



The Commutativity of Multiplication

Unit 1 Lesson 6a

What is the commutative property?

The commutativity of multiplication indicates that **no matter what order the factors are placed in, the product will be the same**. In an array, a number of rows multiplied by a number of columns will have the same answer to a number of columns multiplied by a number of rows.

That means **that rows of a certain number columns are equal to a certain number of columns of rows**.

the commutativity of multiplication allows the same product of the same factor pair multiplied in any order

What is the
commutative property?

Consider:

Number
of rows

$$3 \times 4$$

can be read as

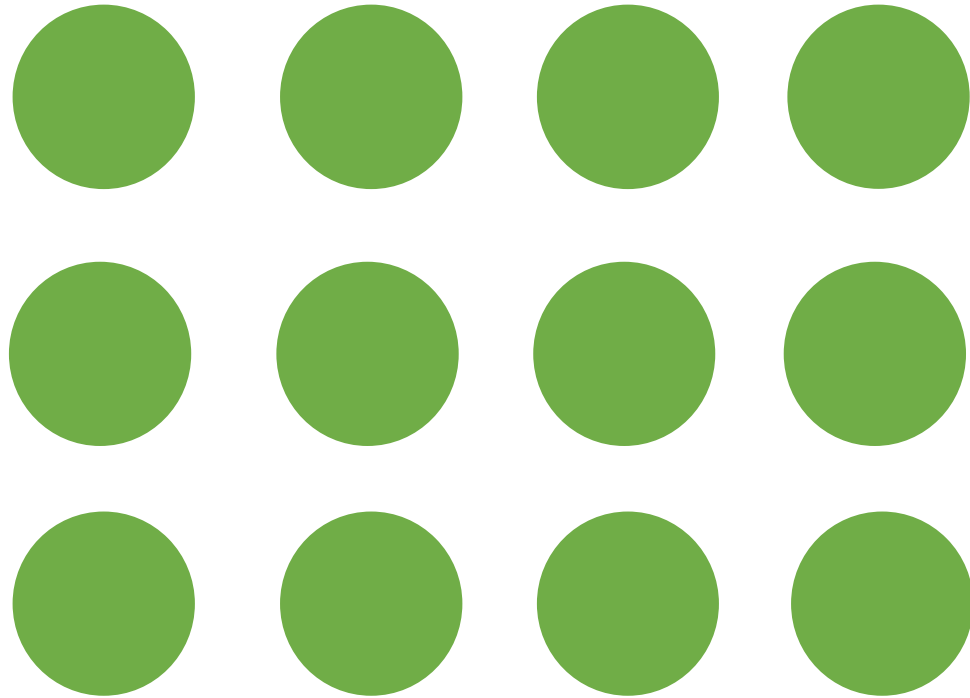
3 rows of 4

Number
of
columns

What is the
commutative property?

$$3 \times 4$$

Draw the array model that has 3 rows of 4:



What is the
commutative property?

Now look at:

Number
of rows

$$4 \times 3$$

can be read as

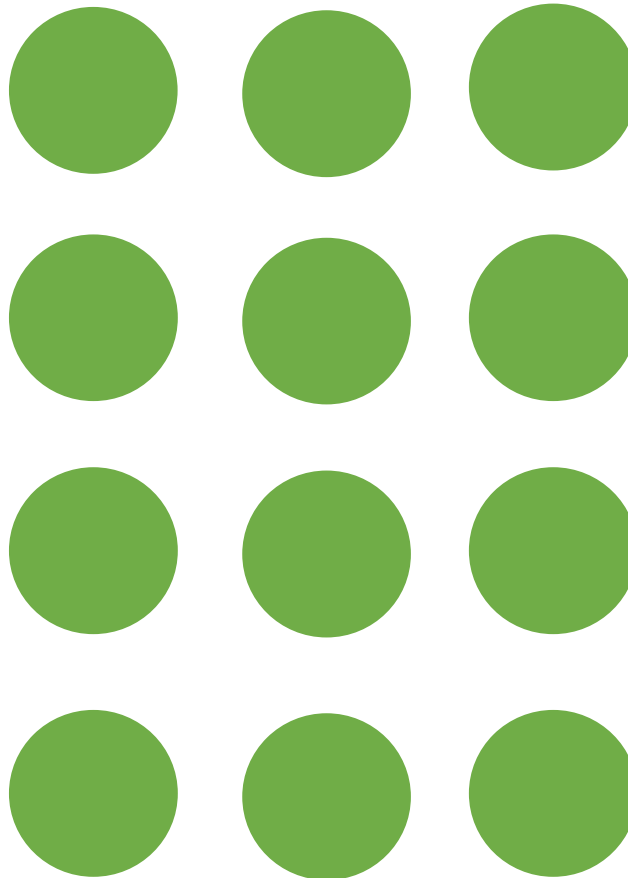
4 rows of 3

Number
of
columns

What is the
commutative property?

