equation true.

| | | | |
|---|---|---|---|
| **a.** | $9 \times \square = 64$ | ☐ Yes | ☐ No |
| **b.** | $6 \times \square = 48$ | ☐ Yes | ☐ No |
| **c.** | $56 \div \square = 8$ | ☐ Yes | ☐ No |
| **d.** | $32 \div \square = 4$ | ☐ Yes | ☐ No |

**5** Ho says that some fact families have only one multiplication equation and one division equation. Fill in the blanks to show an example.

_____ × _____ = _____ _____ ÷ _____ = _____

**6** Sasha has 32 stickers to use in her scrapbook. The scrapbook has 8 pages, and she wants to put the same number of stickers on each page. Write two multiplication facts Sasha can use to find how many stickers to put on each page.

***Answer*** _____

_____

✓ **Self Check** ***Go back and see what you can check off on the Self Check on page 1.***


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# Lesson 6 (Student Book pages 42–51)

# Multiplication and Division Facts

## LESSON OBJECTIVES

- Fluently multiply and divide within 100.
- Use fact families and the relationship between multiplication and division to find unknown whole numbers in multiplication and division problems.
- Solve word problems using equations with the missing whole number in different places.

## PREREQUISITE SKILLS

- Understand the meaning of multiplication.
- Understand the meaning of division.
- Connect multiplication and division.

## VOCABULARY

**fact family:** a group of related number sentences that use the same numbers, but in a different order

Review the following key terms.

**divide:** separate equal groups

**dividend:** the number you divide in a division problem

**divisor:** the number you divide by in a division problem

**factor:** a number that is multiplied

**multiply:** combine equal groups

**product:** the total when equal groups are combined

**quotient:** the answer to a division problem

## THE LEARNING PROGRESSION

Multiplication is a major focus for students in grade 3. Students also build a foundational understanding of division and learn how the two operations are related. In this lesson, students apply using fact families and multiplication tables to solve multiplication and division problems.

Students learn how a multiplication table can help them find products. They also use the table to find a missing factor by following the row of one factor until they find the dividend or product in the table.

Reaching fluency in single-digit multiplications and related divisions is critical and will be relied upon in higher grades. Therefore, it is important that students learn strategies and apply understanding of the two operations to learning multiplication and division facts.

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| | *Prerequisite Skills* | *3.OA.A.4 3.OA.C.7* |
|---|---|---|
| *Ready Lessons* | | ✓ |
| *Tools for Instruction* | | ✓ ✓ |
| *Interactive Tutorials* | | ✓ ✓ |

## CCSS Focus

***3.OA.A.4*** Determine the unknown whole number in a multiplication or division equation relating three whole numbers. *For example, determine the unknown number that makes the equation true in each of the equations* $8 \times ? = 48$, $5 = \square \div 3$, $6 \times 6 = ?$

***3.OA.C.7*** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that $8 \times 5 = 40$, one knows $40 \div 5 = 8$) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

**ADDITIONAL STANDARDS:** ***3.OA.A.3, 3.OA.A.4, 3.OA.B.5, 3.OA.B.6, 3.OA.C.7*** *(see page A42 for full text)*

**STANDARDS FOR MATHEMATICAL PRACTICE:** ***SMP 1, 2, 6, 7, 8*** *(see page A9 for full text)*


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## AT A GLANCE

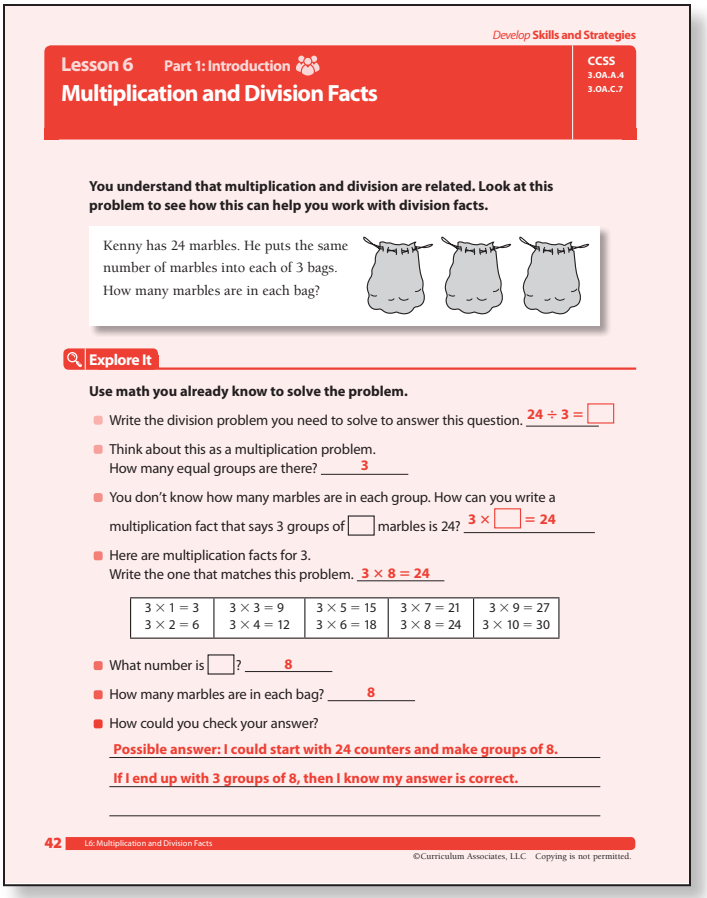
Students use what they know about how multiplication and division are related to help them learn division facts.

## STEP BY STEP

- Tell students that this page explores ways to make learning division facts easier.
- Remind students that multiplication and division are related. Write the problem "3 × 4 = 12" and "12 ÷ 3 = 4" on the board. Help students to focus on the structure of the two number sentences. Point out that in multiplication, two factors are multiplied to get the total amount and that in division the problem begins with the total amount that is divided into equal shares.

**SMP Tip:** Students are asked to look at the structure of multiplication and division number sentences to make sense of the relationship between the two operations *(SMP 7)*.

- Have students read the problem at the top of the page.
- Work through Explore It as a class. Write the division problem "24 ÷ 3 = ☐." Ask students to think of the multiplication fact that multiplies a number by 3 to get 24. Point out the multiplication table and ask them to find the fact.
- Ask student pairs to tell each other how they used multiplication facts to solve the division problem.



*Develop* **Skills and Strategies**

**Lesson 6** Part 1: Introduction
**Multiplication and Division Facts**
CCSS 3.OA.A.4 3.OA.C.7

**You understand that multiplication and division are related. Look at this problem to see how this can help you work with division facts.**

Kenny has 24 marbles. He puts the same number of marbles into each of 3 bags. How many marbles are in each bag?

**Explore It**

**Use math you already know to solve the problem.**

- Write the division problem you need to solve to answer this question. 24 ÷ 3 = ☐
- Think about this as a multiplication problem. How many equal groups are there? 3
- You don't know how many marbles are in each group. How can you write a multiplication fact that says 3 groups of ☐ marbles is 24? 3 × ☐ = 24
- Here are multiplication facts for 3. Write the one that matches this problem. 3 × 8 = 24

| | | | | |
|---|---|---|---|---|
| 3 × 1 = 3<br>3 × 2 = 6 | 3 × 3 = 9<br>3 × 4 = 12 | 3 × 5 = 15<br>3 × 6 = 18 | 3 × 7 = 21<br>3 × 8 = 24 | 3 × 9 = 27<br>3 × 10 = 30 |

- What number is ☐? 8
- How many marbles are in each bag? 8
- How could you check your answer?

Possible answer: I could start with 24 counters and make groups of 8.
If I end up with 3 groups of 8, then I know my answer is correct.

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## Concept Extension

- Point out that thinking of a related multiplication fact can make solving a division problem easier. Write the problem "18 ÷ 3 = ____" on the board. Write the sentence frame, "____ times what number equals ____." Have students practice this type of thinking with this problem and with 24 ÷ 4 = ____ and 21 ÷ 3 = ____.

## Mathematical Discourse

- *How can knowing a multiplication fact help you to solve a division problem?*

  The same three numbers are used in related multiplication and division equations.



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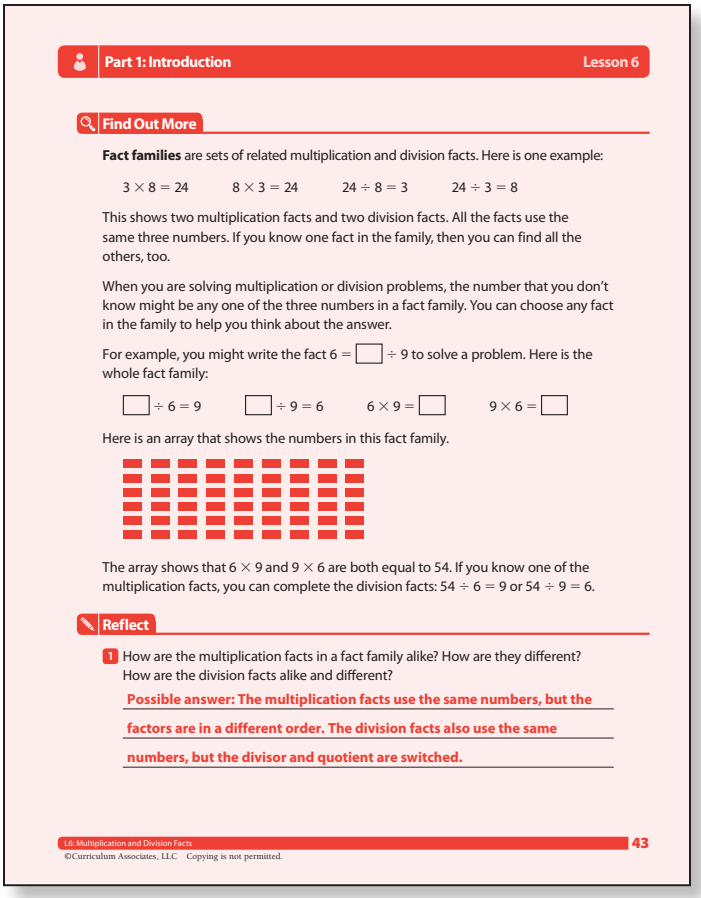
## AT A GLANCE

Students explore the use of fact families to find a number they don't know in a multiplication or division problem.

## STEP BY STEP

- Read Find Out More as a class. Write the four number sentences on the board for the $3 \times 8 = 24$ fact family. Ask students to circle the products or total amount in the four sentences on the page as you circle them on the board. Instruct students to underline the factors in all four sentences as you do the same on the board.
- Ask students for the numbers they see in the four family sentences. Write 3, 8, 24 on the board.
- Write "6 =____ ÷ 9" on the board. Help them to analyze the problem by asking questions such as: *What number are you dividing in the problem.* [54] *What does the 6 tell you?* [how many in each group] *What does the 9 tell you?* [how many equal groups]

**SMP Tip:** Students make sense of the relationship between the numbers in a division problem and connect it to the operation of multiplication *(SMP 2)*.



Part 1: Introduction Lesson 6

Find Out More

**Fact families** are sets of related multiplication and division facts. Here is one example:

$3 \times 8 = 24$ $8 \times 3 = 24$ $24 \div 8 = 3$ $24 \div 3 = 8$

This shows two multiplication facts and two division facts. All the facts use the same three numbers. If you know one fact in the family, then you can find all the others, too.

When you are solving multiplication or division problems, the number that you don't know might be any one of the three numbers in a fact family. You can choose any fact in the family to help you think about the answer.

For example, you might write the fact 6 = ☐ ÷ 9 to solve a problem. Here is the whole fact family:

☐ ÷ 6 = 9 ☐ ÷ 9 = 6 6 × 9 = ☐ 9 × 6 = ☐

Here is an array that shows the numbers in this fact family.

The array shows that 6 × 9 and 9 × 6 are both equal to 54. If you know one of the multiplication facts, you can complete the division facts: 54 ÷ 6 = 9 or 54 ÷ 9 = 6.

Reflect

1 How are the multiplication facts in a fact family alike? How are they different? How are the division facts alike and different?

