

**Unit Title: “Accentuate the Negative”**

**Course: Middle School Mathematics**

**Subject Area: Mathematics**

**Time Frame: 20 days**

**Standards**

<b>Middle School Mathematics Standards</b>	<b>Sunshine State Standards Benchmarks</b>	<b>NCEE New Standards</b>
<p>The student will:</p> <p>12.1 Represent integers on the number line.</p> <p>12.2 Model situations with integers.</p> <p>12.3 Compare integers using <math>&lt;</math>, <math>=</math>, and <math>&gt;</math> symbols.</p> <p>12.4 Develop strategies for adding, subtracting, multiplying, and dividing integers.</p> <p>12.5 Use integers to solve problems.</p> <p>12.6 Find inverses for given integers.</p> <p>12.7 Sketch coordinate graphs in four quadrants.</p>	<p>MA.A. 3.3.1 The students understands and explains the effects of addition, subtraction, multiplication, and division on whole numbers, fractions, including mixed numbers, and decimals, including the inverse relationships of positive and negative numbers.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"><li>• Knows the effects of the four basic operations on whole numbers, fractions, mixed numbers, and decimals.</li><li>• Uses models or pictures to show the effects of addition, subtraction, multiplication, and division, on whole numbers, decimals, fractions, and mixed numbers.</li><li>• Applied the properties of rational numbers to solve problems (commutative, associative, distributive, identity, equality, inverse).</li><li>• Knows the inverse relationship of positive</li></ul>	<p>The student:</p> <p>M1a Consistently and accurately adds, subtracts, multiples, and divides rational numbers using appropriate methods.</p> <p>M1b Uses and understands the inverse relationships between addition and subtraction, multiplication and division, and exponentiation and root-extraction; uses the inverse operation to determine unknown quantities in equations.</p> <p>M6a Computes accurately with arithmetic operations on rational numbers.</p>

	<p>and negative numbers.</p> <p>MA.A.3.3.2 The student selects the appropriate operation to solve problems involving addition, subtraction, multiplication, and division of rational numbers, ratios, proportions, and percents, including the appropriate application of the algebraic order of operations.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"> <li>• Knows the appropriate operations to solve real-world problems involving fractions, decimals, and integers.</li> <li>• Solves real-world problems using one- or two-step problems.</li> <li>• Solves real-world problems involving percents.</li> <li>• Applies order of operations to solve problems.</li> <li>• Knows proportional relationships and uses tables, graphs, or “constant ratio” relationships to solve and explain problems.</li> </ul> <p>MA.A.3.3.3 The student adds, subtracts, multiplies, and divides whole numbers, decimals, and fractions, including mixed numbers, to solve real-world problems, using appropriate methods of computing, such as mental mathematics, paper and pencil, and</p>	
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	<p>calculators.</p> <p><i>Expectations</i> The student:</p> <ul style="list-style-type: none"><li>• Solves one- or two-step real-world problems involving whole numbers, fractions or decimals using appropriate methods of computation, such as mental computation, paper and pencil.</li></ul>	
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### Desired Results

Enduring Understanding	Essential Questions	Knowledge and Skills
<p>Students will understand</p> <ul style="list-style-type: none"> <li>The algorithms for addition, subtraction, multiplication, and division of integers can be developed through the basic models of using the number line and the chip-board.</li> </ul>	<ul style="list-style-type: none"> <li>What situations in daily life can be represented by positive or negative numbers?</li> <li>How can meaning be found for operations on negative numbers? Where can such operations be modeled?</li> <li>Is it possible to use “less than” or “greater than” concepts with integers?</li> <li>How are integers different from whole numbers? How are these two sets of numbers alike?</li> <li>Can a coordinate grid be expanded to include negative numbers?</li> </ul>	<p>Students will know</p> <ul style="list-style-type: none"> <li>Key terms (e.g., absolute value, integers, negative integer, negative number, opposites, positive integer, positive numbers, inverse operations, quadrant).</li> </ul> <p>Students will be able to</p> <ul style="list-style-type: none"> <li>Compare integers using the symbols <math>&lt;</math>, <math>=</math>, and <math>&gt;</math>.</li> <li>Develop strategies for adding, subtracting, multiplying, and dividing integers.</li> <li>Represent integers on a number line.</li> <li>Model situations with integers.</li> <li>Use integers to solve problems.</li> <li>Find the additive inverse for given integers.</li> <li>Graph in four quadrants.</li> <li>Graph linear equations using a graphing calculator</li> </ul>

### Acceptable Evidence

Performance Tasks	Quizzes, Test, and Work Samples	Observations and Dialogues
<ul style="list-style-type: none"> <li><b>Extending the Number Lines</b> Students are introduced to a game in which points are won and lost introduces integers and provides an entry points for comparing integers, discussing order, and working with opposites. The number line is used to model strategies for</li> </ul>	<p>Check-Up 1 Quiz A Check-Up 2 Quiz B Unit Test</p>	<p>Teacher observations of students during work on performance tasks. Accountable talk during work on performance tasks.</p>

adding, subtracting, and multiplying integers.

- **Adding Integers**  
Students develop rules for adding integers. They explore two models – a number line and a board with chips of two colors, one to represent  $+1$  and the other to represent  $-1$  – as ways to represent, solve, and explain addition problems involving positive and negative integers.
- **Subtracting Integers**  
Number lines and chip boards are used to model the subtraction of positive and negative integers. Subtraction, interpreted as the opposite of addition, is modeled on a chip board as “taking away” chips and on a number line as reversing the direction of the arrow representing the second integer in a subtraction expression. Students look for patterns and find rules for subtracting positive and negative integers.
- **Multiplying and Dividing Integers**  
Students develop rules for multiplying and dividing integers. As it is difficult to model multiplying or dividing a negative integer by a negative integer, students look for patterns and further develop their understanding of integers and of the operations of multiplication and division as a means for developing rules with integers.
- **Coordinate Grids**  
Integers facilitate the introduction of the complete coordinate grid with all four quadrants. The axes for the coordinate grids are described as two perpendicular number lines representing both positive and negative integers.