# building arrays

## LEARNING GOAL

**The goal of this activity is for students to understand that multiplication problems can be solved flexibly by decomposing into partial products that are friendly.**

## SUGGESTED USE

| Whole Group | Small Group | Partners | Independent |
|---|---|---|---|
| ○ | ☑ | ○ | ○ |

This activity is best used before students are introduced to multiplication strategies based on place value, like the area model. This activity will provide students with an opportunity to develop creative strategies for solving larger multiplication problems, which will lay the foundation for more sophisticated strategies.

## MATERIALS & PREP

- **Activity Cards**
- **Student Work Pages**
- **Connecting Cubes**

Print and cut the activity cards for each small group. Provide each student with a student work page and each small group with at least 70 cubes.

## DIRECTIONS

In this activity, students will work in small groups to build arrays with connecting cubes and discuss how the arrays can be decomposed into smaller sections (partial products) to determine the total amount of cubes in the array.

In activity card #1, students will follow the directions to create an array with their cubes. Depending on the number of cubes each group has access to, arrays can be built individually, in pairs, or one array can be build for the entire small group.

Once each student or pair of students has built their array, the group should discuss the prompt on the activity card and find the total number of cubes. Each student should then document their thinking on the student work page. After every student has had time to show their thinking, the group can move on to the next activity card.

## 1 BUILDING ARRAYS

### build

Use the cubes to build an array that is 4 rows and has 13 cubes in each row.

### discuss

Brainstorm ways that you could find the total number of cubes in your array without counting the cubes one-by-one.

### solve

Use the array to find the product of 4 × 13 without counting the cubes.



## 2 BUILDING ARRAYS

### build

Use the cubes to build an array that is 3 rows and has 16 cubes in each row.

### discuss

How could the multiplication facts that you already know help you figure out the total number of cubes in your array?

### solve

Find the product of 3 × 16 without counting the cubes.

## 3 BUILDING ARRAYS

### build

Use the cubes to build two arrays. One of the the arrays should be 5 rows with 10 cubes in each row. The other array should be 5 rows with 4 cubes in each row.

### draw

Combine both arrays so that together they create a new array. Draw a picture of the new array.

### discuss

How could you find the total number of cubes in the new array without counting the cubes one-by-one?



## 4 BUILDING ARRAYS

### draw

Draw a picture of an array that is 12 units long and 14 units wide.

### discuss

Brainstorm ways that you could find the total number of squares in your array without counting the squares one-by-one.

### solve

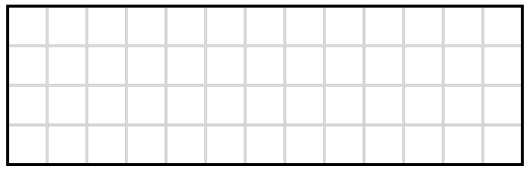
Use the array to find the product of 12 × 14 without counting the cubes.

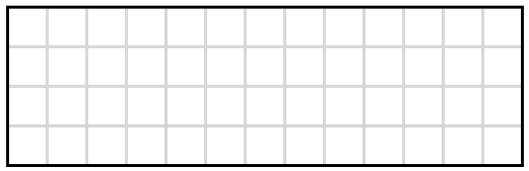
NAME: _____

# building arrays

**1**

Show two different strategies that your group discussed for finding the total number of cubes in the array without counting.





How many cubes are in the 4 × 13 array? Show or explain your thinking.

**2**

Show how you decomposed the cubes to help you find the total number of cubes.

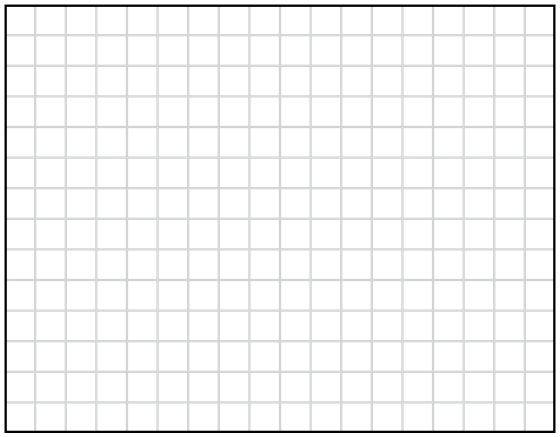
How many cubes are in the 3 × 16 array? Show or explain your thinking.

NAME: _____

# building arrays

**3**

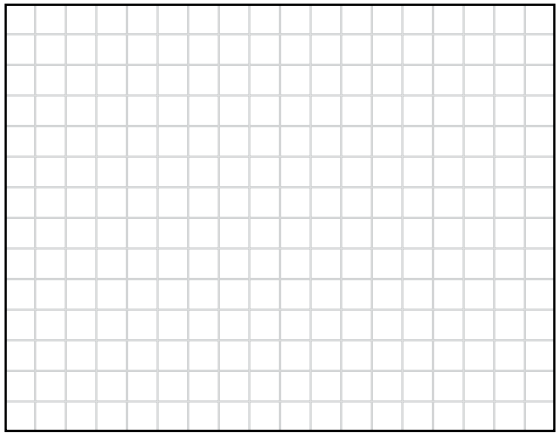
Draw a picture of the new array you created from combining the two arrays.