Possible answer: The multiplication facts use the same numbers, but the factors are in a different order. The division facts also use the same numbers, but the divisor and quotient are switched.

L6: Multiplication and Division Facts 43

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## ELL Support

- Assist ELL students in distinguishing between the meanings of the term family used in daily life and its use in mathematics.
- For example, students may recall being asked by others, "How many people are in your family?" Emphasize that in mathematics, a fact family is a group of related number sentences.

## Concept Extension

- Give students practice finding missing numbers in multiplication and division sentences that are written in a variety of ways, such as $7 =$ ____ $\div 5$, $32 =$ ____ $\times 4$, $5 \times$ ____ $= 30$, and ____ $\div 4 = 20$.

## Real-World Connection

- *Why is the total amount in different positions in the multiplication and division sentences?*

  The total is the result of combining equal groups in multiplication. In division you start with the total and divide it into equal groups.
- *Why are the factors in different places in the multiplication and division sentences?*

  The factors tell how many groups and the number in each. You multiply the factors to get the total. In division you divide the total by one of the factors. The answer is a factor.


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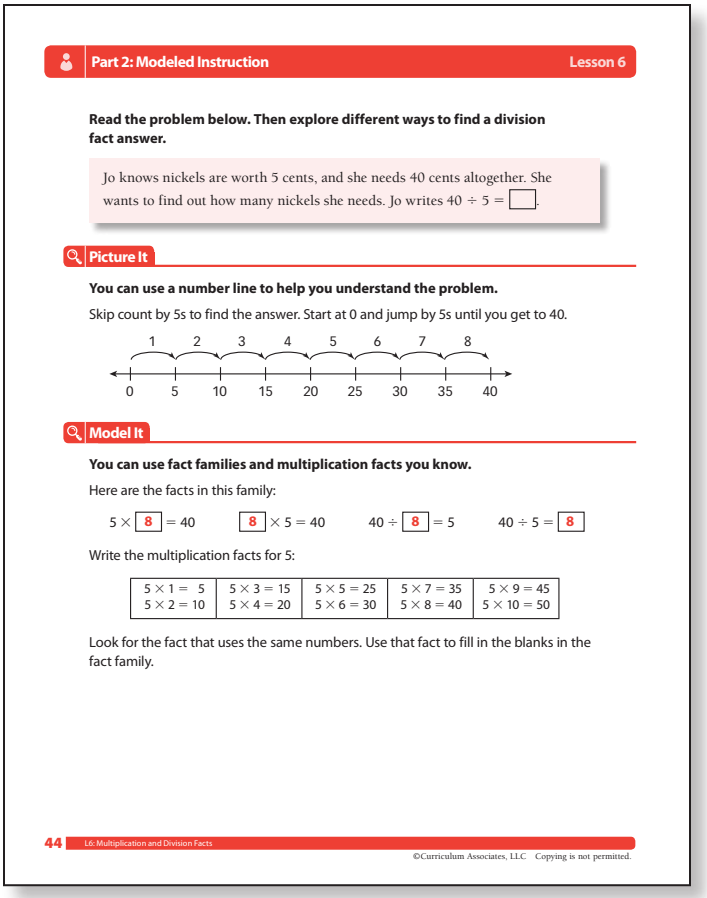
## AT A GLANCE

Students explore ways to find a division fact answer.

## STEP BY STEP

- Explain to students that they will explore ways to make finding division facts easier.
- Read the problem at the top of the page as a class and model Picture It for students. Draw the number line and write the problem "40 ÷ 5 = ____" on the board. Instruct students to show the jumps of 5 on the page as you count out jumps on the board. Be sure students understand that the answer 8 means 8 jumps of 5. Expect students to use the word quotient to describe the answer in a division problem.
- Ask students for the number sentences for this fact family and write them on the board. Ask them which fact family sentences can help them solve the division problem. [5 × 8 = 40 and 8 × 5 = 40]
- Direct students to the multiplication facts for 5 on the page. Have them circle the product of each fact. Remind them that the products are the same numbers they use when they skip count by fives.

**SMP Tip:** Students practice using precise mathematical terms to communicate with others *(SMP 6)*.



Part 2: Modeled Instruction Lesson 6

**Read the problem below. Then explore different ways to find a division fact answer.**

Jo knows nickels are worth 5 cents, and she needs 40 cents altogether. She wants to find out how many nickels she needs. Jo writes 40 ÷ 5 = ☐.

**Picture It**

**You can use a number line to help you understand the problem.**

Skip count by 5s to find the answer. Start at 0 and jump by 5s until you get to 40.

1 2 3 4 5 6 7 8

0 5 10 15 20 25 30 35 40

**Model It**

**You can use fact families and multiplication facts you know.**

Here are the facts in this family:

5 × 8 = 40 8 × 5 = 40 40 ÷ 8 = 5 40 ÷ 5 = 8

Write the multiplication facts for 5:

| | | | | |
|---|---|---|---|---|
| 5 × 1 = 5<br>5 × 2 = 10 | 5 × 3 = 15<br>5 × 4 = 20 | 5 × 5 = 25<br>5 × 6 = 30 | 5 × 7 = 35<br>5 × 8 = 40 | 5 × 9 = 45<br>5 × 10 = 50 |

Look for the fact that uses the same numbers. Use that fact to fill in the blanks in the fact family.

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## Concept Extension

- Some students may need extra help in writing the facts of 5 (or other facts). Suggest that they can use tally marks in groups of 5 and that they can count on 5 more. Also, they may wish to skip count and keep track of how many fives, instead of writing out all the multiplication facts for a number.

## Mathematical Discourse

- *What strategies do you use to help you remember your facts of 5?*

  Some students may say that every product ends in either a 5 or 0, using fingers for groups of 5, skip counting by fives.

- *What patterns do you see in the facts of 5?*

  Every other product is even, ends in 0 or is odd and ends in 5.



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## AT A GLANCE

Students revisit the problem on page 44 to find fact family sentences they can use to solve a division problem.

