

<b>Essential Understandings</b>	<ul style="list-style-type: none"> <li>Patterns can be found in many forms.</li> </ul>
<b>Essential Questions</b>	<ul style="list-style-type: none"> <li>What is a geometric pattern?</li> <li>How can a pattern be used to make a prediction?</li> <li>How does one solve for unknowns?</li> <li>How can one check one's answers?</li> <li>What is the commutative property?</li> </ul>
<b>Essential Knowledge</b>	<ul style="list-style-type: none"> <li>A geometric pattern is a sequence in which the ratio between successive terms is the same (i.e., 1, 2, 4, 8, etc.).</li> <li>One can make generalizations from patterns.</li> <li>Patterns can be used to solve problems.</li> <li>Number patterns and relationships can be represented using variables.</li> <li>Lists, tables and diagrams can be used to solve problems</li> <li>Equivalent expressions can help with computation.</li> <li>The commutative property states that numbers can be added or multiplied in any order.</li> <li>The inverse relationship between addition and subtraction can be used to solve and check problems.</li> <li>The inverse relationship between multiplication and division can be used to solve and check problems.</li> </ul>
<b>Vocabulary</b>	<ul style="list-style-type: none"> <li><u>Terms:</u> <ul style="list-style-type: none"> <li>factor, geometric pattern, variable, diagram, missing factor</li> </ul> </li> </ul>
<b>Essential Skills</b>	<ul style="list-style-type: none"> <li>Create, describe, explain and extend number and geometric patterns. (I, R, A)</li> <li>Identify and write the missing addend or subtrahend with sums to 1000. (I, R)</li> <li>Identify and write the missing factor, dividend, or divisor. (I)</li> <li>Use symbols or letters (variables) to represent or model quantity. (I)</li> <li>Create and use organized lists, tables, or diagrams to solve problems. (I, R)</li> <li>Use equivalent expressions to aid computations (i.e., <math>43 + 56</math> is the same as <math>40 + 3 + 50 + 6</math>). (I, R)</li> <li>Use the inverse relationships between addition and subtraction and between multiplication and division to solve and check problems. (I, R)</li> <li>Recognize and show how the commutative property applies to addition and multiplication. (I, R, A)</li> <li>Complete simple input/output tables. (I, R, A)</li> </ul>

<b>Related Maine Learning Results</b>	<p>D. Algebra</p> <p>Symbols and Expressions</p> <p>D1.Students use equivalent expressions to aid computation such as knowing that <math>43 + 56</math> is the same as <math>40 + 3 + 50 + 6</math>.</p> <p>Equations and Inequalities</p> <p>D2.Students find the unknown in simple equations (or open sentences) in the context of numbers and operations as described in <u>Standard 2:1 Number</u> for this grade level such as:</p> <p><math>3 + 5 = [ ] + 3</math>  <math>3 + 9 = [ ] + 10</math>  <math>[ ] + ( ) = 10</math>.</p> <p>Functions and Relations</p> <p>D3.Students understand arithmetic relationships between addition and subtraction and between multiplication and division and the commutative laws of multiplication and addition to solve problems.</p> <p>a. Use the inverse relationships between addition and subtraction and between multiplication and division and the commutative laws of multiplication and addition to solve problems.</p> <p>b. Be able to show that for whole numbers subtraction and division are not commutative and show that multiplication and addition are commutative.</p> <p>D4.Students create, describe, explain, and extend patterns with numbers and geometric objects.</p>
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