LESSON 6

Objective

Solve problems using either multiplication or division.

Common Core State Standards

- **3.OA.3** Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem.
- **3.OA.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 × ? = 48, 5 = □ ÷ 3, 6 × 6 = ?.*
- **3.OA.6** Understand division as an unknown-factor problem. *For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.*
- **3.OA.7** Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division (e.g., knowing that 8 × 5 = 40, one knows 40 ÷ 5 = 8) or properties of operations. By the end of Grade 3, know from memory all products of two one-digit numbers.

Operations and Algebraic Thinking

Multiplication and Division

Beginning with concrete models and moving on to paper and pencil experiences, students begin to develop computational fluency. The more they work with numbers, the stronger this foundation becomes. Using the inverse operation of a problem as a means of checking answers is another way to practice computations and build fluency. In this lesson, students identify whether multiplication or division should be used to solve problems and then create arrays to model and find the answers.

Try It! *Perform the Try It! activity on the next page.*

Talk About It

Discuss the Try It! activity.

- **Say:** *Look at the multiplication problem you wrote.* **Ask:** *How did you turn it into a division problem to find the missing factor?*
- **Ask:** *What two multiplication problems describe the array you made with the Color Tiles?* Students should conclude that 4 × 7 and 7 × 4 describe the array.
- **Ask:** *How can you use multiplication to make sure you perform division problems correctly?*

Solve It

With students, reread the problem. Have students write instructions telling how to solve the problem using multiplication, and then how to solve it using division. Then have students illustrate the solution on paper.

More Ideas

For other ways to teach about solving problems using multiplication or division—

- Display the following multiplication problems on the board: 6 × _____ = 42, 7 × _____ = 35, 9 × _____ = 27, and 3 × _____ = 45. Have students model and solve each problem using Centimeter Cubes. Then find the corresponding division problems.
- Have one student write a multiplication or division problem and model it using Color Tiles. Then direct his or her partner to make an inverse model to find the same answer.

Formative Assessment

Have students try the following problem.

Which of the following is another way to write and solve 20 × _____ = 80?

A. 2 × 80 = 160

B. 80 ÷ 20 = 4

C. 80 – 20 = 60

D. 80 + 20 = 100

Try It! 25 Minutes | Pairs

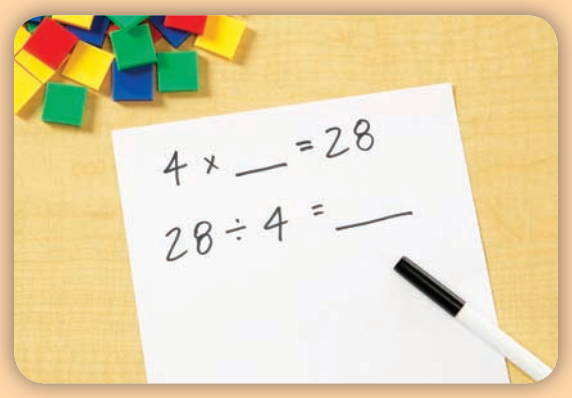
Here is a problem about using either multiplication or division.

There are 28 desks in the classroom. If we arrange the desks evenly in 4 rows, how many desks will there be in each row?

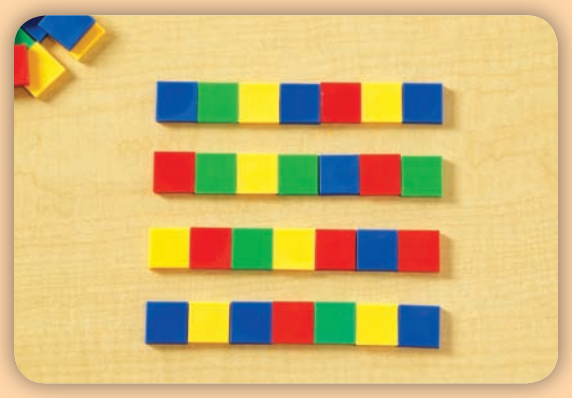
Introduce the problem. Then have students do the activity to solve the problem. Distribute Color Tiles, paper, and pencils to pairs of students.

Materials

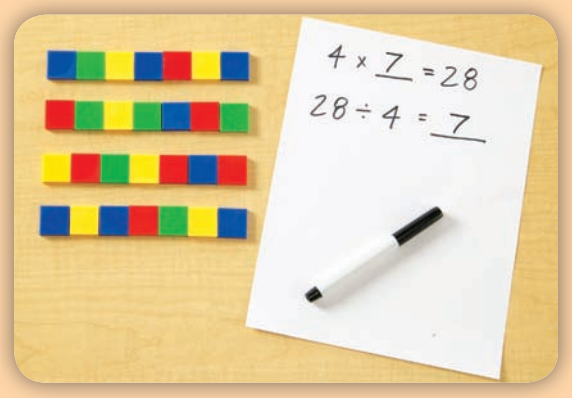
- Color Tiles (50 per pair)
- paper (1 sheet per pair)
- pencils (1 per pair)



1. Say: *We know that there are 28 desks arranged evenly in 4 rows.* Write *4* × _____ = *28* on the board, and have students write it on their papers. **Say:** *We want to find the missing number.* **Ask:** *What kind of problem can we write to find how many desks will be in each row?* Guide students to conclude that they should write a division problem. Write *28* ÷ *4* = _____ on the board, and have students write it on their papers.