## STEP BY STEP

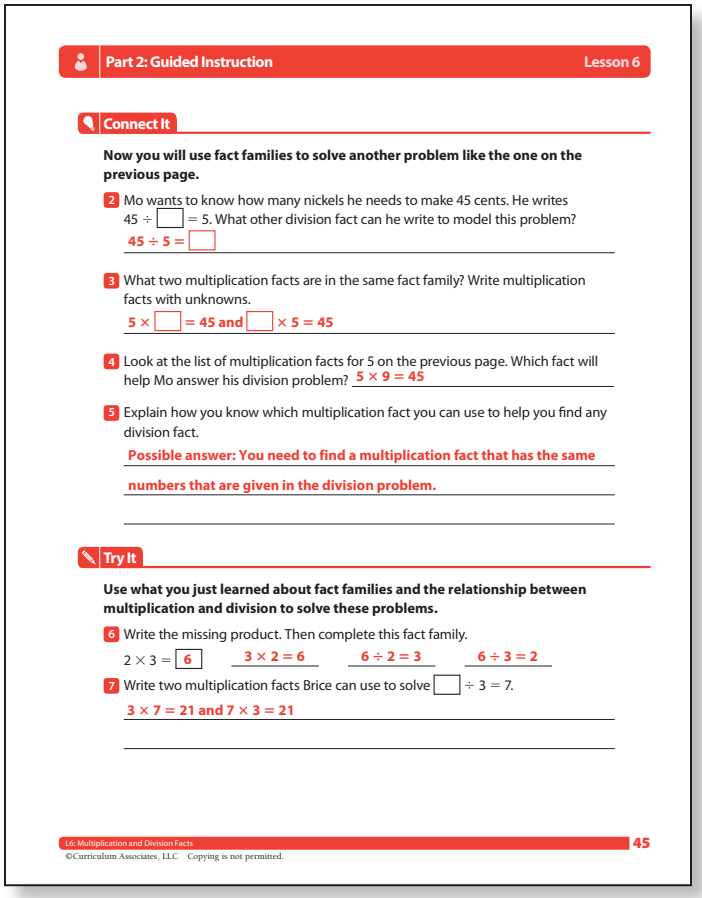
- Ask students to work in pairs. For a quick check on understanding, have students answer question number two on paper (write large) or white board and hold it up. Do the same for problem 3.
- Write the multiplication facts with unknowns on the board. Ask students which fact will help solve the problem and circle it on the board. [5 × ____ = 45] Have students use facts to find the missing factor.
- Ask pairs to discuss the answer to problem 5 and invite them to share ideas.

# Hands-On Activity

### Make fact triangles.

**Materials:** cut blank paper into triangles (base of approx. 3 inches) or make large triangles on 3 × 5 note cards

- Students work in pairs or individually to create fact cards to practice division facts using fact families. First, have students write out the facts for the sixes (or other facts you wish students to practice). Instruct them to circle the three numbers in each multiplication sentence.
- For each fact triangle, ask the student to write the product (dividend) on the top of the triangle and one of the facts on one of the other triangle corners. Ask each pair or student to create a set of 9 triangle fact cards. Students practice by going through the cards and naming the missing factor. The missing factor can be written on the back of each card.



Part 2: Guided Instruction Lesson 6

Connect It

**Now you will use fact families to solve another problem like the one on the previous page.**

2 Mo wants to know how many nickels he needs to make 45 cents. He writes 45 ÷ ☐ = 5. What other division fact can he write to model this problem?
45 ÷ 5 = ☐

3 What two multiplication facts are in the same fact family? Write multiplication facts with unknowns.
5 × ☐ = 45 and ☐ × 5 = 45

4 Look at the list of multiplication facts for 5 on the previous page. Which fact will help Mo answer his division problem? 5 × 9 = 45

5 Explain how you know which multiplication fact you can use to help you find any division fact.
Possible answer: You need to find a multiplication fact that has the same numbers that are given in the division problem.

Try It

**Use what you just learned about fact families and the relationship between multiplication and division to solve these problems.**

6 Write the missing product. Then complete this fact family.
2 × 3 = 6 3 × 2 = 6 6 ÷ 2 = 3 6 ÷ 3 = 2

7 Write two multiplication facts Brice can use to solve ☐ ÷ 3 = 7.
3 × 7 = 21 and 7 × 3 = 21

L6: Multiplication and Division Facts 45
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## TRY IT SOLUTIONS

**6** *Solution:* 2 × 3 = 6; 3 × 2 = 6; 6 ÷ 2 = 3; 6 ÷ 3 = 2

**ERROR ALERT:** Students who wrote only one multiplication and one division fact sentence may not remember that they can switch the order of the factors to create four different number sentences for the fact family.

**7** *Solution:* 3 × 7 = 21 and 7 × 3 = 21.


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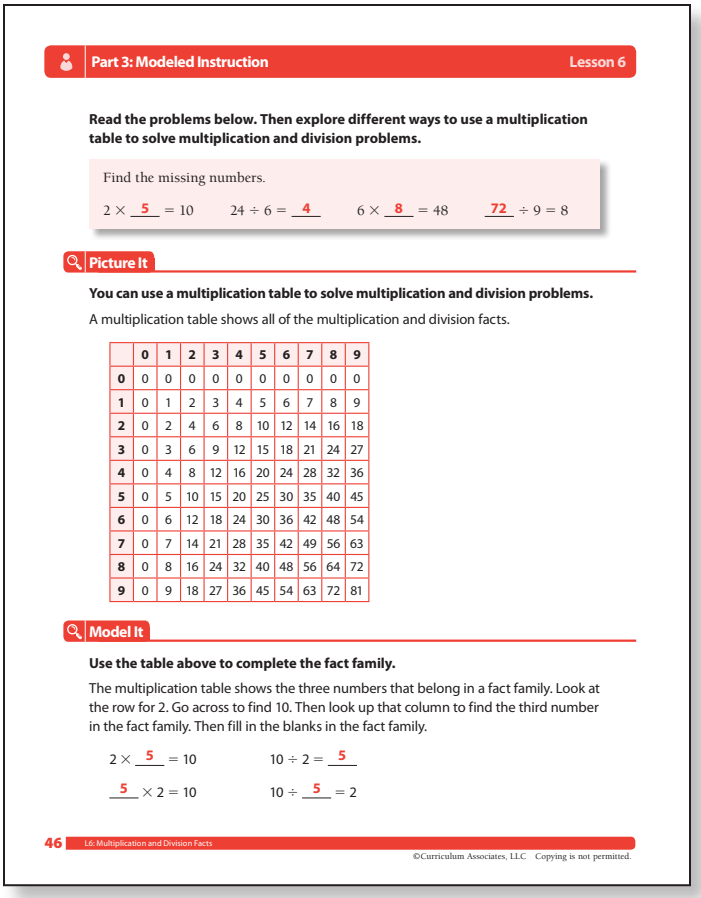
## AT A GLANCE

Students explore using a multiplication table to solve multiplication and division problems.

