



# Arrays and Multiplication

An **array** is a group of objects arranged in equal numbered rows and equal numbered columns. Arrays can help you multiply.



## Math in My World



### Example 1

Mrs. Roberts baked a batch of bagels. She arranged the bagels in 3 equal rows of 4 bagels each on the cooling rack. How many bagels did she bake?

Find the total number of bagels. Use counters to model the array. Draw the array.

\_\_\_\_\_ rows of \_\_\_\_\_ = \_\_\_\_\_  
Find the unknown.

My drawing!

You can use repeated addition or multiplication to find the unknown.

**One Way Add.**

$$+ + + =$$

addition  
sentence

**Another Way Multiply.**

$$\times =$$

multiplication  
sentence

So, \_\_\_\_\_ rows of \_\_\_\_\_ is \_\_\_\_\_ or \_\_\_\_\_  $\times$  \_\_\_\_\_ = \_\_\_\_\_.

The unknown is \_\_\_\_\_. Mrs. Roberts baked 12 bagels.

### Lesson 4

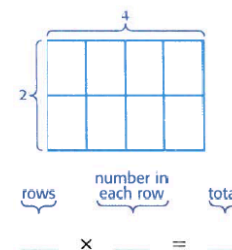
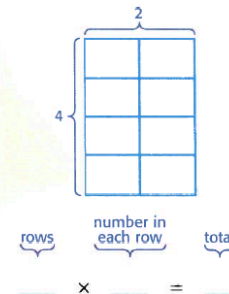
**ESSENTIAL QUESTION**  
What does multiplication mean?



### Example 2



One page of Elsa's photo album is shown. Write two multiplication sentences to find how many photos are on the page.



## Key Concept Commutative Property

### Words

The **Commutative Property of Multiplication** says the order in which numbers are multiplied does not change the product.

### Examples

$$4 \times 2 = 8 \quad 2 \times 4 = 8$$

factor factor product      factor factor product

## Guided Practice



Write an addition sentence and a multiplication sentence to show equal rows.

1.  $\bullet + \bullet =$   
 $\bullet \times =$

2.  $\begin{array}{|c|c|c|c|c|c|} \hline & & & & & \\ \hline \end{array} + =$   
 $\times =$

## Talk MATH

What other operation uses the Commutative Property? Explain.



## Independent Practice

Write an addition sentence and a multiplication sentence to show equal rows.



$$\underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

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



$$\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} = \underline{\quad}$$

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



$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

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



$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

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



$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

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



$$\underline{\quad} + \underline{\quad} = \underline{\quad}$$

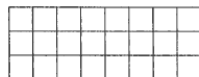
$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

Use the Commutative Property of Multiplication to find each missing number.

9.  $5 \times 2 = \underline{\quad}$       10.  $\underline{\quad} \times 5 = 15$       11.  $3 \times \underline{\quad} = 27$

$2 \times \underline{\quad} = 10$        $\underline{\quad} \times 3 = 15$        $9 \times 3 = \underline{\quad}$

12. Hope drew the array at the right. Write a multiplication sentence to represent the model.



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



## Problem Solving

For Exercises 13 and 14, draw an array to solve. Then write two multiplication sentences.

13. Bailey made a 3 by 4 array with her crackers. How many crackers does she have?

14. There are 4 waiters serving 5 tables each. How many tables do the waiters have altogether?

## HOT Problems

15. **Mathematical PRACTICE 2 Reason** Why do you sometimes have only one multiplication sentence for an array?

16. **Mathematical PRACTICE 3 Find the Error** Alyssa is using the numbers 2, 3, and 6 to show the Commutative Property. Find and correct her mistake.

$$3 \times 2 = 6 \text{ so, } 6 \times 3 = 2$$

17. **? Building on the Essential Question** How can the Commutative Property be used to write multiplication sentences?

Time to Ketchup



My Work!

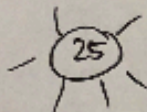
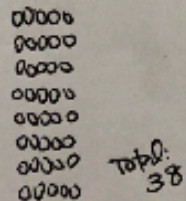
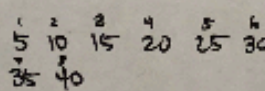
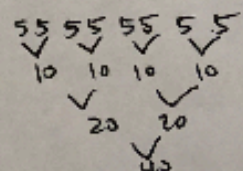



## Key Mathematical Idea(s)

What is your "bottom line" for this lesson? What do you hope your students gain mathematically out of today's work?

- understand multiplication (equal groups) and connect to arrays

## LESSON PLAN

|                  |  |   |  |
|------------------|--|---|--|
| WARM-UP ACTIVITY | <p>How many ways to make?</p> <div style="text-align: center;">  </div> <p>possible responses:</p> <div style="display: flex; justify-content: space-around;"> <div> <math>20+5</math><br/> <math>10+10+5</math><br/> <math>5+5+5+5+5</math><br/> <math>30-5</math><br/> <math>24+1</math> </div> <div> <math>24\frac{1}{2}+\frac{1}{2}</math><br/> <math>20+1+1+1+1+1</math><br/> <math>25+0</math> </div> </div>                                    |   |  |
|                  | <p><b>Problem &amp; Number Set(s)</b></p> <p>Mrs. Roberts baked a batch of bagels. She put the bagels in — equal rows of — bagels each on the tray. How many bagels did she bake? (8, 5) (8, 15)</p>   | <p><b>Plans for Launch</b></p> <ul style="list-style-type: none"> <li>• talk about bagels and baking</li> <li>• How do bakers usually put things on the tray? (rows)</li> <li>• show problem &amp; read together</li> <li>• ask what's happening in story — PS</li> <li>• did she bake more or less than 20?</li> <li>• how do you know?</li> </ul> |  |
| STORY PROBLEM    | <p><b>Anticipated Student Strategy 1</b></p>    | <p><b>Anticipated Student Strategy 2</b></p>    | <p><b>Anticipated Student Strategy 3</b></p>  |
|                  | <p><b>Plans for Strategy Share</b></p> <ul style="list-style-type: none"> <li>• Share strategy #1. class counts together &amp; T labels the count at the end of each row (5, 10, 15...)</li> <li>• Share strategy #3. Have student re-create on board, pause at  Have class discuss what is happening and predict what might happen next. Have S finish explaining</li> <li>• Show both strategies side by side and ask for connections.</li> </ul> |   |  |