

Name \_\_\_\_\_



Activity

## Solve & Share

Mark has 12 sports cards. He arranges the cards with an equal number in each row. Find ways Mark can arrange his cards.

You can **use appropriate tools**. Sometimes using counters or objects can help you solve a problem.

Number of Rows of Cards	Number of Cards in Each Row	Total Number of Cards

## Step Up to Grade 3

### Lesson 2 Arrays and Properties

#### I can ...

use arrays and multiply factors in any order to solve multiplication problems.

**I can also** choose and use a math tool to help solve problems.

**Look Back!** What do you notice about the number of rows of cards, the number of cards in each row, and the total number of cards? Explain.



A

Dana keeps her swimming medal collection in a display on the wall.

The display has 4 rows. Each row has 5 medals. How many medals are in Dana's collection?

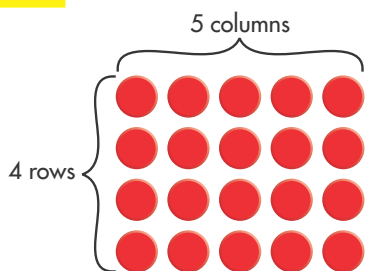


The medals are in an **array**. An array shows objects in equal rows and columns.



B

The counters show 4 **rows** and 5 **columns**.



Each row is a group. You can use addition or skip counting to find the total.

Addition:  $5 + 5 + 5 + 5 = 20$

Skip counting: 5, 10, 15, 20

C

Multiplication can also be used to find the total in an array.

You say, "4 times 5 equals 20."

$$\begin{array}{ccccc} 4 & \times & 5 & = & 20 \\ \swarrow & & \nwarrow & & \\ \text{number} & & \text{number in} & & \\ \text{of rows} & & \text{each row} & & \end{array}$$

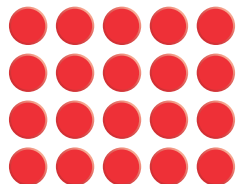
There are 20 medals in Dana's collection.

**Convince Me! Construct Arguments** Jason also has a swimming medal collection. His display has 5 rows with 5 medals in each row. Draw an array for Jason's medals. Use skip counting to find the total number of medals. Then write a multiplication equation for your array. Who has more medals, Jason or Dana?

## Another Example!

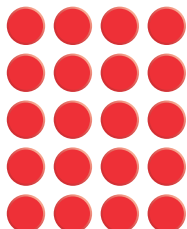
Dana rearranged her swimming medal collection. The arrays have the same number of medals.

Original Array



$$4 \times 5 = 20$$

New Array



$$5 \times 4 = 20$$

The **Commutative (Order) Property of Multiplication** says you can multiply numbers in any order and the product is the same. So,  $4 \times 5 = 5 \times 4$ .



## ☆ Guided Practice

### Do You Understand?

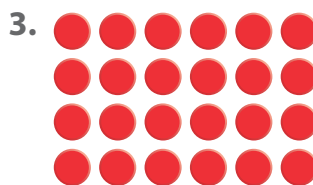
1. Mia puts muffins in 4 rows, with 7 muffins in each row. Draw an array to find the total number of muffins.

2. Complete the following statement.

$$4 \times 7 = 28, \text{ so } 7 \times 4 = \underline{\quad}.$$

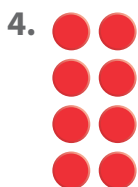
### Do You Know How?

In **3**, write and solve a multiplication equation for the array.



## ☆ Independent Practice ☆

In **4** and **5**, fill in the blanks to show skip counting and multiplication for each array.



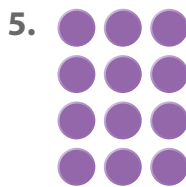
$$2, 4, \underline{\quad}, \underline{\quad}$$

$$4 \times \underline{\quad} = 8$$



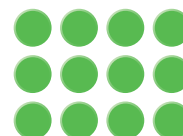
$$4, \underline{\quad}$$

$$2 \times \underline{\quad} = 8$$



$$3, 6, \underline{\quad}, \underline{\quad}$$

$$4 \times \underline{\quad} = 12$$

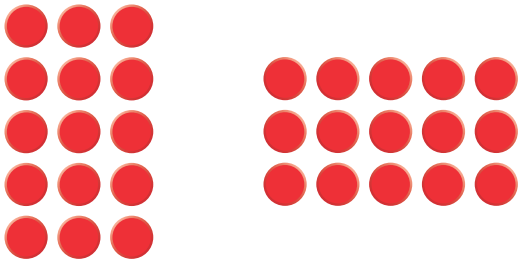


$$4, \underline{\quad}, \underline{\quad}$$

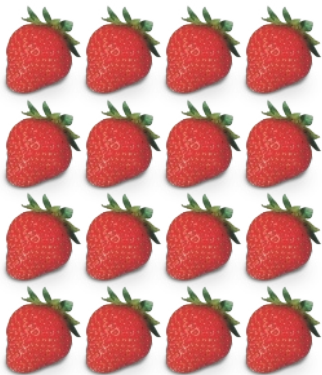
$$3 \times \underline{\quad} = 12$$

Problem Solving

6. Liza draws these two arrays. How are the arrays alike? How are they different?



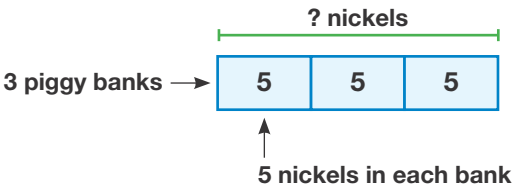
7. **Use Structure** Chen arranged 16 berries in the array shown below. Use counters to help complete the table to show other arrays Chen can make with the same number of berries.



Number of Rows of Berries		Number of Berries in Each Row		Total Number of Berries
4	×	4	=	16
	×		=	
	×		=	
	×		=	
	×		=	

8. **Higher Order Thinking** Ramón says he can use the Commutative Property of Multiplication to show the product of  $4 \times 6$  is the same as the product of  $3 \times 8$ . Is he correct? Why or why not?

9. Delbert puts 5 nickels in each of his 3 empty piggy banks. How many nickels did Delbert put in the banks? Write a multiplication equation to show how you solved the problem.



Assessment Practice

10. An equation is shown.

$8 \times 5 = 5 \times \square$

Use the Commutative Property of Multiplication to find the missing factor.

- (A) 5
- (B) 8
- (C) 40
- (D) 85

11. Using the Commutative Property of Multiplication, which of the following expressions is equivalent to  $5 \times 4$ ?

- (A)  $5 + 5$
- (B)  $4 \times 5$
- (C)  $5 + 4$
- (D)  $5 - 4$