## STEP BY STEP

- Explain to students that they will explore different ways to use a multiplication table to solve problems.
- Read the problem at the top of the page as a class.
- If possible, have a completed multiplication chart posted on the wall for use in this lesson and for future reference. For Picture It, direct students' attention to the table on page 46. Help students understand how the table works by pointing out that the numbers along the left side refer to the multiplier or row and the numbers at the top show what is multiplied or the column.
- Work through the Model It problems together as a class. To help students focus on where to look on the chart, have them circle the product (or dividend) in each problem. Remind them that the product or dividend is found somewhere inside the chart. For each problem, ask students what numbers are given and where they should look on the chart. For example, for 2 × ____ = 12, students should know that the 2 tells them to look at row 2 until they find 12. From the 12, they move up the column to see that 6 is the missing factor.



Part 3: Modeled Instruction Lesson 6

**Read the problems below. Then explore different ways to use a multiplication table to solve multiplication and division problems.**

Find the missing numbers.

2 × 5 = 10  24 ÷ 6 = 4  6 × 8 = 48  72 ÷ 9 = 8

**Picture It**

**You can use a multiplication table to solve multiplication and division problems.**

A multiplication table shows all of the multiplication and division facts.

| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 1 | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
| 2 | 0 | 2 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 |
| 3 | 0 | 3 | 6 | 9 | 12 | 15 | 18 | 21 | 24 | 27 |
| 4 | 0 | 4 | 8 | 12 | 16 | 20 | 24 | 28 | 32 | 36 |
| 5 | 0 | 5 | 10 | 15 | 20 | 25 | 30 | 35 | 40 | 45 |
| 6 | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 |
| 7 | 0 | 7 | 14 | 21 | 28 | 35 | 42 | 49 | 56 | 63 |
| 8 | 0 | 8 | 16 | 24 | 32 | 40 | 48 | 56 | 64 | 72 |
| 9 | 0 | 9 | 18 | 27 | 36 | 45 | 54 | 63 | 72 | 81 |

**Model It**

**Use the table above to complete the fact family.**

The multiplication table shows the three numbers that belong in a fact family. Look at the row for 2. Go across to find 10. Then look up that column to find the third number in the fact family. Then fill in the blanks in the fact family.

2 × 5 = 10  10 ÷ 2 = 5

5 × 2 = 10  10 ÷ 5 = 2

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## Mathematical Discourse

- *Why are there zeros in the first row and the first column?*

  They show the product when you multiply the number by 0. It will always be zero.

- *Look at the "1" row across (that starts with 1, 2, 3, etc.). Where else can you find these same numbers on the chart? Why?*

  Students should recognize that these same numbers can be found in the "1" column. This is because numbers can be multiplied in any order.

## Hands-On Activity

### Build a multiplication table.

**Materials:** blank multiplication chart (only rows/columns without numbers)

- Students build their own multiplication tables to deepen their understanding about how multiplication and the table works and as a method for learning/remembering facts. They realize that learning one set of facts, such as the fives can help them when they are learning other sets of facts
- Instruct students to first fill in the zero columns/rows. Then ask what other rows/columns would be easy to fill in (ones). Then fill in the rows/columns for the twos and fives. Students begin to see how many facts they already know. Be sure to point out that if they fill in one whole row, they already know the facts for the relating column.



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## AT A GLANCE

Students revisit the problem on page 46 and use the table to find answers to other multiplication and division problems.

## STEP BY STEP

- Ask students to work in pairs to use the multiplication table to help them find the answers for problems 8–10.
- For problem 11, ask pairs to join another pair and show them how they used the table to find the answers to the problems.
- Ask students to share anything new they discovered or noticed while working with the multiplication table. Students may share a pattern they noticed in the table or see another way that the table can be helpful.

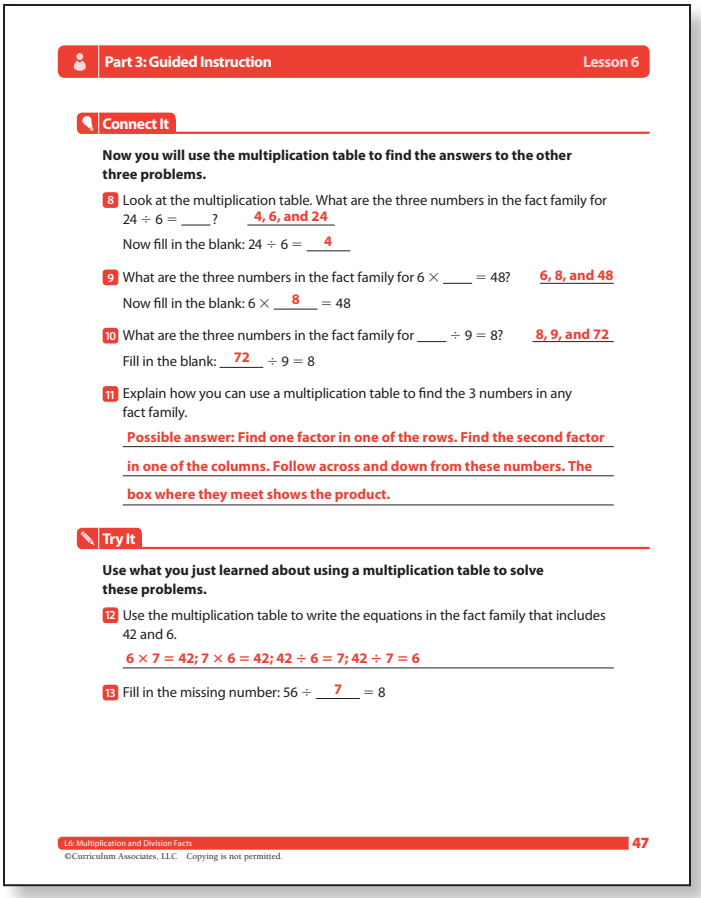
**SMP Tip:** Students look for patterns in the multiplication table and use them to help them learn facts *(SMP 7)*.

