MULTIPLICATION

Multiplication is a very important concept in mathematics. It's a way of adding the same number together many times.

A DEFINITIONS

Definition **Multiplication**

Multiplication is the process of repeated addition. When we multiply, we calculate the total by adding a number to itself a specified number of times.
The $\times$ symbol is called the multiplication or times sign, indicating that the numbers should be multiplied together.
Multiplication can be represented in several ways:

- **Numbers**:

$$4 \times 3 = 12$$

- **Groups**:

$$4 \text{ groups of } 3 = 12$$

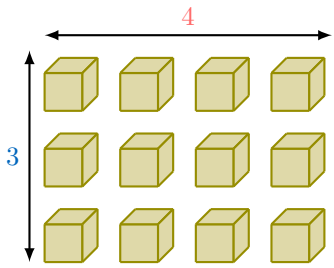
- **Repeated addition**:

$$3 + 3 + 3 + 3 = 12$$

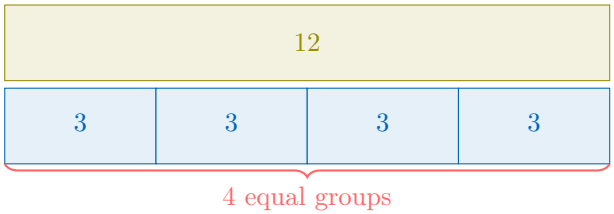
- **Words**:

four times three equals twelve

- **Items**:



- **Part-whole model**:



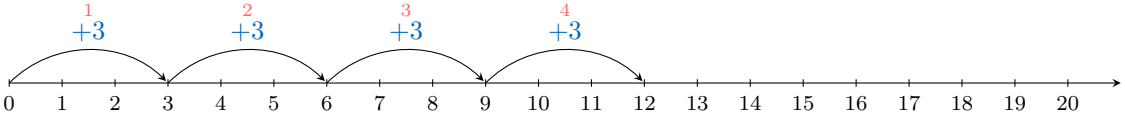
Ex: Write the repeated addition $5 + 5 + 5$ as a multiplication.

Answer: $5 + 5 + 5 = 3 \times 5$

B IN NUMBER LINE

Method **Multiplication in number line**

To evaluate 4×3, we start from 0 and we move 3 ones to the right 4 times.



We end up at 12, which is the result of the multiplication 4×3.

C REPRESENTATION OF MULTIPLICATION IN WORD PROBLEMS

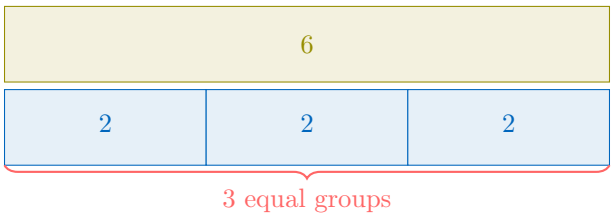
Method **Groups of items**

When we multiply, we often think about groups and the number of items in each group.

$$\text{number of groups} \times \text{number of items in each group} = \text{total}$$

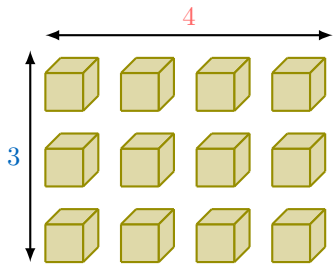
For example, there are 3 bags, and each bag contains 2 apples. The total number of apples is:

$$\begin{aligned} 3 \times 2 &= 2 + 2 + 2 \\ &= 6 \end{aligned}$$



D COMMUTATIVE

Proposition **Commutative**



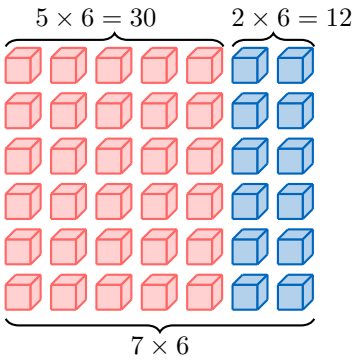
$$4 \times 3 = 3 \times 4$$

E DISTRIBUTIVE WITH ADDITION

Proposition **Distributive with Addition**

When multiplying, we can break one of the numbers into smaller parts to make it easier. Then, we multiply each part and add the results. For example:

$$\begin{aligned} 7 \times 6 &= (5 \times 6) + (2 \times 6) \\ &= 30 + 12 \\ &= 42 \end{aligned}$$



Or:

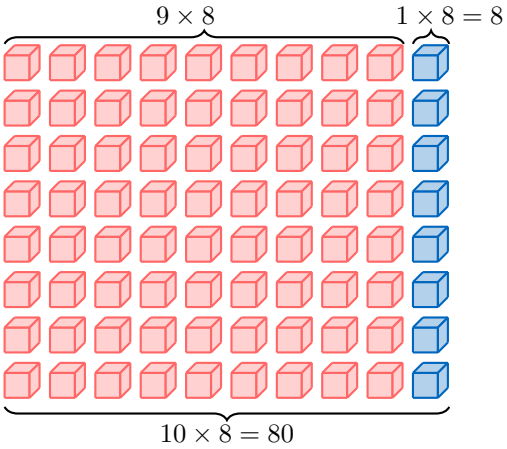
$$\begin{aligned} 6 \times 7 &= (6 \times 5) + (6 \times 2) \\ &= 30 + 12 \\ &= 42 \end{aligned}$$

F DISTRIBUTIVE WITH SUBTRACTION

Proposition **Distributive with Subtraction**

When multiplying, you can break numbers apart in a way that makes subtraction easier. For example:

$$\begin{aligned} 9 \times 8 &= (10 \times 8) - (1 \times 8) \\ &= 80 - 8 \\ &= 72 \end{aligned}$$



Or:

$$\begin{aligned} 8 \times 9 &= (8 \times 10) - (8 \times 1) \\ &= 80 - 8 \\ &= 72 \end{aligned}$$