**Grade 3 Unit 2 Family Resource**

**Unit Name: Developing a Conceptual Understanding of Place Value**

| What's my child learning in Unit 2? | What does this mean? What does it look like? | How can I help my child at home? |
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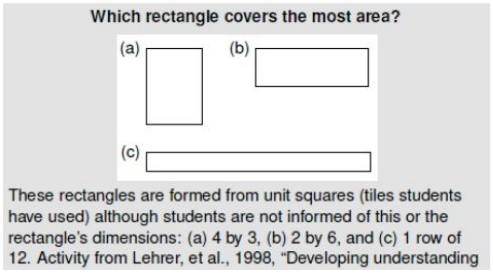
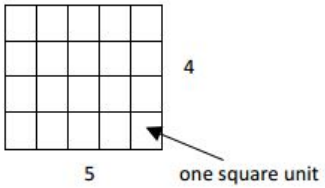
| • Students will recognize area as attribute of plane figures and understand concepts of area measurement.<br>• Students will understand that a square with a side length of 1 unit, called a "unit square" is said to have "one square unit" of area and recognize that a plane figure which can be covered without gaps or overlaps by *n* unit squares is said to have an area of *n* units.<br>• Students will measure area by counting unit squares (square cm, square m, square in, square ft, and improvised units). |  <br>These rectangles are formed from unit squares (tiles students have used) although students are not informed of this or the rectangle's dimensions: (a) 4 by 3, (b) 2 by 6, and (c) 1 row of 12. Activity from Lehrer, et al., 1998, "Developing understanding<br>  | Using Arrays - Directions to a printable game where students build the array which matches the roll of the dice.<br><br>Area Game - An online game to practice finding area using grids |
| • Students will apply the commutative and associative properties as strategies to multiply, exploring the use of parenthesis within the Associative Property. | • The associative property states that the sum or product stays the same when the grouping of addends or factors is changed. For example, when a student multiplies 7 x 5 x 2, a student could rearrange the numbers to first multiply 5 x 2 = 10 and then multiply 10 x 7 = 70.<br>• The commutative property (order property) states that the order of numbers does not matter when adding or multiplying numbers. For example, if a student knows that 5 x 4 = 20, then they also know that 4 x 5 = 20.<br>• The array below could be described as a 5 x 4 array for 5 columns and 4 rows, or a 4 x 5 array for 4 rows and 5 columns. There is no "fixed" way to write the dimensions of an array as rows x columns or columns x rows.<br>• Students should have flexibility in being able to describe both dimensions of an array.<br>X X X X<br>X X X X<br>X X X X<br>X X X X<br>X X X X<br>4x5<br>or<br>5x4<br>X X X X X<br>X X X X X<br>X X X X X<br>X X X X X | Commutative Property of Multiplication - This video shows how to use the commutative property of multiplication<br><br>Associative Property of Multiplication Video - This video shows how to use the associative property of multiplication. |
| Students will use multiplication within 100 to solve word problems in product unknown situations involving equal groups, arrays and | **Examples of multiplication:**<br>There are 24 desks in the classroom. If the teacher puts 6 desks in each row, how many rows are there? This task can be solved by drawing an | Cookie Capers - Online fact acquisition to practice repeated addition and math vocabulary |

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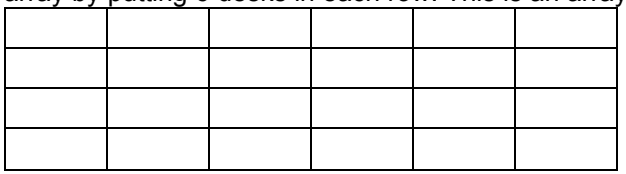
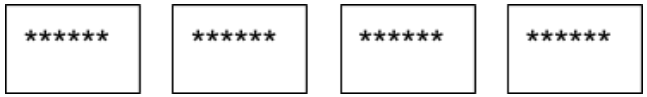
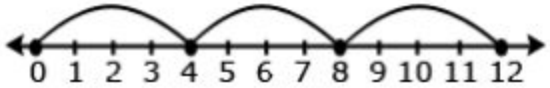
| measurement quantities (area) and write an equation to represent the problem with a symbol for the unknown whole number in the problem. | array by putting 6 desks in each row. This is an array model.<br>  <br>This task can also be solved by drawing pictures of equal groups. 4 groups of 6 equals 24 objects<br>  <br><br>A number line could also be used to show equal jumps.<br>Students in third grade students should use a variety of pictures, such as stars, boxes, flowers to represent unknown numbers (variables). Letters are also introduced to represent unknowns in third grade.<br><br>Word problems may be represented in multiple ways:<br>● Equations: 3 x 4 = ?, 4 x 3 = ?, 12 ÷ 4 = ? and 12 ÷ 3 = ?<br>● Array:  <br>●  <br>● Equal Groups:<br>● Repeated addition: 4 + 4 + 4 or repeated subtraction<br>● Three equal jumps forward from 0 on the number line to 12 or three equal jumps backwards from 12 to 0<br>  <br> | such as “groups of” and “in each group”. |
| Students will understand that multiplying a whole number by a multiple of 10 is the same as multiplying *n* groups of *y* tens (For example, 4 x 30 is the same as 4 groups of 3 tens). | For the problem 50 x 4, students should think of this as 4 groups of 5 tens or 20 tens. Twenty tens equal 200.<br>The special role of 10 in the base-ten system is important in understanding multiplication of one-digit numbers with multiples of 10. For example, the product 3 x 50 can be represented as 3 groups of 5 tens, which is 15 tens, which is 150. This reasoning relies on the associative property of multiplication: 3 x 50 = 3 x (5 x 10) = (3 x 5) x 10 = 15 x 10 = 150. It is an example of how to explain an instance of a calculation pattern for these products: calculate the product of the non-zero digits, and then shift the product one place to the left to make the result ten times as large. | Multiply using the Grouping Strategy - An online game where students make equal groups to satisfy the commands given. This game does not require an equation. |

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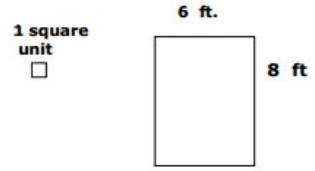
| | • **Grade 3 explanations for "15 tens is 150"**<br>• Skip-counting by 50. 5 tens is 50, 100, 150.<br>• Counting on by 5 tens. 5 tens is 50, 5 more tens is 100, 5 more tens is 150.<br>• Decomposing 15 tens. 15 tens is 10 tens and 5 tens. 10 tens is 100. 5 tens is 50. So 15 tens is 100 and 50, or 150.<br><br>• Decomposing 15.<br>$15 \times 10 = (10 + 5) \times 10$<br>$= (10 \times 10) + (5 \times 10)$<br>$= 100 + 50$<br>$= 150$<br><br>*All of these explanations are correct. However, skip-counting and counting on become more difficult to use accurately as numbers become larger, e.g., in computing $5 \times 90$ or explaining why $45$ tens is $450$, and needs modification for products such as $4 \times 90$. The first does not indicate any place value understanding.* | |
| Students will apply repeated addition or multiplication strategies to find areas. | Students should solve real world and mathematical problems.<br>Example: Drew wants to tile the bathroom floor using 1 foot tiles. How many square foot tiles will he need?<br>  <br> | Using Arrays - Directions to a printable game where students build the array which matches the roll of the dice. |