# Concept Extension

### Practice with "count bys" or "go bys."

**Materials:** white boards or paper

- Students often use the phrases "count by" twos or "go by" twos when finding multiples of a number. Point out that practice with writing the multiples or "go bys" of numbers can help them learn and retrieve their multiplication facts more quickly. Ask students to write their "count bys" or "go bys" of 3 on their white boards or paper as quickly as they can. When students have an extra minute or when waiting in line, ask the group to count by or "go by" sixes out loud or have them quickly write them on their paper or white boards. You may wish to pass out empty multiplication charts and have students fill it in using "go bys" over time.


Part 3: Guided Instruction Lesson 6

Connect It

**Now you will use the multiplication table to find the answers to the other three problems.**

8 Look at the multiplication table. What are the three numbers in the fact family for 24 ÷ 6 = ____? 4, 6, and 24

Now fill in the blank: 24 ÷ 6 = 4

9 What are the three numbers in the fact family for 6 × ____ = 48? 6, 8, and 48

Now fill in the blank: 6 × 8 = 48

10 What are the three numbers in the fact family for ____ ÷ 9 = 8? 8, 9, and 72

Fill in the blank: 72 ÷ 9 = 8

11 Explain how you can use a multiplication table to find the 3 numbers in any fact family.

Possible answer: Find one factor in one of the rows. Find the second factor in one of the columns. Follow across and down from these numbers. The box where they meet shows the product.

Try It

**Use what you just learned about using a multiplication table to solve these problems.**

12 Use the multiplication table to write the equations in the fact family that includes 42 and 6.

6 × 7 = 42; 7 × 6 = 42; 42 ÷ 6 = 7; 42 ÷ 7 = 6

13 Fill in the missing number: 56 ÷ 7 = 8

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## TRY IT SOLUTIONS

**12** *Solution:* 6 × 7 = 42, 7 × 6 = 42, 42 ÷ 6 = 7, and 42 ÷ 7 = 6; Students may write the sentences in any order.

**13** *Solution:* 7; Students may already know the missing factor or use the multiplication table to find the factor.

**ERROR ALERT:** Students who wrote an incorrect missing factor, may need more practice finding the correct row or column and the dividend in the table.


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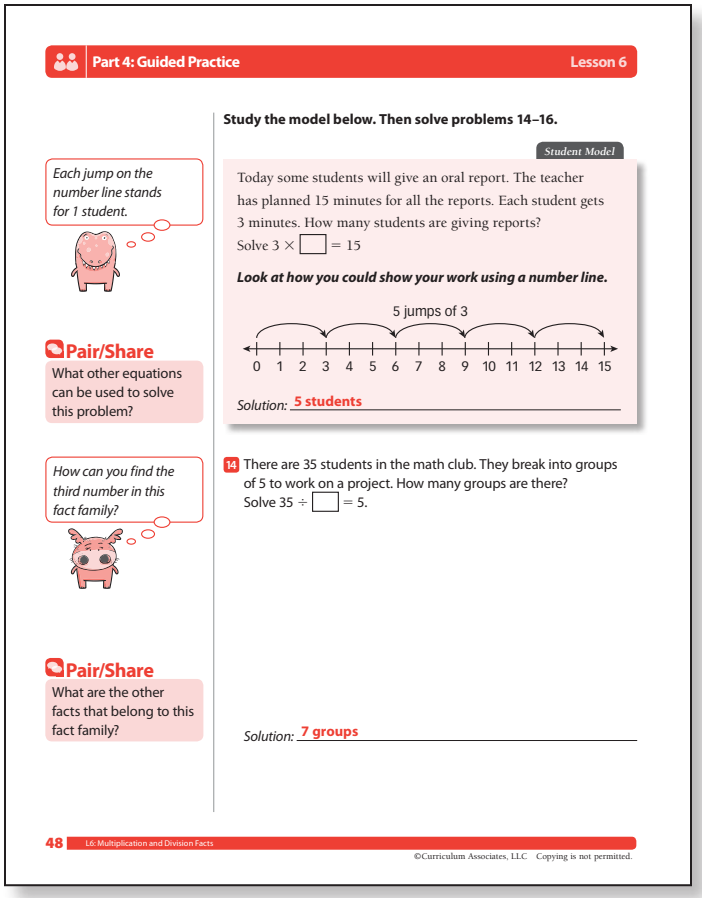


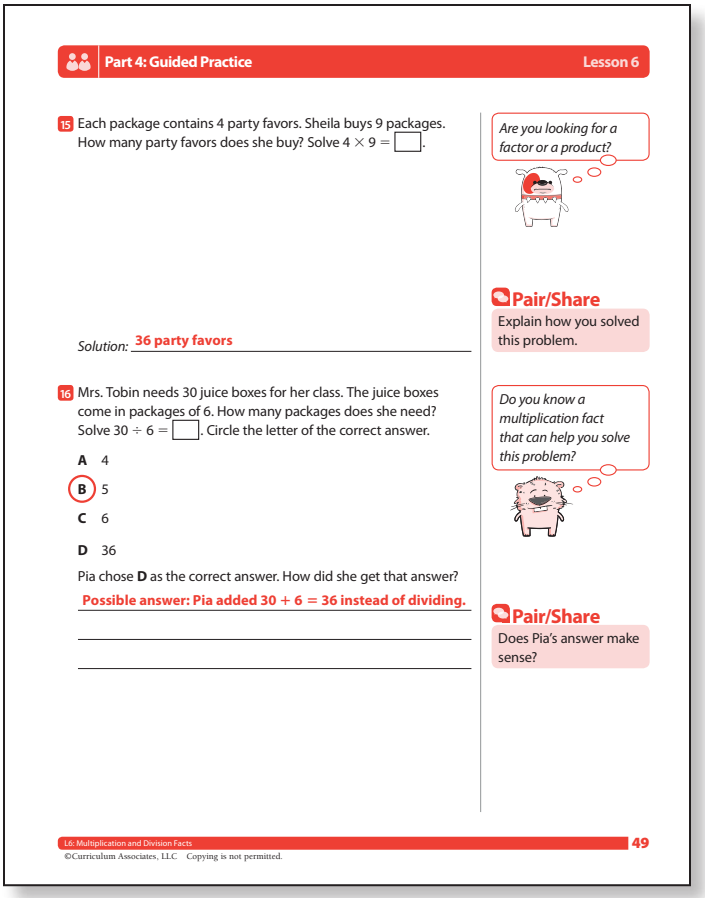


## AT A GLANCE

Students practice using equations, fact families, number lines, and a multiplication table to solve multiplication and division problems.

