Student Learning Goals:
- I can use tools, models, and strategies to multiply.
- I can use repeated addition, skip-counting in equal groups, and my knowledge of trusting 5 and 10 to multiply numbers.
- I can use properties of numbers to make it easier to find a product of two factors.
- I can use multiplication to find the area of a given rectangular space.

Key Vocabulary: (factor x factor = product)
- Multiply, groups of, factors, product, strategies, multiplication
- array, equal groups, area, rows, columns, unknown
- Place value, properties, partitioned equally, group size
- equations, expression, distributive property, commutative property

Website for Information:
https://www.khanacademy.org/math/arithmetic/arith-review-multiply-divide/arith-review-mult-intro/v/introduction-to-multiplication

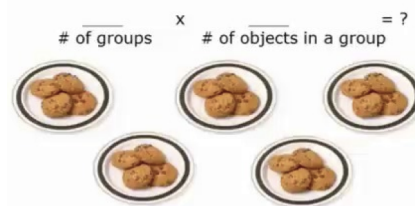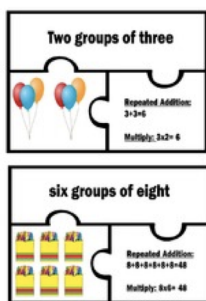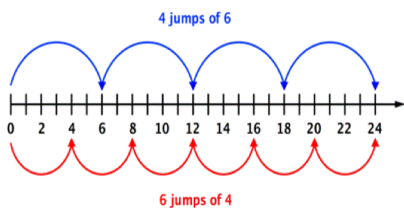# Tools/Models/Strategies

Multiplication Table:

1-12 Multiplication Chart

Equal Groups:

Two groups of three

Repeated Addition: 3+3=6
Multiply: 3x2= 6

six groups of eight

Repeated Addition: 8+8+8+8+8+8=48
Multiply: 8x6= 48

# of groups   x   # of objects in a group   = ?

Skip-counting using a Number line: (4x6 or 6x4):

4 jumps of 6

0 2 4 6 8 10 12 14 16 18 20 22 24

6 jumps of 4

Arrays:

A Common Misunderstanding

Thinking an array represents addition

3 + 5

5 columns

3 rows

1 2 3 4 5
6 7 8 9 10
11 12 13 14 15

5 + 5 + 5 = 3 x 5 = 15

LEARNZILLION

4 x 3 = 12   3 x 4 = 12
3 x 2 = 6   2 x 3 = 6

King's Way:

5 x 7
5 groups of 7

5
10
15
20
25
— = 5

25 + 10 = 35

6 x 6
6 groups of 6

5
10
15
20
25
30

30 + 6 = 36
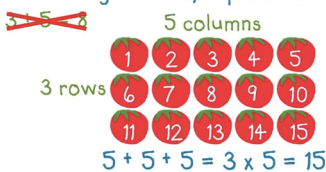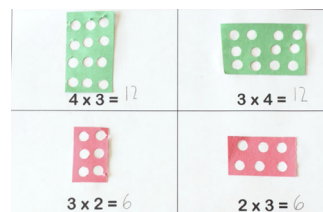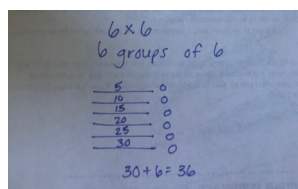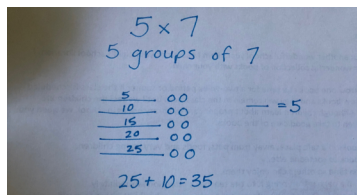
Properties of Multiplication

Zero Property: Any factor times 0 is equal to a product of 0.
Identity Property: Any factor times 1 is equal to a product of that same factor.
Commutative Property: Two factors can be multiplied in any order and still have the same product.
Distributive Property: You can multiply a sum by multiplying each addend separately and then add the products.

What is Area?

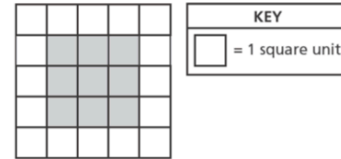The measure of how much space there is in a flat object.

In 3rd grade, they explore the area of a rectangle using unit squares and composite figures of rectangles.

EXAMPLES:

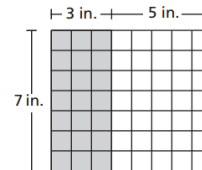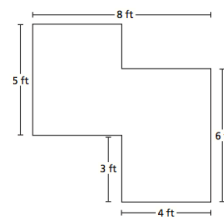|	
In this problem, the diagram is drawn and they must use the square tiles to come up with the area. They can either count the squares one by one, or as time goes on they will learn that the length and width of a rectangle multiplied together can give them the area. Length of shaded space = 3 square units Width of shaded space = 3 square units Area = Length x width 9 square units = 3 square units x 3 square units	**23** Brandon used square tiles to find the area of the shaded part of the picture below. KEY = 1 square unit What is the area of the shaded part of the picture? A 3 square units B 6 square units C 8 square units D 9 square units
In this problem, they have to combine their understanding of the distributive property and area.	Ryan used square tiles to make the design shown below. He used gray tiles and white tiles. ⊢ 3 in. ─┼── 5 in. ──┤ 7 in. Which expression could be used to find the total area, in square inches, of Ryan's design? A $(7 \times 3) + (7 \times 5)$ B $(7 + 3) \times (7 + 5)$ C $3 \times 5 \times 7$ D $3 + 5 + 7$
The following problem shows a composite figure. They have to see that this shape is made up of two rectangles. So if they split the shape (figure) in two to make two rectangles, they can take what they have learned about area (area = length x width) to find the area of each rectangle and then add them together.	**51** A gardener is drawing plans for a new yard. She creates the picture below to represent the size and shape of a new lawn. 8 ft 5 ft 3 ft 6 ft 4 ft How can the gardener find the total area of the new lawn? Describe the process she can use. _____ _____ _____ What is the total area of the new lawn?

Website about Area: