

Vertical Progression:

<p>2nd Grade</p>	<p>2.OA.C Work with equal groups of objects to gain foundations for multiplication.</p> <ul style="list-style-type: none"> ○ 2.OA.C.3 Determine whether a group of objects (up to 20) has an odd or even number of members, e.g., by pairing objects or counting them by 2s; write an equation to express an even number as a sum of two equal addends. ○ 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.
<p>3rd Grade</p>	<p>3.OA.A Represent and solve problems involving multiplication and division.</p> <ul style="list-style-type: none"> ○ 3.OA.A.1 Interpret products of whole numbers, e.g., interpret 5×7 as the total number of objects in 5 groups of 7 objects each. For example, describe a context in which a total number of objects can be expressed as 5×7. ○ 3.OA.A.2 Interpret whole-number quotients of whole numbers, e.g., interpret $56 \div 8$ as the number of objects in each share when 56 objects are partitioned equally into 8 shares, or as a number of shares when 56 objects are partitioned into equal shares of 8 objects each. For example, describe a context in which a number of shares or a number of groups can be expressed as $56 \div 8$. ○ 3.OA.A.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem. ○ 3.OA.A.4 Determine the unknown whole number in a multiplication or division equation relating three whole numbers. For example, determine the unknown number that makes the equation true in each of the equations $8 \times ? = 48$, $5 = _ \div 3$, $6 \times 6 = ?$
<p>4th Grade</p>	<p>4.OA.A Use the four operations with whole numbers to solve problems.</p> <ul style="list-style-type: none"> ○ 4.OA.A.1 Interpret a multiplication equation as a comparison, e.g., interpret $35 = 5 \times 7$ as a statement that 35 is 5 times as many as 7 and 7 times as many as 5. Represent verbal statements of multiplicative comparisons as multiplication equations ○ 4.OA.2 Multiply or divide to solve word problems involving multiplicative comparison, e.g., by using drawings and equations with a symbol for the unknown number to represent the problem, distinguishing multiplicative comparison from additive comparison. ○ 4.OA.3 Solve multi-step word problems posed with whole numbers and having whole-number answers using the four operations, including problems in which remainders must be interpreted. Represent these problems using equations with a letter standing for the unknown quantity. Assess the reasonableness of answers using mental computation and estimation strategies including rounding. <p>4.OA.B Gain familiarity with factors and multiples.</p> <ul style="list-style-type: none"> ○ 4.OA.B.4 Find all factor pairs for a whole number in the range 1-100. Recognize that a whole number is a multiple of each of its factors. Determine whether a given whole number in the range 1-100 is a multiple of a given one-digit number. Determine whether a given whole number in the range 1-100 is prime or composite.

Students will demonstrate command of the ELG by:

- Interpreting whole number products and quotients.
- Determining unknown whole numbers in multiplication or division equations relating three whole numbers.
- Demonstrating and explaining how equal groups can represent the product.
- Creating a context for an expression or equation involving multiplication or division.
- Dividing groups of objects into equal shares.
- Creating an equation connected to a visual model of division.
- Creating models (arrays, equal groups, and measurement quantities) to represent and solve multiplication and division word problems.
- Creating equations with an unknown number that is represented by a symbol to solve multiplication and division word problems.
- Explaining when and why you would use multiplication and division to solve a word problem.
- Applying properties of operations as strategies to multiply and divide.

Vocabulary:

- | | | |
|----------------|------------------|---------------------|
| • array | • expression | • partition equally |
| • dividend | • factor | • product |
| • division | • groups of | • quotient |
| • divisor | • model | • set(s) |
| • equal groups | • multiple | • unknown |
| • equation | • multiplication | |

Sample Instructional/Assessment Tasks:

1) Standard: 3.OA.A.1

Source: Engage NY

Item Prompt: What number sentence can be represented by the picture below?



Use the blanks below to create your number sentence:

$$\underline{\quad} \times \underline{\quad} = \underline{\quad}$$

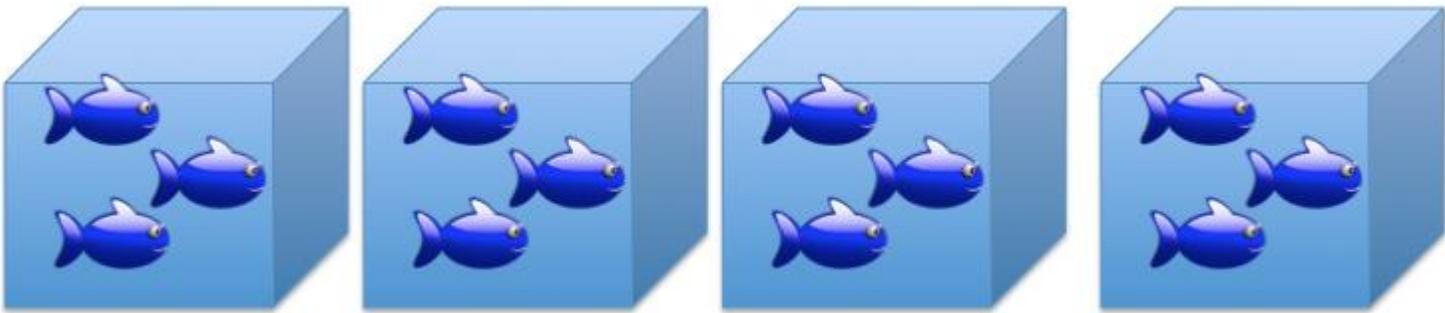
Correct Answer: $4 \times 6 = 24$

Commentary: Some students will respond with $6 \times 4 = 24$; however, there are four groups of six. It is important the students interpret that it is four groups of six NOT six groups of four.

2) Standard(s): 3.OA.A.2

Source: Illustrative Mathematics

Item Prompt:



Suppose there are 4 tanks and 3 fish in each tank. The total number of fish in this situation can be expressed as $4 \times 3 = 12$.

1. Describe what is meant in this situation by $12 \div 3 = 4$.
2. Describe what is meant in this situation by $12 \div 4 = 3$

Solution:

The students' language may vary. What is important is the structure. The student needs to match what is known (either the number of groups or the amount in each group) and what is being determined by the quotient operation in this context.

1. There are 12 fish. If 3 fish are put in each tank there will be 4 tanks.
2. There are 12 fish. If we want to partition (share) them equally among 4 tanks, we will end up with 3 fish in each tank.

3) Standard: 3.OA.4

Source: Illustrative Mathematics

Item Prompt:

Tehya and Kenneth are trying to figure out which number could be placed in the box to make this equation true.

Tehya insists that 12 is the only number that will make this equation true.

Kenneth insists that 3 is the only number that will make this equation true.

$$2 = \square \div 6$$

Who is right? Why? Draw a picture to support your idea.

Solution:

This solution shows that 12 split into groups of 6 will result in 2 groups.

$$2 = \boxed{12} \div 6$$



This solution shows that 12 split into 6 equal groups will result in 2 in each group.

$$2 = \boxed{12} \div 6$$