## STEP BY STEP

- Ask students to solve the problems individually. Remind students that they can use a multiplication table and fact families, besides number lines and equations, to solve the multiplication and division problems.
- Encourage students to pay attention to the hints along the side of each page, especially the hint that asks them to figure out if they are looking for a factor or for a product.
- When students have completed each problem, have them Pair/Share to discuss their solutions with a partner or in a group.
- Briefly share answers for each problem as a class. Ask students to share which strategy they used.

## SOLUTIONS

**Ex** Students may count by multiples (or "go bys"), use a multiplication table, or fact families to solve the problems.

**14** *Solution:* 7 groups; Students may think what number × 5 = 35. ***(DOK 1)***

**15** *Solution:* 36 party favors; Students may use a number line to find the product. ***(DOK 1)***

**16** *Solution:* **B**; Determine how many equal groups of 6 are in 30. Students might ask themselves what number times 6 equals 30.

Explain to students why the other two answer choices are not correct:

Students may have chosen **A** or **C** because they didn't use the multiplication table correctly to find the missing factor. ***(DOK 3)***


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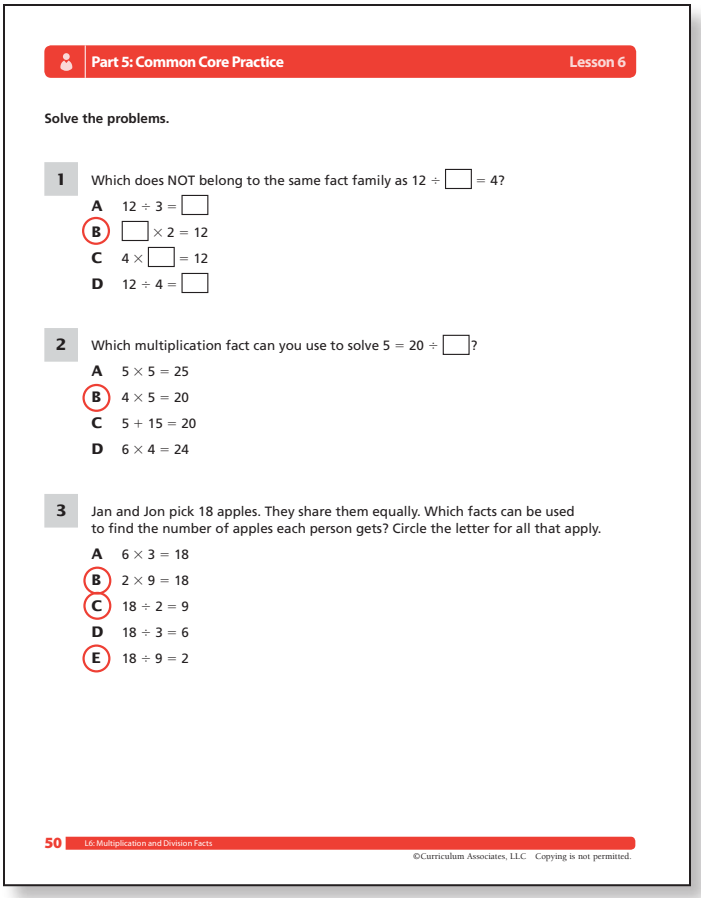

Part 5: Common Core Practice Lesson 6

Solve the problems.

**1** Which does NOT belong to the same fact family as 12 ÷ ☐ = 4?

**A** 12 ÷ 3 = ☐
**B** ☐ × 2 = 12
**C** 4 × ☐ = 12
**D** 12 ÷ 4 = ☐

**2** Which multiplication fact can you use to solve 5 = 20 ÷ ☐?

**A** 5 × 5 = 25
**B** 4 × 5 = 20
**C** 5 + 15 = 20
**D** 6 × 4 = 24

**3** Jan and Jon pick 18 apples. They share them equally. Which facts can be used to find the number of apples each person gets? Circle the letter for all that apply.

**A** 6 × 3 = 18
**B** 2 × 9 = 18
**C** 18 ÷ 2 = 9
**D** 18 ÷ 3 = 6
**E** 18 ÷ 9 = 2

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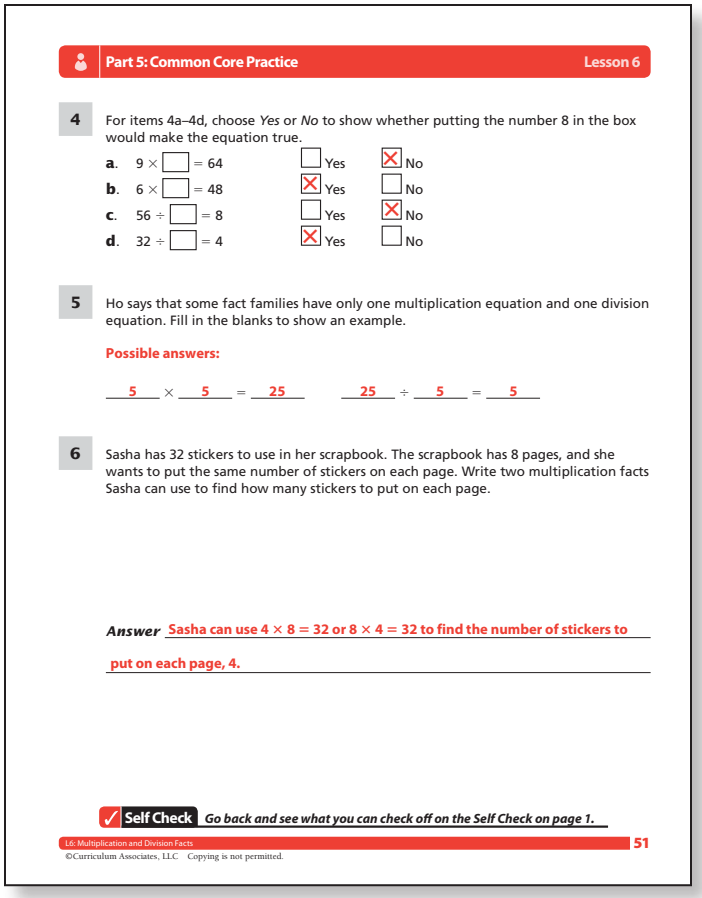