Write a multiplication equation to represent your new array and solve. Show or explain how you know your answer is correct without counting the cubes.

**4**

Draw an array that is 12 units long and 14 units wide.



Write a multiplication equation to represent your array and solve. Show or explain how you decomposed the array to find the total number of squares.

ANSWER KEY

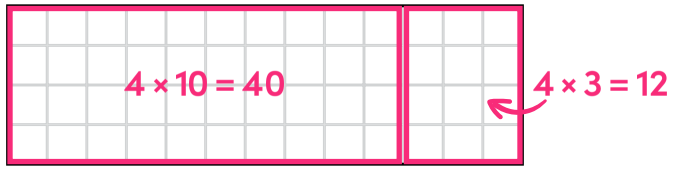
NAME: _____

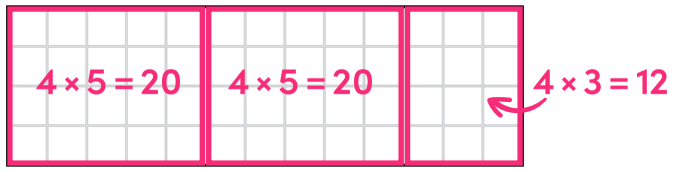
# building arrays

**1**

Show two different strategies that your group discussed for finding the total number of cubes in the array without counting.

Answers will vary.




How many cubes are in the 4 × 13 array? Show or explain your thinking.

The array has 52 cubes.

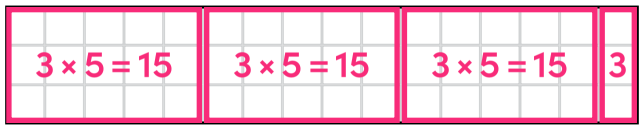
Answers will vary.

We decomposed the array into smaller groups and then added those groups together.

**2**

Show how you decomposed the cubes to help you find the total number of cubes.

Answers will vary.




How many cubes are in the 3 × 16 array? Show or explain your thinking.

The array has 48 cubes.

Answers will vary.

I decomposed the array into 3 groups of 15 to get a total of 45. Then I added the 3 cubes that were left.

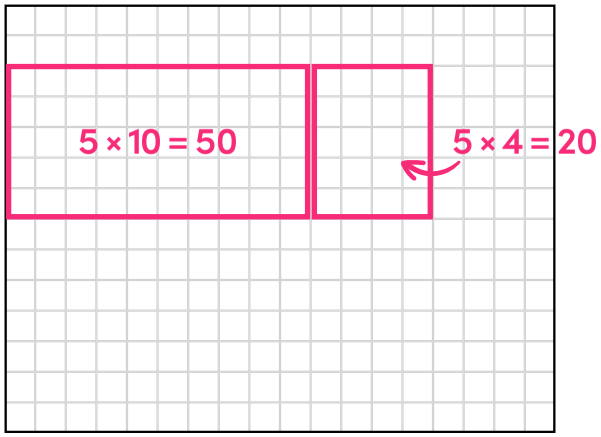
ANSWER KEY

NAME: _____

# building arrays

**3**

Draw a picture of the new array you created from combining the two arrays.




Write a multiplication equation to represent your new array and solve. Show or explain how you know your answer is correct without counting the cubes.

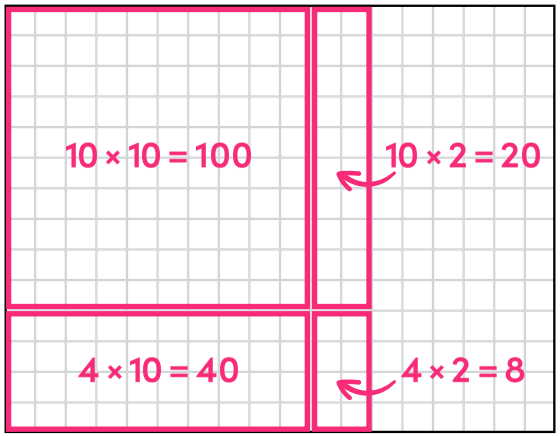
5 × 14 = 70

Answers will vary.

The first array was 5 × 10 which equals 50 cubes. The second array was 5 × 4 which equals 20 cubes. If I add them together, I get 70 cubes total.

**4**

Draw an array that is 12 units long and 14 units wide.




Write a multiplication equation to represent your array and solve. Show or explain how you decomposed the array to find the total number of squares.

12 × 14 = 168

Answers will vary.

100 + 40 + 20 + 8 = 168

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