

LESSON 3

Objective

Explore the meaning of division.

Common Core State Standards

- **3.OA.2** Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. *For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$.*
- **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.

Operations and Algebraic Thinking

Exploring Division

Exploring ideas visually and kinesthetically helps students learn new concepts. When students reach grade 3, the emphasis on operations switches from addition and subtraction to multiplication and division. Using concrete models to solve division problems allows students to see the meaning of the different parts of the division problem and how the numbers are tied together.

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

Talk About It

Discuss the Try It! activity.

- **Ask:** How many groups of Two-Color Counters did you get when you divided 24 into equal groups of 4? How many groups were there when you divided 24 counters into equal groups of 8?
- **Ask:** What do you notice about the division sentences you wrote when you divided 24 into equal groups of 2 and equal groups of 12? How can you use what you know about multiplication to help you solve a division problem?
- **Ask:** Will you always have equal parts when you divide something? Why or why not?

Solve It

With students, reread the problem. Have students write about how they can use what they know about arrays and multiplication to solve division problems.

More Ideas

For other ways to teach about exploring division—

- Sort Centimeter Cubes and paper cups into evenly divisible groups for a variety of division problems. Present a problem to students, such as *21 divided into equal groups of 3*. Then have students model the problem by placing the correct number of cubes into each cup.
- Have students work in pairs using Color Tiles. One student will make an array using the tiles, and the other student must come up with a multiplication sentence and a division sentence that matches the array. Students take turns creating arrays and multiplication and division sentences.

Formative Assessment

Have students try the following problem.

Which grouping of tally marks shows $24 \div 3$?

- A. ||||| ||||| |||||
- B. ||| ||| ||| ||| ||| |||
- C. ||||| ||||| |||||
- D. ||| ||| ||| ||| ||| ||| ||| |||

Try It! 30 minutes | Pairs

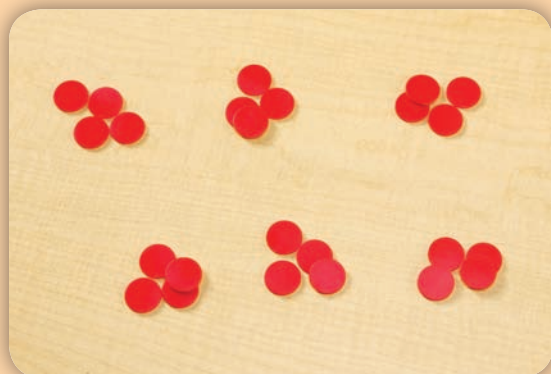
Here is a problem about exploring division.

There are 24 students in Mrs. Lopez's class. Mrs. Lopez divided the class into groups of 4 students. How many groups are there?

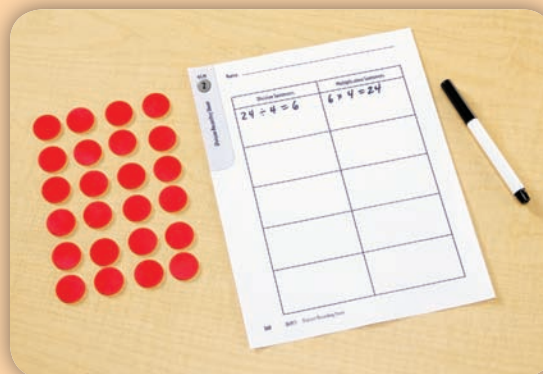
Introduce the problem. Then have students do the activity to solve the problem. Pass out Two-Color Counters and a Division Recording Sheet (BLM 2) to students.

Materials

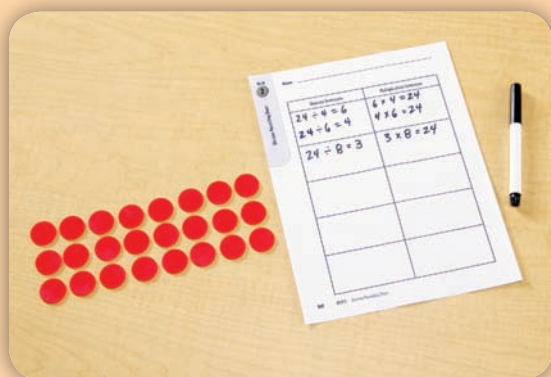
- Two-Color Counters (24 per pair)
- Division Recording Sheet (BLM 2; 1 per student)
- paper (1 sheet per student)
- pencils (1 per student)



1. Say: We are going to divide our counters into equal groups of 4. Tell students that this is one way to show 24 divided into equal groups of 4. **Ask:** What division sentence are we modeling?



2. Have students use their groups to construct an array to show the product of 6 and 4. **Ask:** What multiplication sentence is displayed? Have students fill out the Division Recording Sheet, using counters to assist them.



3. Have students use arrays of counters to model the other ways of dividing 24 into equal groups. They should write a division and multiplication sentence for the models they built on the recording sheet.

