Pacing: 2 weeks (plus 1 week for reteaching/enrichment)

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| **Mathematical Practices** |
| *Mathematical Practices #1 and #3* *describe a classroom environment that encourages thinking mathematically and are critical for quality teaching and learning.*  *Practices in bold are to be emphasized in the unit.*  1. Make sense of problems and persevere in solving them.  **2. Reason abstractly and quantitatively.**  3. Construct viable arguments and critique the reasoning of others.  **4. Model with mathematics.**  5. Use appropriate tools strategically.  6. Attend to precision.  7. Look for and make use of structure.  8. Look for and express regularity in repeated reasoning. |
| **Domain and Standards Overview** |
| **The Number System**   * **Apply and extend previous understanding of numbers to the system of rational numbers.** |

| **Priority and** Supporting **CCSS** | **Explanations and Examples\*** | |
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| **6.NS. 6. Understand a rational number as a point on the number line. Extend number line diagrams and coordinate axes familiar from previous grades to represent points on the line and in the plane with negative number coordinates.**   1. **Recognize opposite signs of numbers as indicating locations on opposite sides of 0 on the number line; recognize that the opposite of the opposite of a number is the number itself, e.g.,**   **–(–3) = 3, and that 0 is its own opposite.**   1. **Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane; recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes.** 2. **Find and position integers and other rational numbers on a horizontal or vertical number line diagram; find and position pairs of integers and other rational numbers on a coordinate plane.**   6.NS.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.  6.NS.8 Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate. | **6.NS. 6.** Number lines can be used to show numbers and their opposites. Both 3 and -3 are 3 units from zero on the number line. Graphing points and reflecting across zero on a number line extends to graphing and reflecting points across axes on a coordinate grid. The use of both horizontal and vertical number line models facilitates the movement from number lines to coordinate grids.  Example:  • Graph the following points in the correct quadrant of the coordinate plane. If you reflected each point across the x-axis, what are the coordinates of the reflected points? What similarities do you notice between coordinates of the original point and the reflected point?    (0.25, -0.75)  6.NS.8 Example: If the points on the coordinate plane below are the three vertices of a rectangle, what are the coordinates of the fourth vertex? How do you know? What are the length and width of the rectangle?  (Continued on next page)  To determine the distance along the x-axis between the point (-4, 2) and (2, 2) a student must recognize that -4 is or 4 units to the left of 0 and 2 is or 2 units to the right of zero, so the two points are total of 6 units apart along the x-axis. Students should represent this on the coordinate grid and numerically with an absolute value expression, +. | |
| **6.NS.7. Understand ordering and absolute value of rational numbers.**   1. **Interpret statements of inequality as statements about the relative position of two numbers on a number line diagram.** *For example, interpret –3 > –7 as a statement that –3 is located to the right of –7 on a number line oriented from left to right.* 2. **Write, interpret, and explain statements of order for rational numbers in real-world contexts.** *For example, write –3 C > – 7 C to express the fact that –3 C is warmer than – 7 C.* 3. **Understand the absolute value of a rational number as its distance from 0 on the number line; interpret absolute value as magnitude for a positive or negative quantity in a real-world situation.** *For example, for an account balance of -30 dollars, write /-30/ = 30 to describe the size of the debt in dollars.* 4. **Distinguish comparisons of absolute value from statements about order.***For example, recognize that an account balance less than – 30 dollars represents a debt greater than 30 dollars.* | **6.NS.7.** Common models to represent and compare integers include number line models, temperature models and the profit-loss model. On a number line model, the number is represented by an arrow drawn from zero to the location of the number on the number line; the absolute value is the length of this arrow. The number line can also be viewed as a thermometer where each point of on the number line is a specific temperature. In the profit-loss model, a positive number corresponds to profit and the negative number corresponds to a loss. Each of these models is useful for examining values but can also be used in later grades when students begin to perform operations on integers.  In working with number line models, students internalize the order of the numbers; larger numbers on the right or top of the number line and smaller numbers to the left or bottom of the number line. They use the order to correctly locate integers and other rational numbers on the number line. By placing two numbers on the same number line, they are able to write inequalities and make statements about the relationships between the numbers.  Case 1: Two positive numbers  5 > 3  5 is greater than 3  Case 2: One positive and one negative number  3 > -3  positive 3 is greater than negative 3  negative 3 is less than positive 3  Case 3: Two negative numbers  -3 > -5  negative 3 is greater than negative 5  negative 5 is less than negative 3  Comparative statements generate informal experience with operations and lay the foundation for formal work with operations on integers in grade 7.  Example:  • One of the thermometers shows -3°C and the other shows -7°C. Which thermometer shows which temperature? Which is the colder temperature? How much colder? Write an inequality to show the relationship between the temperatures and explain how the model shows this relationship.  (Continued on next page) | |
|  | Students recognize the distance from zero as the absolute value or magnitude of a rational number. Students need multiple experiences to understand the relationships between numbers, absolute value, and statements about order.  Example:  • The Great Barrier Reef is the world’s largest reef system and is located off the coast of Australia. It reaches from the surface of the ocean to a depth of 150 meters. Students could represent this value as less than  -150 meters or a depth no greater than 150 meters below sea level. | |
| **Concepts**  **What Students Need to Know** | **Skills**  **What Students Need To Be Able To Do** | **Bloom’s Taxonomy Levels** |
| * rational numbers   + integers   + opposites   + absolute value     - absolute value as magnitude   + order for rational numbers in real-world contexts * number line diagrams   + relative position of two numbers on a number line diagram   + distance from 0 on the number line * coordinate plane   + quadrants   + ordered pairs/coordinates   + reflections | * UNDERSTAND   + (rational numbers as points on numbers lines)   + (ordered pairs as locations in coordinate plane)   + (absolute value as distance on number line) * REPRESENT (points on number lines and coordinate plane) * RECOGNIZE (opposites) * FIND/POSITION (points on number lines and coordinate planes) * ORDER (rational numbers) * WRITE and EXPLAIN (statements of order/real world context) * INTERPRET (relative position on number line) | 2  2  2  2  2,3  2 |