Part 5: Common Core Practice Lesson 6

**4** For items 4a–4d, choose *Yes* or *No* to show whether putting the number 8 in the box would make the equation true.

| | | | |
|---|---|---|---|
| **a.** | 9 × ☐ = 64 | ☐ Yes | ☒ No |
| **b.** | 6 × ☐ = 48 | ☒ Yes | ☐ No |
| **c.** | 56 ÷ ☐ = 8 | ☐ Yes | ☒ No |
| **d.** | 32 ÷ ☐ = 4 | ☒ Yes | ☐ No |

**5** Ho says that some fact families have only one multiplication equation and one division equation. Fill in the blanks to show an example.

Possible answers:

5 × 5 = 25 25 ÷ 5 = 5

**6** Sasha has 32 stickers to use in her scrapbook. The scrapbook has 8 pages, and she wants to put the same number of stickers on each page. Write two multiplication facts Sasha can use to find how many stickers to put on each page.

*Answer* Sasha can use 4 × 8 = 32 or 8 × 4 = 32 to find the number of stickers to put on each page, 4.

✓ Self Check *Go back and see what you can check off on the Self Check on page 1.*

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## AT A GLANCE

Students use what they know about multiplication and division facts to solve problems that might appear on a mathematics test.

## SOLUTIONS

**1** *Solution:* **B**; Students see that 2 and 6 are not in the 3, 4, 12 fact family. ***(DOK 1)***

**2** *Solution:* **B**; Students may ask themselves what fact family goes with the numbers 5 and 20. Also, they may ask themselves if they are looking to find a factor or a product. ***(DOK 1)***

**3** *Solution:* **B**; The fact family that goes with the numbers 18 and 2 includes 2 × 9 = 18.
**C**; The fact family that goes with the numbers 18 and 2 includes 18 ÷ 2 = 9.
**E**; The fact family that goes with the numbers 18 and 2 includes 18 ÷ 9 = 2. ***(DOK 1)***

**4** *Solution:* a. **No**; b. **Yes**; c. **No**; d. **Yes** ***(DOK 1)***

**5** *Possible solution:* 5 × 5 = 25 and 25 ÷ 5 = 5; If incorrect, students may not realize that there is only one way to write a multiplication and division equation if the 2 factors are the same. ***(DOK 2)***

**6** *Solution:* 4 × 8 = 32 and 8 × 4 = 32. ***(DOK 1)***


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## Assessment and Remediation

- Ask students to find the fact Jenna can use to solve this problem: 56 ÷ 7 = _____
- For students who are struggling, use the chart below to guide remediation.
- After providing remediation, check students' understanding. Ask students to find the fact that can be used to solve this problem: 27 ÷ 9 = ____.

| If the error is . . . | Students may . . . | To remediate . . . |
|---|---|---|
| 7 or 9 | not know how to use a multiplication table correctly to find the missing factor in a division problem | Ask the student to circle the total (dividend) in the problem and underline the fact. Remind them that in a multiplication table, they can look at the row number at the left side of the table, follow the row until they reach 56, and look to see the column number for the missing factor. |
| 7 or 9 | not know the multiplication facts of 7 | Have students practice counting by or "going by" sevens (7, 14, 21, etc.) and keeping count of how many sevens they have counted when they reach 56. |
| Students chose a division fact instead of a multiplication fact | not understand how knowing a multiplication fact can help find the answer to a division problem. | Write a simple division problem, such as 12 ÷ 3 = ____. Have students circle the product (total). Ask them to underline the factor and the empty box . Point out that they are looking for the factor that goes with 3 to make the product 12. Rewrite the sentence as 3 × ____ = 12, have the student fill in the missing factor, then fill in the box for 12 ÷ 3 = ____. |

## Hands-On Activity

**Use a multiplication table to learn facts for 9.**

**Materials:** multiplication facts table for each student

- Ask students to look for patterns in the multiplication table and share patterns.
- Direct students' attention to the nines column. Write the multiples of 9 on the board. Asks students to describe a pattern they see. [The two digits in the product add up to 9.]
- Tell students that knowing these patterns can help them remember their facts of 9. Help them reason that the product for 9 × 5 will not be in the 50s, but in the 40s (because 5 × 10 = 50 and 5 × 9 is 9 less). So it will be 4_. Since the 2 digits equal 9 when added, the other digit must be 5. Help students test this out with other facts, such as 9 × 8 (product will be in 70s, the ones digit must be a 2).

## Challenge Activity

**Materials:** 1–100 completed multiplication table and a blank multiplication table.

Glue or staple the blank table to the completed one, so students can easily extend the table to 15 rows.

Students will use what they know about the multiplication chart to extend it to at least 15 rows. Ask students to work in pairs to complete the table. Explain that they will need to rely on the patterns on the chart to extend the table. For example, to complete the "twos" column, they add 2 to the previous number in the column. So after 20, students write 22, 24, 26, 28, 30 in the column. Advise them to work on completing columns, rather than rows. When the chart is complete, ask them: *In the elevens row, what do you notice about each number in the row?* [Each number is eleven more than the previous number.] Work the problem 15 × 5 together. Have students find row 15 and column 5 to find the product 75. Ask students to use the chart to find other products, such as 7 × 13, 8 × 12.


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