2. Tell students that they can make an array using the tiles to solve a division problem. **Ask:** *How many tiles will you use in your array?* Students should see that they will use 28 tiles, since that is the number they want to divide. **Ask:** *How many rows of tiles will there be in the array?* Guide students to conclude that there will be 4 rows. Have students make the array.



3. Ask: *How can you use the array to find the answer to 28 ÷ 4 =* _____ . Have students count the tiles in a row to solve and then fill in the blanks in the multiplication and division problems on their paper.

⚠ Look Out!

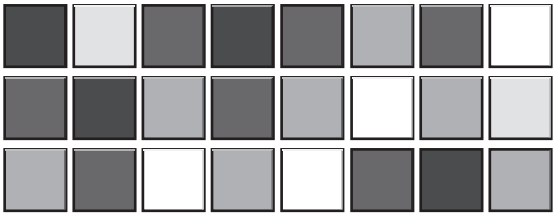
Watch for students who have difficulty formulating a division problem to solve a multiplication problem. Write *4* × *5* = *20* and *20* ÷ *4* = *5* on the board. Point out how the same three numbers are used in both problems, and how they are related. Invite students to write their own pairs of simple, corresponding division and multiplication problems.

Answer Key

Use Color Tiles to model each array. Complete the multiplication sentence. Write a related division sentence.

(Check students' work.)

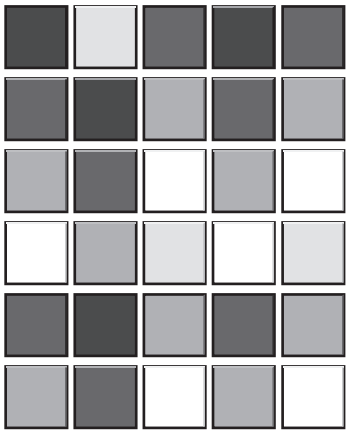
1.



$3 \times$ 8 $= 24$

24 ÷ 3 = 8

2.



$6 \times$ 5 $= 30$

30 ÷ 6 = 5

Using Color Tiles, model an array for each number sentence. Sketch the model. Complete the multiplication sentence. Write a related divison sentence.

(Check students' models.)

3. $8 \times$ 6 $= 48$

48 ÷ 8 = 6

4. $5 \times$ 4 $= 20$

20 ÷ 5 = 4

Complete each multiplication sentence. Write a related division sentence.

5. $7 \times$ 6 $= 42$

42 ÷ 7 = 6

6. $4 \times$ 9 $= 36$

36 ÷ 4 = 9

7. $8 \times$ 5 $= 40$

40 ÷ 8 = 5

8. $7 \times$ 8 $= 56$

56 ÷ 7 = 8

Answer Key

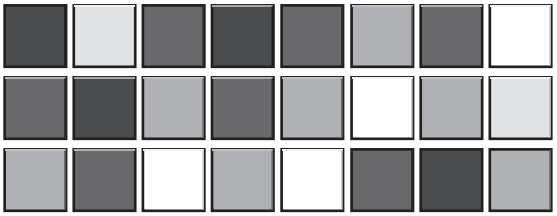
Challenge! Write another division sentence for Problem 1. Describe the model for this division sentence. Write the other two sentences in this fact family.

Challenge: (Sample) 24 ÷ 8 = 3, 8 rows of 3 Color Tiles for a total of 24 Color Tiles; 3 × 8 = 24; 8 × 3 = 24

Name _____

Use Color Tiles to model each array. Complete the multiplication sentence. Write a related division sentence.

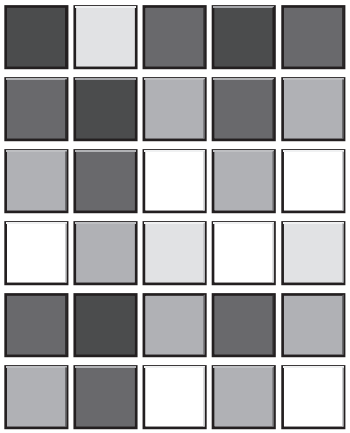
1.



3 × _____ = 24

_____

2.



6 × _____ = 30

_____

Using Color Tiles, model an array for each number sentence. Sketch the model. Complete the multiplication sentence. Write a related divison sentence.

3. 8 × _____ = 48

_____

4. 5 × _____ = 20

_____

Complete each multiplication sentence. Write a related division sentence.

5. 7 × _____ = 42

_____

6. 4 × _____ = 36

_____

7. 8 × _____ = 40

_____

8. 7 × _____ = 56

_____

Name _____

Challenge! Write another division sentence for Problem 1. Describe the model for this division sentence. Write the other two sentences in this fact family.