

### Common Core State Standards

**2.OA.C.4** Use addition to find the total number of objects arranged in rectangular arrays with up to 5 rows and up to 5 columns; write an equation to express the total as a sum of equal addends.

**2.OA.B.2** Fluently add and subtract within 20 using mental strategies. By end of Grade 2, know from memory all sums of two one-digit numbers.

### Objective

Use addition to represent the number of objects in an array.

Discuss everyday examples of arrays with children.

Real-life arrays help children visualize the structure in repeated addition.

## Array Totals

By now, children should be able to apply their addition skills to repeated single-digit addends. A good way to approaching adding repeated single-digit addends is to frame it in terms of an array and have children add the rows to find the total. This is important groundwork, because children will revisit arrays when they learn about multiplication and division in later grades.

### Vocabulary

Draw 2 rows of 5 circles on the board.

- **Ask:** *Have you ever seen eggs in a carton?*
- **Say:** *If I make the carton bigger, I can add a new **row**. Let's add a row of circles.*
- **Say:** *The up and down circles are in **columns**. Make an up and down motion with your hand.*

Draw horizontal lines through the rows and vertical lines through the columns. Label the lines "row" and "column."

- **Say:** *The rows and columns make an **array**.*

Write "array" on the board.

- An **array** is an arrangement of objects in **rows** and **columns**; the rows go side to side, and the columns go up and down.



# Set the Stage



## Engage WHOLE CLASS

■ **Ask:** *What items might you count by 2s?*

After children have had a chance to share ideas, show children 3 groups of Two-Color Counters with 2 counters in each group.

■ **Ask:** *How can you find the total number of counters without counting every one?*

Guide children to move the counters into an organized pattern, and skip count by 2 to get the total.

■ **Ask:** *What is the total?* [6] *Show me how you know.*

■ **Say:** *Write an equation that shows how to skip count by two.*  
 $[2 + 2 + 2 = 6]$



## Warm-Up

Use this short thinking exercise to jump-start the instructional session.

Name Answer Key

**2**

Count each group of dots below. Are there some groups where you can tell how many dots there are without counting?

**ANSWER:** Sample: 4, 3, 6, 5, 7. I recognized 4, 3, 6, and 5 right away without counting.

**COMMENTS & EXTENSIONS:** Fill a see-through plastic bag with various items (macaroni, buttons, pebbles, and popcorn) and let children have a good look. Then challenge them to estimate the number of items in the bag and to justify their guesses. Then count the items with the children.



## Foundation Skill Practice

Use this VersaTiles® activity to help children activate their prior knowledge.

### Seeing Double!

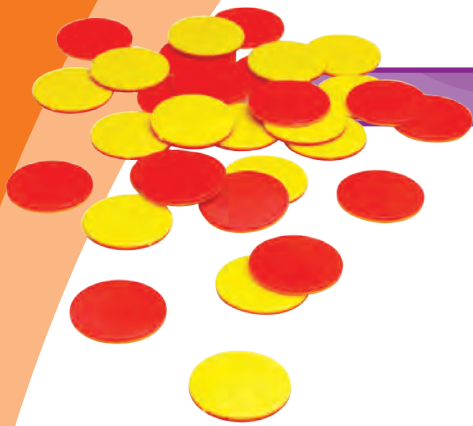
Find the sum.

- |          |           |          |         |
|----------|-----------|----------|---------|
| <b>1</b> | $6 + 6$   | <b>2</b> | $1 + 1$ |
| <b>3</b> | $2 + 2$   | <b>4</b> | $5 + 5$ |
| <b>5</b> | $8 + 8$   | <b>6</b> | $9 + 9$ |
| <b>7</b> | $10 + 10$ | <b>8</b> | $3 + 3$ |
- 9** A week has 7 days.  
How many days are in 2 weeks?
- 10** Eleven goldfish swim in a tank.  
Eleven guppy fish swim in a tank.  
How many fish are there in all?
- 11** 12 boys and 12 girls skateboard.  
How many are there in all?
- 12** Four birds sit in one nest.  
Four birds sit on a wire.  
How many birds are there in all?