Look Out!

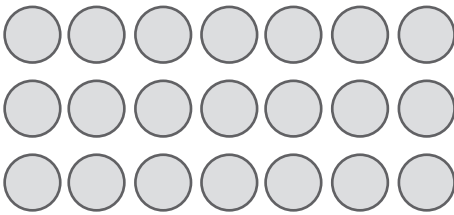
If students have difficulty using arrays to perform division, you may wish to show them a multiplication array. Point out that they need 4 columns, and they have 24 counters to use up. Have students put 1 counter in each column, adding rows until the counters have all been used. Also, watch for students who can divide using paper and pencil but cannot display the operation using manipulatives. This may indicate that the student lacks number sense and is relying on the memorization of facts.



Use Two-Color Counters to build each array. Rearrange the counters into groups of the size shown. Complete each division sentence.

(Check students' work.)

1.

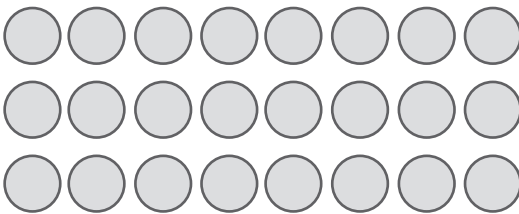


put into groups of



$$\underline{21} \div \underline{3} = \underline{7}$$

2.



put into groups of



$$\underline{24} \div \underline{4} = \underline{6}$$

Build each array using Two-Color Counters. Group the counters to be able to complete each division sentence.

(Check students' work.)

3. 45 into 9 groups

4. 32 into 4 groups

5. 30 into 6 groups

$$45 \div \underline{9} = \underline{5}$$

$$32 \div \underline{4} = \underline{8}$$

$$30 \div \underline{6} = \underline{5}$$

Write each division sentence. Write a related multiplication sentence.

6. 15 into 3 groups

$$15 \div \underline{3} = \underline{5}$$

$$\underline{5} \times \underline{3} = 15$$

7. 28 into 7 groups

$$28 \div \underline{7} = \underline{4}$$

$$\underline{4} \times \underline{7} = 28$$

8. 20 into 2 groups

$$20 \div \underline{2} = \underline{10}$$

$$\underline{2} \times \underline{10} = 20$$

9. 35 into 5 groups

$$35 \div \underline{5} = \underline{7}$$

$$\underline{5} \times \underline{7} = 35$$

10. 48 into 8 groups

$$48 \div \underline{8} = \underline{6}$$

$$\underline{6} \times \underline{8} = 48$$

11. 81 into 9 groups

$$81 \div \underline{9} = \underline{9}$$

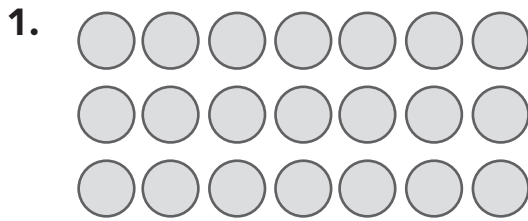
$$\underline{9} \times \underline{9} = 81$$

Answer Key

Challenge! Problem 2 shows three rows of 8 Two-Color Counters for a total of 24 counters. Write a fact family for the model shown. Write a fact family for the model you create from the 24 counters. Explain how the number 24 can have two different fact families.

Challenge: (Sample) The fact family 3, 8, and 24 have the following: $3 \times 8 = 24$; $8 \times 3 = 24$; $24 \div 8 = 3$; and $24 \div 3 = 8$. The fact family 4, 6, and 24 have the following: $4 \times 6 = 24$; $6 \times 4 = 24$; $24 \div 4 = 6$; and $24 \div 6 = 4$. The number 24 has more than one factor pair.

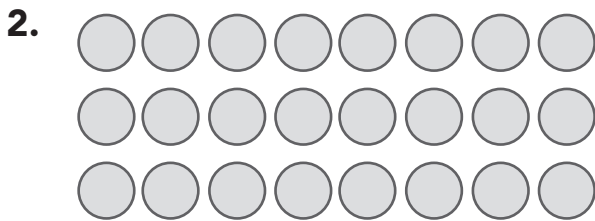
Use Two-Color Counters to build each array. Rearrange the counters into groups of the size shown. Complete each division sentence.



put into groups of



$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$



put into groups of



$$\underline{\hspace{2cm}} \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

Build each array using Two-Color Counters. Group the counters to be able to complete each division sentence.

3. 45 into 9 groups

4. 32 into 4 groups

5. 30 into 6 groups

$$45 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

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Write each division sentence. Write a related multiplication sentence.

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$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 15$$

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$$28 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

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$$48 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 48$$

11. 81 into 9 groups

$$81 \div \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$$

$$\underline{\hspace{2cm}} \times \underline{\hspace{2cm}} = 81$$

Name _____

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Name _____

Division Sentences	Multiplication Sentences