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| **Essential Questions** |
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| **Corresponding Big Ideas** |
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| **Standardized Assessment Correlations**  **(State, College and Career)** |
| **Expectations for Learning (in development)**  This information will be included as it is developed at the national level. CT is a governing member of the Smarter Balanced Assessment Consortium (SBAC) and has input into the development of the assessment. |

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| **Tasks from Inside Mathematics (**<http://insidemathematics.org/index.php/mathematical-content-standards>)  **These tasks can be used during the course of instruction when deemed appropriate by the teacher.**  **NOTE: Most of these tasks have a section for teacher reflection.** |
| **Percent Cards** |

| **Unit Assessments**  **The items developed for this section can be used during the course of instruction when deemed appropriate by the teacher.** | |
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| 1. During the 2011 Travelers’ Golf Championship, Fredrik Jacobson won with a score of -20. This means his score was 20 strokes below par. John Daly had a score of 1 which means he was 1 stroke above par.   What does a score of 0 mean?  Answer: The player’s score equals par. | |
| 1. The elevation of Mount Washington in New Hampshire is 6,288 feet. This means that Mount Washington is 6,288 feet above sea level. The elevation of Death Valley is -282 feet. What does an elevation of -282 feet mean?   Answer: An elevation of -282 feet means 282 feet below sea level. | |
| 1. Mark an X on the number line that shows the location of the **opposite** of Point A.   Answer: | |
| 1. Shade the thermometer to show -8°F.     Answer: Thermometer is shaded up to -8°F. | |
| 1. Look at the coordinate plane below.      1. What are the coordinates of Point A? 2. Graph the point (3, -5) and label it Point B.   Answer: The coordinates of Point A is (-4, 6) and the correct location of the point (3, -5) is graphed on the coordinate plane.  Partial Credit: The student answers only one question correctly.  No Credit: The student answers neither question correctly. | |
| 1. Which number on the number line is the same distance from both Point A and Point B?   Show or explain how you found your answer.    Answer: 0 with an explanation that may include:   * Identifying the graphed points as opposites. * Identifying the distances from zero and/or absolute value * Counting in from both ends   Partial Credit: Correct answer, 0, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of absolute value or distance from zero of integers and their opposites.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| 1. On a coordinate plane, a line segment is drawn between Point A (-3, 4) and Point B (3, 4). What are the coordinates of the point on the line segment that is half way between Points A and B?   Show or explain how you found your answer. You may use the coordinate plane below to help you find the answer.    Answer: (0, 4) with an explanation that may include:   * The coordinate plane with points graphed correctly * Absolute value/distance from (0,4)   Partial Credit: Correct answer, 0, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of absolute value or distance from zero of integers and their opposites.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| 1. If the point (3,-5) is reflected across the x-axis, what are the coordinates of the new point?   Show or explain how you found your answer. You may use the coordinate plane below to help you find the answer.    