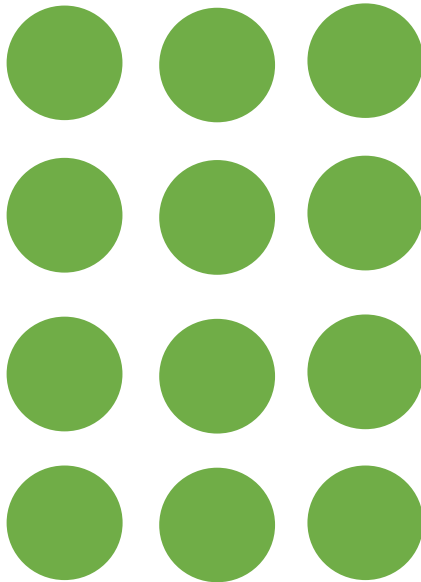
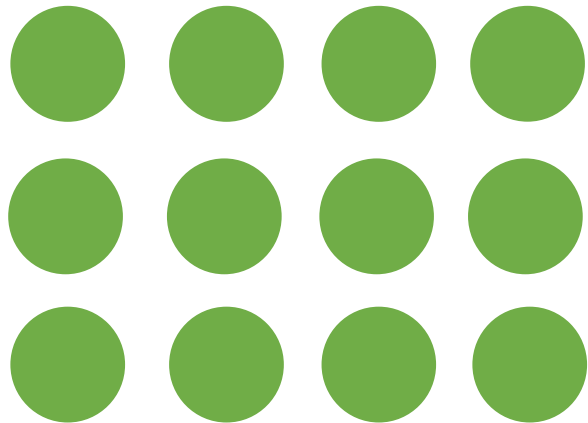
$$4 \times 3$$

Draw the array model that has 4 rows of 3:



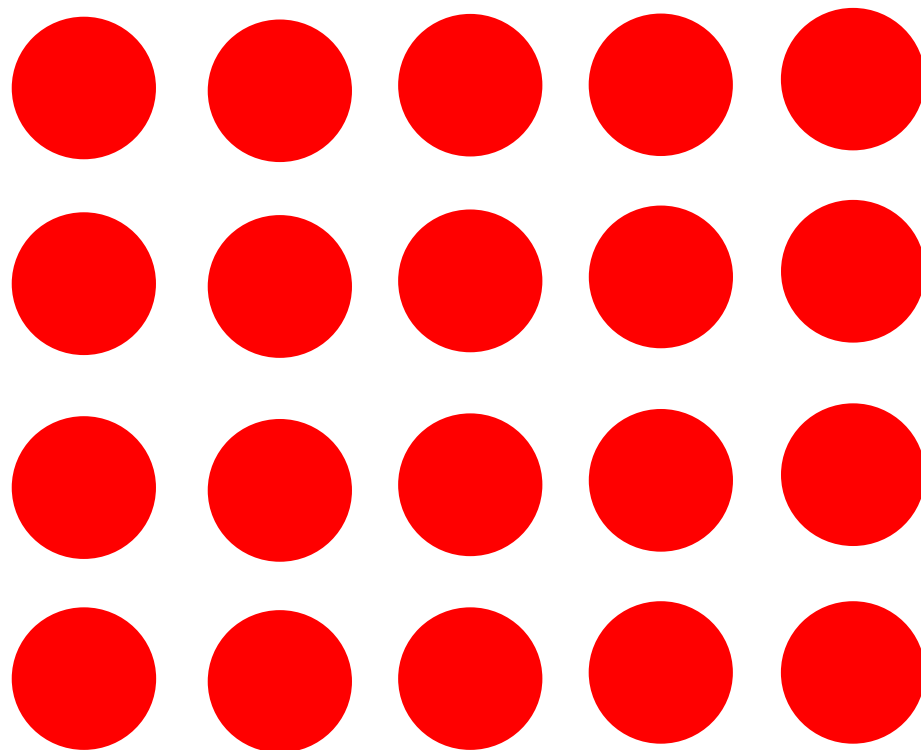
What is the
commutative property?

3 x **4** = **4** x **3** Both arrays have 12 dots
altogether.



Thus, **3 x 4** and **4 x 3** are
both equal to 12.

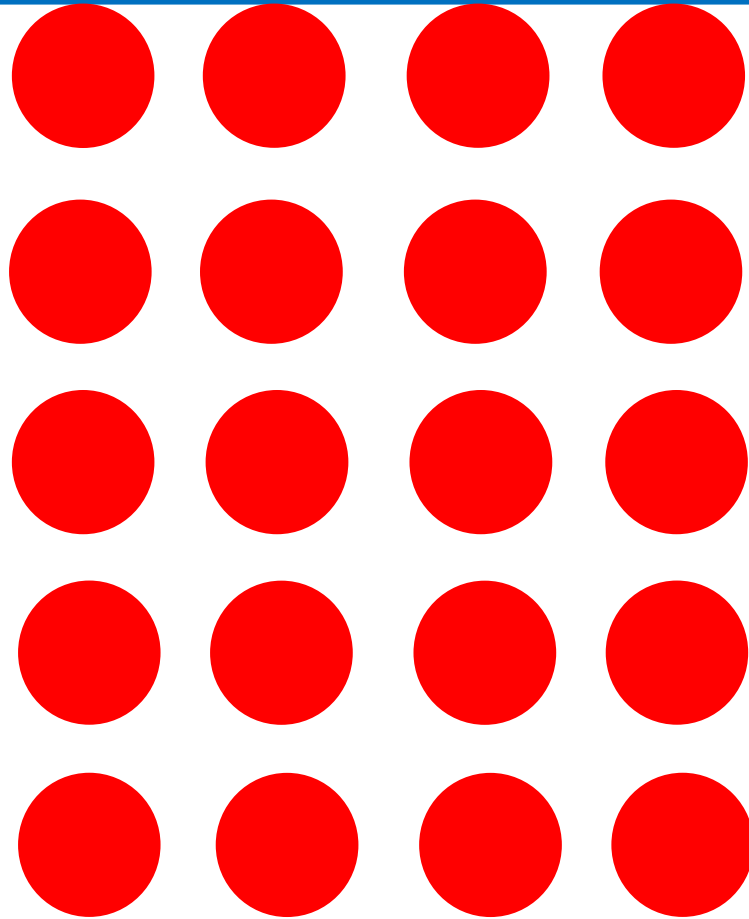
Draw 4 rows of 5.



What is the total?

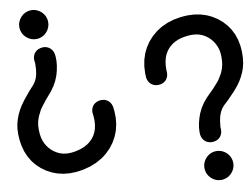
20

Draw 5 rows of 4.

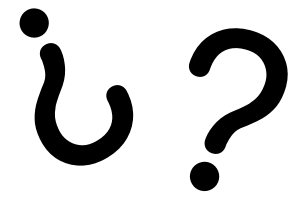


What is the total?

20



Time to Think



➤ 1. What are the expressions of the two previous arrays?

The two expressions are 4×5 and 5×4 respectively.

➤ 2. Describe the relationship of the two expressions.

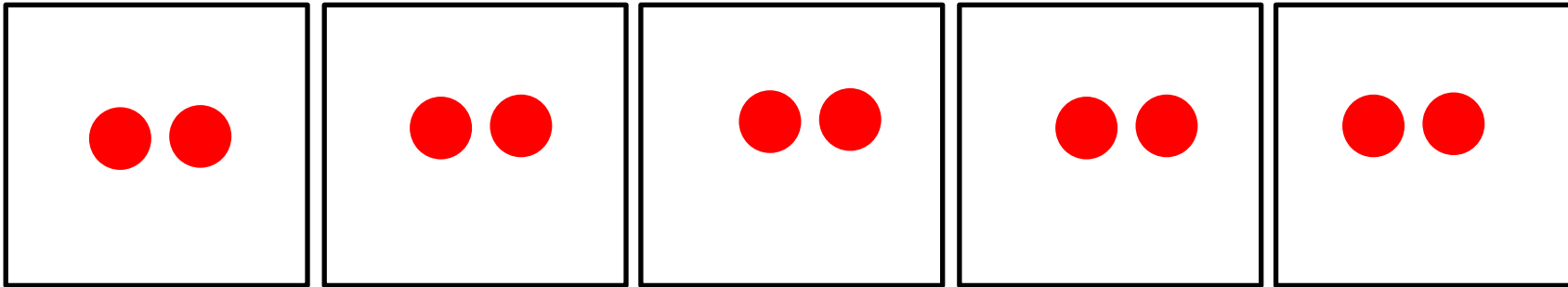
Both expressions have a product of 20. Therefore, they are equal to each other.



