



## Grade 3 - Unit 2 - Introduction to Multiplication & Division Concepts

### Unit Focus

In Unit 2, students begin to develop a conceptual understanding of multiplication and division. Investigations begin with contexts and problems that invite students to multiply and divide and to think about equal groups. Students are introduced to loops and groups, skip counting, repeated addition and then make use of a variety of models for multiplication and division including equal groups, arrays and number lines. They learn the zero, identity and associative properties. They apply what they have learned by solving problems involving all four operations.

### Stage 1: Desired Results - Key Understandings

Standard(s)	Transfer		
<b>Standards</b> <ul style="list-style-type: none"><li>Common Core<ul style="list-style-type: none"><li>Mathematics: 3<ul style="list-style-type: none"><li>Represent and solve problems involving multiplication and division.</li><li>Interpret products of whole numbers, e.g., interpret <math>5 \times 7</math> 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 <math>5 \times 7</math>. (CCSS.MATH.CONTENT.3.OA.A.1)</li><li>Interpret whole-number quotients of whole numbers, e.g., interpret <math>56 \div 8</math> 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 <math>56 \div 8</math>. (CCSS.MATH.CONTENT.3.OA.A.2)</li><li>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. (CCSS.MATH.CONTENT.3.OA.A.3)</li><li>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 <math>8 \times ? = 48</math>, <math>5 = \_ \div 3</math>, <math>6 \times 6 = ?</math> (CCSS.MATH.CONTENT.3.OA.A.4)</li><li>Understand properties of multiplication and the relationship between multiplication and division.</li><li>Apply properties of operations as strategies to multiply and divide.2 Examples: If <math>6 \times 4 = 24</math> is known, then <math>4 \times 6 = 24</math> is also known. (Commutative property of multiplication.) <math>3 \times 5 \times 2</math> can be found by <math>3 \times 5 = 15</math>, then <math>15 \times 2 = 30</math>, or by <math>5 \times 2 = 10</math>, then <math>3 \times 10 = 30</math>. (Associative property of multiplication.) Knowing that <math>8 \times 5 = 40</math> and <math>8 \times 2 = 16</math>, one</li></ul></li></ul></li></ul>	<i>Students will be able to independently use their learning to...</i> <b>T1</b> Initiate a plan using a variety of methods/strategies appropriately, execute it, and evaluate the reasonableness and accuracy of the solution. <b>T2</b> Apply models to solve problems. <b>T3</b> Identify and generalize patterns and structure in numbers, expressions, data and objects.		
	Meaning		
	Understanding(s)	Essential Question(s)	
	<i>Students will understand that...</i> <b>U1</b> Mathematicians work to make sense of the problem before trying to solve it. <b>U2</b> Mathematicians monitor progress while problem solving, change course if necessary and evaluate the reasonableness of their solution. <b>U3</b> Mathematicians create or use models to generalize, represent, and solve problems. <b>U4</b> Mathematicians see patterns to make generalizations about structures and relationships.	<i>Students will keep considering...</i> <b>Q1</b> What do effective problem solvers do when they get stuck? <b>Q2</b> How do I determine that my answer makes sense? <b>Q3</b> What model best represents this problem? <b>Q4</b> What patterns are present? <b>Q5</b> What generalizations can be made from this pattern?	
	Acquisition of Knowledge and Skill		
Knowledge	Skill(s)		
<i>Students will know...</i> <b>K1</b> multiplication is repeated addition & division is repeated subtraction <b>K2</b> some groups remain constant	<i>Students will be skilled at...</i> <b>S1</b> using additive strategies such as skip counting and repeated addition to solve multiplication problems		

## Stage 1: Desired Results - Key Understandings

<p>can find <math>8 \times 7</math> as <math>8 \times (5 + 2) = (8 \times 5) + (8 \times 2) = 40 + 16 = 56</math>. (Distributive property.) (CCSS.MATH.CONTENT.3.OA.B.5)</p> <ul style="list-style-type: none"> <li>Understand division as an unknown-factor problem. For example, find <math>32 \div 8</math> by finding the number that makes 32 when multiplied by 8. (CCSS.MATH.CONTENT.3.OA.B.6)</li> <li>Solve problems involving the four operations, and identify and explain patterns in arithmetic.</li> <li>Solve two-step word problems using the four operations. 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. (CCSS.MATH.CONTENT.3.OA.D.8)</li> <li>Represent and interpret data.</li> <li>Draw a scaled picture graph and a scaled bar graph to represent a data set with several categories. Solve one- and two-step how many more and how many less problems using information presented in scaled bar graphs. For example, draw a bar graph in which each square in the bar graph might represent 5 pets. (CCSS.MATH.CONTENT.3.MD.B.3)</li> <li>Relate area to the operations of multiplication and addition. (CCSS.MATH.CONTENT.3.MD.C.7)</li> <li>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. (CCSS.MATH.CONTENT.3.MD.C.7A)</li> <li>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. (CCSS.MATH.CONTENT.3.MD.C.7B)</li> <li>Mathematical Practices</li> <li>Make sense of problems and persevere in solving them. (CCSS.MATH.MP.1)</li> <li>Model with mathematics. (CCSS.MATH.MP.4)</li> <li>Look for and make use of structure. (CCSS.MATH.MP.7)</li> </ul> <p><b>Madison Public Schools Profile of a Graduate</b></p> <p>Analyzing: Examining information/data/evidence from multiple sources to identify possible underlying assumptions, patterns, and relationships in order to make inferences. (POG.1.2)</p>	<p><b>K3</b> the zero, identity, commutative properties for multiplication</p> <p><b>K4</b> problems can be approached from a range of perspectives</p> <p><b>K5</b> how to use models to solve multiplication and division equations</p> <p><b>K6</b> how to use multiplication to solve division problems</p> <p><b>K7</b> how to write a fact family to match an array</p> <p><b>K8</b> Vocabulary: row, column, product, factor, quotient, multiple, array, variable, commutative property of multiplication, divide, expression, equation</p> <p><b>K9</b> picture graphs, bar graphs and line plots represent mathematical data</p>	<p><b>S2</b> understanding factors and multiples within 100</p> <p><b>S3</b> using an open number line and array to solve multiplication and division problems</p> <p><b>S4</b> solving equations with unknown product, divisor or dividend, group size unknown, or number of groups unknown.</p> <p><b>S5</b> identifying fact families to match an array</p> <p><b>S6</b> solving one and two-step word problems using multiplication and division with products and dividends to 100</p> <p><b>S7</b> creating a picture graph or bar graph</p> <p><b>S8</b> answering questions using data represented on a bar graph, picture graph or line plot</p>
--	---	---