Answer: (3, 5) with an explanation that may include:   * The coordinate plane with points graphed correctly * Absolute value/distance from (3,0)   Partial Credit: Correct answer, (3, 5), with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| |  |  | | --- | --- | | **State** | **Record Low temperature (°F)** | | Connecticut | -32 | | Maine | -48 | | Massachusetts | -35 | | New Hampshire | -47 | | Rhode Island | -25 | | Vermont | -50 |  1. Look at the table below:   Which state had the coldest temperature? Show or explain how you found your answer.  Answer: Vermont with an explanation that may include:   * Number line(s) showing the location of each temperature * Understanding that colder temperatures are further away from zero on a number line * The absolute value of -50 is greater than the absolute values of the other numbers, which means it is further away from 0°F than the others.   Partial Credit: Correct answer, Vermont, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding that for negative degrees Fahrenheit, the greater the absolute value or distance from 0**°**F, the colder the temperature.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| 1. The record low temperature for Maine is -48**°**F. The record low temperature for Massachusetts is -35**°**F.   Which state had the coldest record low temperature? Show or explain how you found your answer.  Answer: Maine with an explanation that may include:   * A number line showing the location of each temperature * Understanding that colder temperatures are further away from zero on a number line * The absolute value of -48 is larger than the absolute value of -35, which means -48 is further away from zero than -35.   Partial Credit: Correct answer, Vermont, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding that for negative degrees Fahrenheit, the greater the absolute value or distance from 0**°**F, the colder the temperature.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| 1. Which number has the greatest absolute value?   15, -34, -27, 28  Answer: -34 | |
| 1. A whale is swimming at a depth of -25 feet. A submarine is located at a depth of -40 feet. Sea level is 0 feet. Which is deeper, the whale or the submarine?   Show or explain how you know your answer is correct.  Answer: The *submarine* with an explanation that may include:   * Number line(s) showing the location of the whale and the submarine * The absolute value of -40 is greater than the absolute value of -25, which means -40 is further away from the surface (0).   Partial Credit: Correct answer, submarine, with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding that for negative depth, the greater the absolute value or distance from the surface, the deeper the object is located from the surface.  No Credit: Incorrect answer with an incorrect or missing explanation. | |
| 1. Look at the coordinate plane below:      1. Points A, B and C are the vertices of a rectangle. What are the coordinates of the missing vertex of the rectangle? 2. What is the distance between points A and B?   Answer: a) (2, -3)  b) 6  Partial Credit: The student answers only one question correctly.  No Credit: The student answers neither question correctly. | |
| 1. The coordinates (-3, 5), (2, -3), (-3, -3), and (2, 5) are the vertices of a rectangle that is graphed on a coordinate plane. What is the length and width of the rectangle? Show or explain how you found your answer. You may use the coordinate plane below to help you find the answer.     Answer: 5 by 8 (or 8 by 5) with an explanation that may include:   * Coordinate plane diagram. * Explanation using distances from axes and/or absolute value.   Partial Credit: Correct answer, 5 by 8 (or 8 by 5), with an incorrect or missing explanation, OR an incorrect answer with an explanation that demonstrates understanding of calculating the dimensions of a rectangle that is graphed on a coordinate plane, given the coordinates of the vertices.  No Credit: Incorrect answer with an incorrect or missing explanation. | |