Count by twos 5 times.

2, 4, 6, 8, 10

Fill in the groups with the correct size of each group:

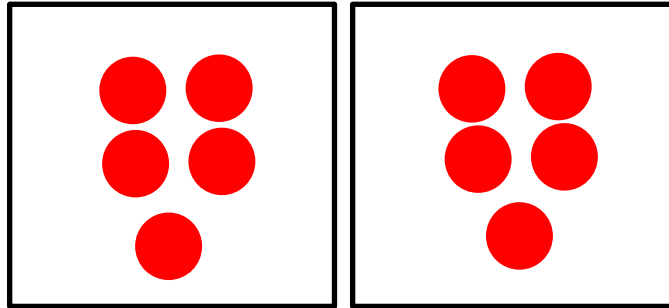


$$5 \times 2 = 10$$

Count by five 2 times.

5, 10

Fill in the groups with the correct size of each group:



$$2 \times 5 = 10$$

What do you notice with the equations?

$$5 \times 2 = 10$$

$$2 \times 5 = 10$$

The factors have a different order but they still produce the same answer.

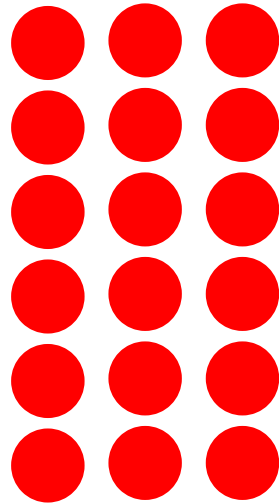
What happened to the equal groups representation?

For the first one, the number of groups is 5 and the size of the group is 2. Meanwhile, the second one makes 5 as the size and 2 as the number of groups.

Count by threes 6 times.

3, 6, 9, 12, 15, 18

Draw an array to represent the expression

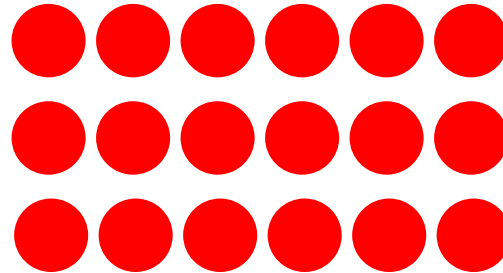


$$6 \times 3 = 18$$

Count by six 3 times.

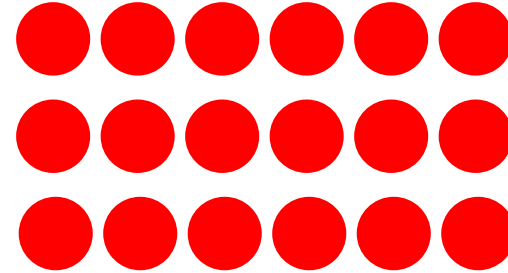
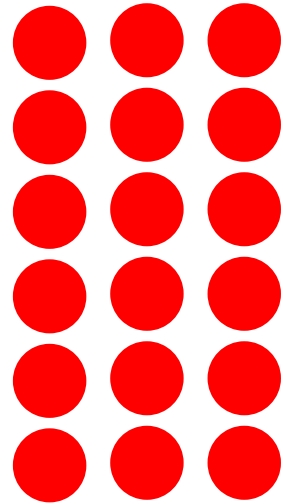
6, 12, 18

Draw an array to represent the expression



$$3 \times 6 = 18$$

What do you notice about the two arrays?



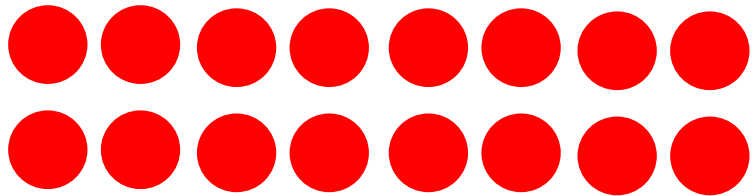
The orientation changed from vertical to horizontal.

