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 as a number of columns multiplied by a number of rows.

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

Consider the factors 3 and 4. We know that these factors have a product of 12.

3 rows of 4 can be written as 3 x 4 = 12.
Likewise, 4 columns of 3 can be written as 4 x 3 = 12.

Therefore, **the commutativity of multiplication allows the same product of the same factor pair multiplied in any order**.

The Commutativity of Multiplication Guided Notes   Math 3

For example:

3 x 4

Number of rows   **Number of columns**

3 rows   **of 4**

The array contains 12 dots altogether.

This is the same with:

4 x 3

Number of rows   **Number of columns**

4   **rows of 3**
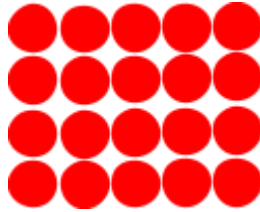
The array also contains 12 dots altogether.

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

The Commutativity of Multiplication Guided Notes   Math 3

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 x 5 and 5 x 4 respectively.

2. Describe the relationship between the two expressions.
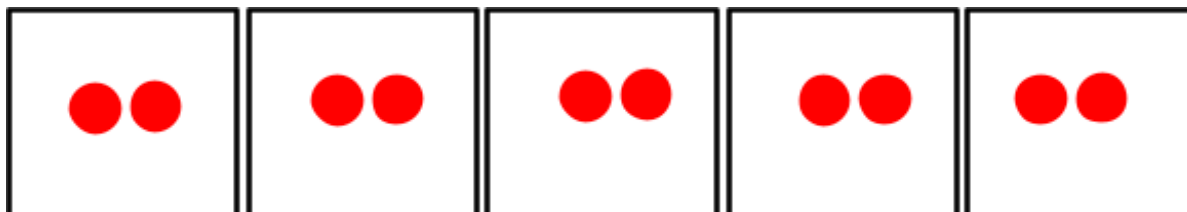
   Both expressions have a product of 20. Therefore, they are equal to each other.

The Commutativity of Multiplication Guided Notes   Math 3

Count by twos 5 times.

2, 4, 6, 8, 10
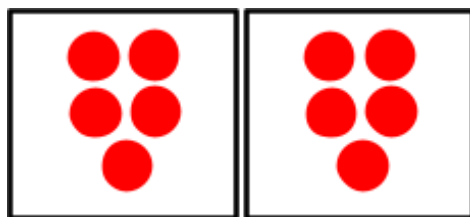
Fill in the groups with the correct size of each group:

5 x 2 = 10

Count by fives 2 times.

5, 10

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

2 x 5 = 10

What do you notice with the two previous equations?

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.

4

The Commutativity of Multiplication Guided Notes   **Math 3**

Count by threes 6 times.

3, 6, 9, 12, 15, 18

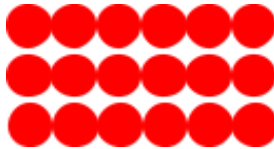Draw an array to represent the expression:

6 x 3 = 18

Count by sixes 3 times.

6, 12, 18

Draw an array to represent the expression:

3 x 6 = 18

What do you notice about the two arrays?

The orientation changed from vertical to horizontal.

Time to Think

Does interchanging the order of two factors change the product?

The order of the factors does not change the product.

The Commutativity of Multiplication Guided Notes   **Math 3**

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

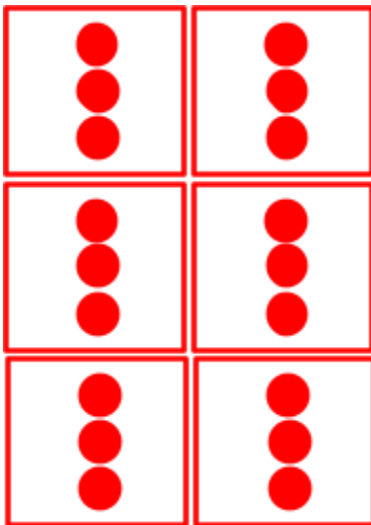Draw <u>2</u> rows of <u>8</u> ice cubes.   Draw <u>8</u> rows of <u>2</u> ice cubes.
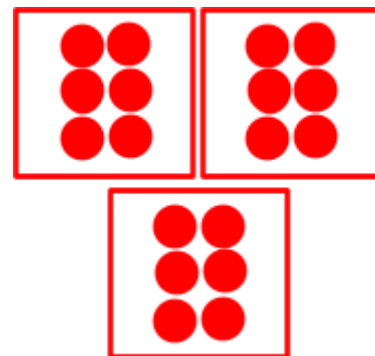
There are <u>16</u> ice cubes.

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

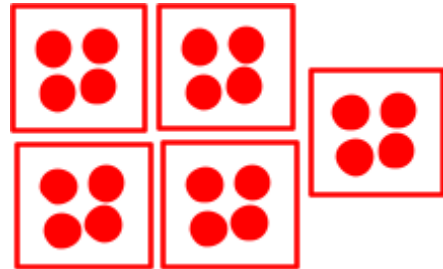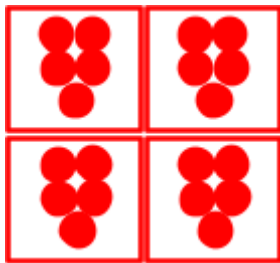Draw <u>6</u> groups of <u>3</u> coins.   Draw <u>3</u> groups of <u>6</u> coins.

There are <u>18</u> coins.

The Commutativity of Multiplication Guided Notes   **Math 3**

Time to Think

Using what we learned about the commutativity of multiplication, answer these word problems:

1. 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 x 5 = 5 x 4 = 20 pieces of cheese

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

   2 x 7 = 7 x 2 = 14 cups