Family Letter
Unit 2
Grade 3
Advanced Math

Key Concepts for Unit 2

- Commutative Property
- Associative Property
- Distributive Property
- Even/Odd patterns in Addition and Multiplication
- Area
- Solving for an unknown number within a problem
- Multiplication facts (3x,4x)

Vocabulary

Commutative Property: *See page 3*

Associative Property: *See page 3*

Distributive Property: *See page 3*

Product: **The answer to a multiplication problem.**

Area: **The space inside a shape, measured in squares.**

Parentheses: **Symbols ( ) used to group numbers together.**

Array: **A multiplication sentence shown in rows and columns.**

Area Model: **A diagram showing the area of a rectangle can be divided into two smaller rectangles.**

Common Core State Standards for this Unit

3.OA.5 Apply properties of operations as strategies to multiply and divide.

3.OA.6 Understand division as an unknown factor problem.

3.OA.7 Fluently multiply and divide within 100, using strategies such as the relationship between multiplication and division

3.OA.3 Use multiplication and division within 100 to solve word problems in situations involving equal groups, arrays, and measurement quantities.

3.OA.9 Identify arithmetic patterns (including patterns in the addition table or multiplication table), and explain them using properties of operations.

3.MD.6 Measure areas by counting unit squares (square cm, square m, square in, square ft, and improvised units).

3.MD.7 Relate area to the operations of multiplication and addition.

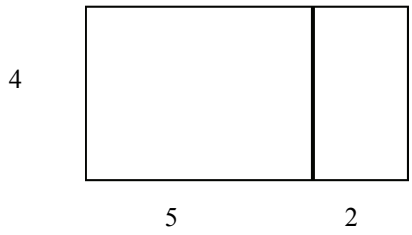
a. Find the area of a rectangle with whole-number side lengths by tiling it, and show that the area is the same as would be found by multiplying the side lengths.

b. Multiply side lengths to find areas of rectangles with whole-number side lengths in the context of solving real world and mathematical problems, and represent whole-number products as rectangular areas in mathematical reasoning.

3.MD.7d Recognize area as additive. Find areas of rectilinear figures by decomposing them into non-overlapping rectangles and adding the areas of the non-overlapping parts, applying this technique to solve real world problems.

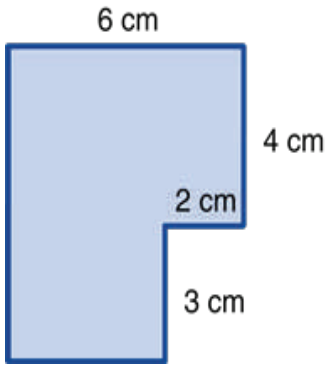
3.MD.7c

Example of Area Model



This area model represents the problem 4 x 7 = ___, which can be answered by solving for the smaller facts 4 x 5 = 20 and 4 x 2 = 8 and then adding 20 + 8 = 28.

3.MD.7d
Area is additive:



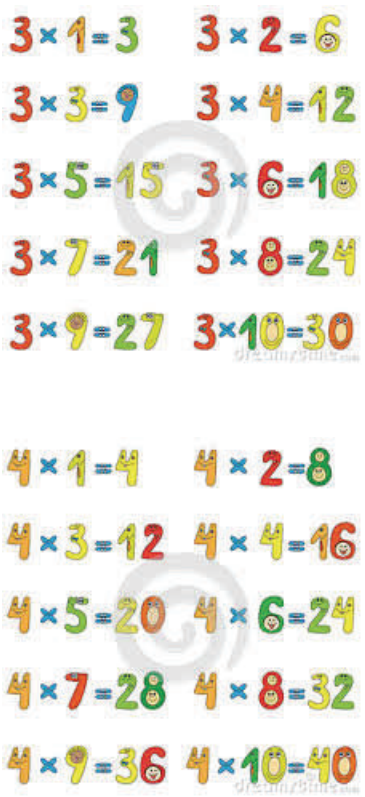
Students would divide this shape into two smaller rectangles. Students would find the areas of the two rectangles, then add the areas together.

(Note: The shape could be divided horizontally, creating a 6 x 4 rectangle and a 4 x 3 rectangle, or vertically to create a 4 x 2 rectangle and a 4 x 7 rectangle. Either way is acceptable.)

Important to Know:

- **By the end of the year third graders are expected to be able to give the answers to multiplication facts 0x to 10x without having to take time to calculate.**

Further explanation for Standard 3.OA.5 . . .



Some patterns…

...for addition:

Even + Even = Even
Even + Odd = Odd
Odd + Odd = Even

...for multiplication:

Even x Even = Even
Even x Odd = Even
Odd x Odd = Odd

The 4x facts will be double the 2x facts.

The products of the 5x facts will always have a 0 or 5 in the ones place.

Commutative Property

This property is also referred to as the "Turn-Around Rule." Basically, factors in a multiplication sentence can be reversed without changing the answer.

Example:

If you know 4 x 6 = 24, then 6 x 4 = 24 is also known.

Associative Property

This property tells us that when multiplying three or more numbers, the answer is always the same regardless of their grouping.

Example:

3 x 5 x 2 can be found by:

3 x 5 = 15, then 15 x 2 =30,

or

5 x 2= 10, then 3 x 10 = 30.

Distributive Property

This tells us that we can break one of the factors into two smaller numbers, multiply by those, then add the products together to get the answer to the original problem.

Example:

If you don't know 8 x 7…

Think of the 7 as 5 + 2.

Now you have 8 x (5 + 2).

Multiply. 8 x 5 = 40 and 8 x 2 = 16.

Add the products. 40 + 16 = 56

. . . And other standards from this unit.

3.OA.6

For example, find 32 ÷ 8 by finding the number that makes 32 when multiplied by 8.

3.OA.7

Use drawings and equations with a symbol for the unknown number to represent the problem.

3.OA.3

For example, observe that 4 times a number is always even, and explain why 4 times a number can be decomposed into two equal addends.