### Answer Box

A	B	C	D	E	F
2	18	12	10	14	4
G	H	I	J	K	L
6	8	22	20	24	16





# Introduce the Concept

## Explore WHOLE CLASS

■ **Say:** I am going to read you a problem. We will find the solution by making an array to match—

Rayan has an array of buttons. He has 4 rows of buttons with 3 buttons in each row. How many buttons does Rayan have in all?

■ **Say:** Let's make an array that matches Rayan's by using Two-Color Counters.

■ **Ask:** How many rows should you make? [4] Why? [Rayan has 4 rows of buttons.]

■ **Ask:** How many counters will be in each row? [3] Why? [Rayan has 3 buttons in each row.]

Some children might not see how each row relates to skip counting. Point out that just like the previous problem, they can count each row by 3s.

■ **Ask:** How can you use addition to find out how many buttons are in Rayan's array? [Add the rows or skip count by 3s.]

■ **Ask:** If each row is one set of three, how can I write the addition to match the array? [ $3 + 3 + 3 + 3$ ]

■ **Ask:** How many buttons does Rayan have in all? [12]

After children use counters to make arrays, have them draw a picture to show their work.

## Materials

- Two-Color Counters




## Explore & Explain

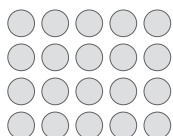
Lesson  
2

Array Totals

Name \_\_\_\_\_ *Answer Key*

**Use Two-Color Counters. Make each model. Fill in the blanks.**

1.   $\underline{4} + \underline{4} + \underline{4}$   
 $\underline{3}$  rows of  $\underline{4}$  counters is  
 $\underline{12}$  counters.

2.   $\underline{5} + \underline{5} + \underline{5} + \underline{5}$   
 $\underline{4}$  rows of  $\underline{5}$  counters  
 is  $\underline{20}$  counters.

**Use Two-Color Counters to solve the problem. Draw a model on the back. Fill in the blanks.**

3. Paul has 5 rows of stickers. There are 5 stickers in each row. How many stickers does Paul have in all?

$\underline{5} + \underline{5} + \underline{5} + \underline{5} + \underline{5}$   
 $\underline{5}$  rows of  $\underline{5}$  stickers is  $\underline{25}$  stickers.

# Reinforce the Concept

## Explain & Elaborate WHOLE CLASS

- **Ask:** How does an array help you make an organized model? Do you have to count every counter? How can an array help you add numbers faster?

## Evaluate WHOLE CLASS

- **Say:** Let's pretend that some friends want to play games together. We will start with a red team, a yellow team, and a blue team. There are 5 friends on each team. Make an array to show me the teams.
- **Ask:** Can you show me an addition sentence that matches the array?
- **Ask:** How many friends will be able to play in all? How does your array match the problem?



## Independent Practice

Use this VersaTiles® activity to give children more practice with the skills they learned in the lesson.

### Addends, Totals, and Arrays

Find the matching array.

- 1  $2 + 2 = 4$
- 2  $4 + 4 + 4 = 12$
- 3  $1 + 1 = 2$
- 4  $5 + 5 = 10$
- 5  $2 + 2 + 2 = 6$
- 6  $5 + 5 + 5 = 15$
- 7  $4 + 4 + 4 + 4 = 16$
- 8  $5 + 5 + 5 + 5 = 20$
- 9  $3 + 3 + 3 = 9$
- 10  $4 + 4 = 8$
- 11  $1 + 1 + 1 = 3$
- 12 5

### Answer Box

A .....	B .....	C .....	D .....	E .....	F .....
G .....	H .....	I .....	J .....	K .....	L .....

24 Objective: Represent repeated addition as an array.



## Re-Engage

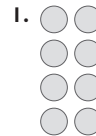
Use this page to give children additional concrete-to-representational-to-abstract practice.

LESSON  
2

Array Totals

Name Answer Key

Use Two-Color Counters to build the model. Answer the questions to help you fill in the blanks.



Remember the rows go side-to-side, and the columns go up-and-down.

How many rows did you make? 4

How many are in each row? 2

$$\underline{2} + \underline{2} + \underline{2} + \underline{2} = \underline{8}$$



$$\underline{3} + \underline{3} + \underline{3} = \underline{9}$$

Foundations of Multiplication ■ Lesson 2

continued on the next page  
Hands-On Standards® Number & Operations

Online resources available at [hand2mind.com/hosnumbergr2](http://hand2mind.com/hosnumbergr2)



## Daily Routine

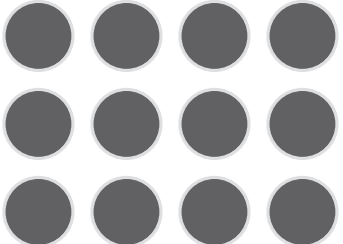
### Arrays in the Hall!

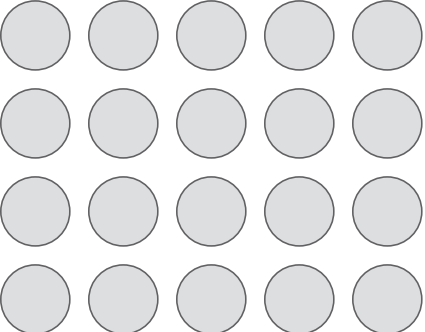
Make arrays come alive by traveling through the school hallways in arrays. For example:

Traveling to...	Form Rows of...	To Create Array ...
Lunch Room	1 child per row	$1 \times 24$
School Library	2 children per row	$2 \times 12$
Art Room	3 children per row	$3 \times 8$
Gymnasium	4 children per row	$4 \times 6$

Have children draw or model their arrays. Create a display to show their work.

**Use Two-Color Counters. Make each model.**  
**Fill in the blanks.**

1.  \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_  
 \_\_\_\_\_ rows of \_\_\_\_\_ counters is  
 \_\_\_\_\_ counters.

2.  \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_  
 \_\_\_\_\_ rows of \_\_\_\_\_ counters  
 is \_\_\_\_\_ counters.

**Use Two-Color Counters to solve the problem.**  
**Draw a model on the back. Fill in the blanks.**

3. Paul has 5 rows of stickers. There are 5 stickers in each row. How many stickers does Paul have in all?

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_  
 \_\_\_\_\_ rows of \_\_\_\_\_ stickers is \_\_\_\_\_ stickers.

**Use Two-Color Counters to solve the problem. Draw a model Write an addition sentence that matches.**

4. Kirsten has 3 rows of forks.

There are 5 forks in each row.

How many forks does Kirsten have in all?

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

# Addends, Totals, and Arrays

Find the matching array.

1  $2 + 2 = 4$

2  $4 + 4 + 4 = 12$

3  $1 + 1 = 2$

4  $5 + 5 = 10$

5  $2 + 2 + 2 = 6$

6  $5 + 5 + 5 = 15$

7  $4 + 4 + 4 + 4 = 16$

8  $5 + 5 + 5 + 5 = 20$













9  $3 + 3 + 3 = 9$

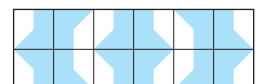
10  $4 + 4 = 8$

11  $1 + 1 + 1 = 3$

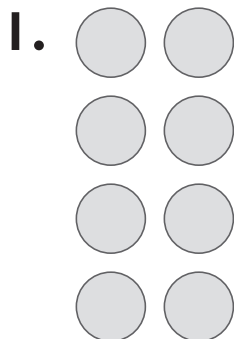
12 5

## Answer Box

A 	B 	C 	D 	E 	F 
G 	H 	I 	J 	K 	L 



**Use Two-Color Counters to build the model. Answer the questions to help you fill in the blanks.**

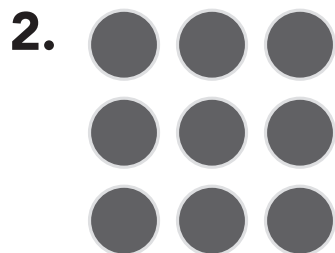


Remember the rows go side-to-side, and the columns go up-and-down.

How many rows did you make? \_\_\_\_\_

How many are in each row? \_\_\_\_\_

\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_



\_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_



3. I have 4 rows of 4 counters. How many counters do I have in all?

Make an array with counters. Draw your array. Write the addition sentence.

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

4. Hiram put apples in 3 rows.

He puts 4 apples in each row.

How many apples does Hiram have in all?

Draw an array that matches the problem.

Fill in the addition sentence.

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