Does interchanging the order of two factors change the product?

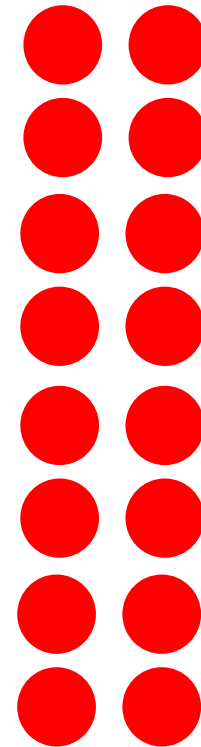
The order of the factors does not change the product.

There is an ice tray that can freeze 2 rows of 8 ice cubes. How many ice cubes can it produce?

Draw 2 rows of 8



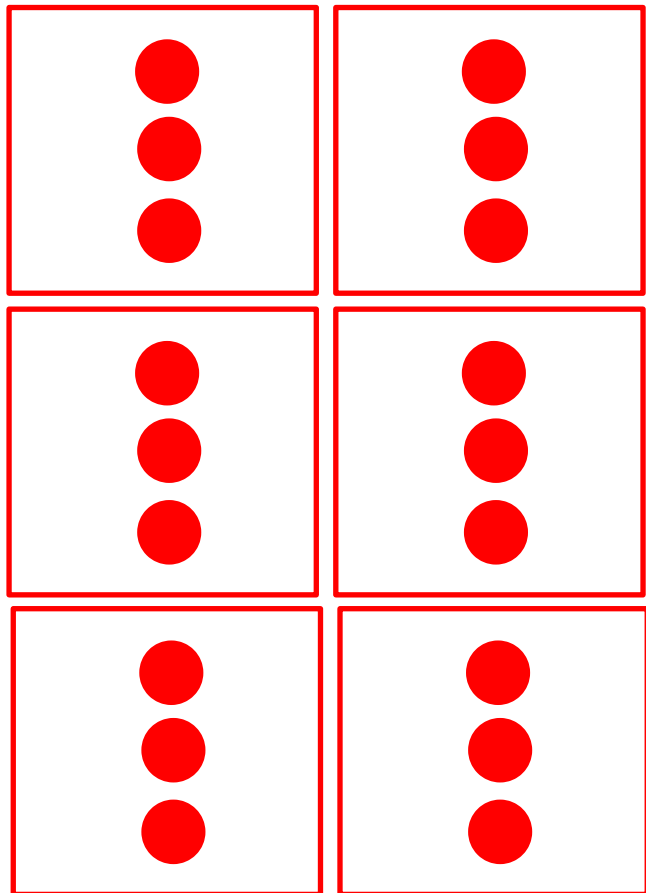
Draw 8 rows of 2



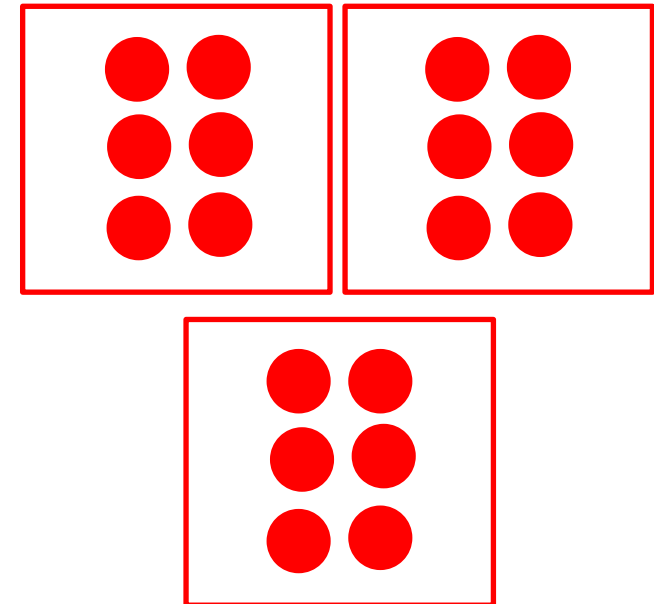
There are **16** ice cubes.

Hazel wants to group 6 coins in 3 purses. How many coins does she have altogether?

Draw 6 groups of 3

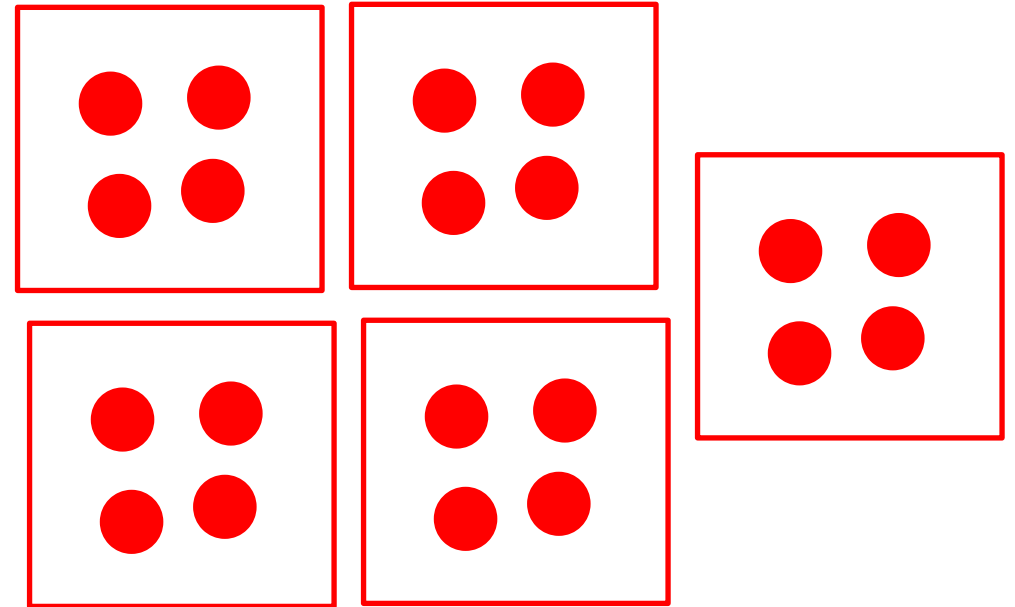
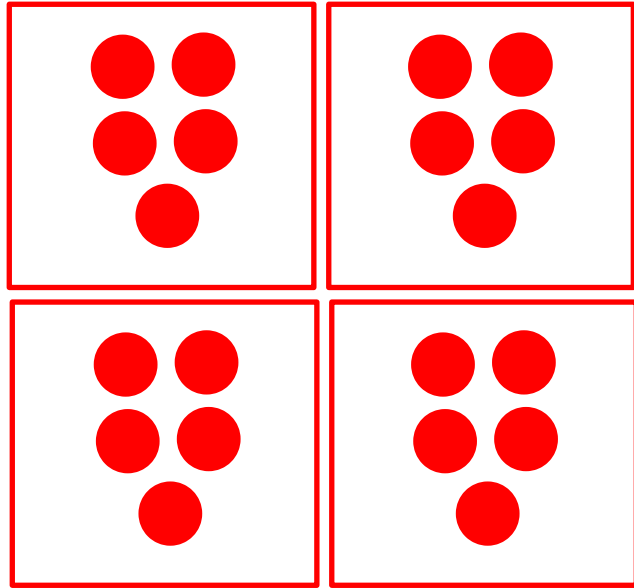


Draw 3 groups of 6



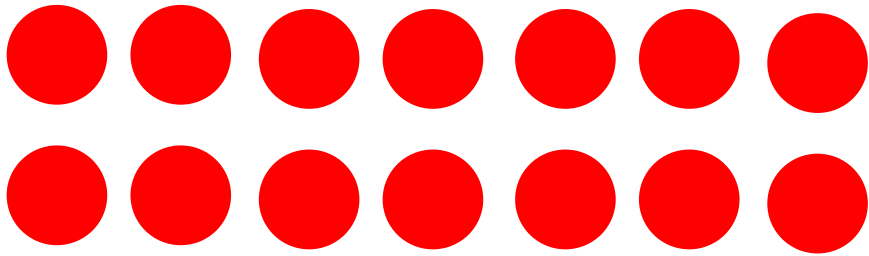
There are **18** coins.

Jerry keeps 5 pieces of cheese in a bag. He has 4 bags. How many pieces of cheese does he have? Draw the two possible equal groups.



$$4 \times 5 = 5 \times 4 = 20 \text{ pieces of cheese}$$

Nico placed 7 cups into two rows. How many cups did he place all in all? Draw the two possible array models.



$$2 \times 7 = 7 \times 2 = 14 \text{ cups}$$

