

Core Content

Cluster Title: Apply and extend previous understandings of numbers to the system of rational numbers.
Standard 5: Understand that positive and negative numbers are used together to describe quantities having opposite directions or values (e.g., temperature above/below zero, elevation above/below sea level, credits/debits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.
MASTERY Patterns of Reasoning:
Conceptual: Understand that positive and negative numbers (integers) allow us to talk about quantities that have opposite directions or values. Understand that a negative integer is less than zero. Understand that the meaning of zero is determined by the real world context (e.g., freezing point in the Celsius system—anything below freezing is negative, anything above freezing is positive).
Procedural: Use integers to represent situations in real-world contexts.
Representational: Represent integers using real-world tools such as a thermometer, balance sheet (money), etc.

Supports for Teachers

Critical Background Knowledge
Conceptual: Know where positive integers are on a number line. Know the set of positive integers. Understand that zero represents a position. Know that number lines extend to show positive integers right and up and negative integers left and down (vertical and horizontal number lines).
Procedural: Describe quantities having opposite values.

<p>Representational: Plot integer points on a number line.</p>																			
<p>Academic Vocabulary and Notation</p>																			
<p>→, ←, ↑, ↓, +, −, integer, negative, positive, rational, zero</p>																			
<p>Instructional Strategies Used</p>		<p>Resources Used</p>																	
<p>Provide multiple examples of types of contexts using positive and negative integers (such as a bank account, hot air balloons, discs to show positive and negative charges, thermometer, number line) and give the students opportunities to make sense of each context.</p> <p>Give students a number and have them write a real-life situation for that number and its opposite that would result in an answer of zero. Explain the meaning of zero in that situation and represent it on the number line.</p> <p>Use a comparison matrix:</p> <table border="1"> <thead> <tr> <th></th> <th>Negative</th> <th>Zero</th> <th>Positive</th> </tr> </thead> <tbody> <tr> <td>Definition</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Example</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Picture</td> <td></td> <td></td> <td></td> </tr> </tbody> </table>			Negative	Zero	Positive	Definition				Example				Picture				<p>http://nlvm.usu.edu/en/nav/frames_asid_334_g_2_t_1.html?from=category_g_2_t_1.html</p>	
	Negative	Zero	Positive																
Definition																			
Example																			
Picture																			
<p>Assessment Tasks Used</p>																			
<p>Skill-based Task: Joe's football team had a loss of 5 yards on first down. Write an integer to represent the situation.</p>		<p>Problem Task: Create a situation in which integers have opposite values and explain what zero means in this situation.</p>																	