CMS Lesson Plan

 Subject: Math

 Rational Explorations & their Opposites Date: 2/8/2016 – 2/12/2015

 Part II Continued from last week

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| GSE Assessment Limits/StandardsUnit 6 – Standards**MCC.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, debits/credits, positive/negative electric charge); use positive and negative numbers to represent quantities in real-world contexts, explaining the meaning of 0 in each situation.**MCC.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 | MondayTuesday & Wednesday – Thursday & FridayTopic: Geometry (G)Solve real-world and mathematical problems involving rational numbers and their opposites,Solve real world problems with absolute value |
| Lesson Objective/Learning Intention: (Objectives will vary depending upon the pace of the students)By the end of this topic students should know:

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| * 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).
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Examples:Example: Represent four degrees below zero on a thermometer6%20ns%207%202Use integers to represent situations in real-world contexts.A whale swims 40 ft. below sea level. Express the whale’s location as an integer and tell how many feet below the surface the whale is swimming. Explain your answers for both parts of the problem.  |
| 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. 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.  |
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| Assessment Tasks used |
| **Skill-based Task:**Joe’s football team had a loss of 5 yards on first down. Write an integer to represent the situation.  | **Problem Task:**Create a situation in which integers have opposite values and explain what zero means in this situation | Performance Task:See Framework Unit 7 Task What’s Your Sign Pt. III |

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| **MCC6.NS.6 *Students are expected to:*** |
| **MCC.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. **MCC.6.NS.6a** 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. **MCC.6.NS.6b** 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. **MCC.6.NS.6c** 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.  |

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| MASTERY Patterns of Reasoning: |
| Conceptual:

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| Understand the meaning of the term *opposite*. Recognize that the opposite of the opposite of the number is the number itself (e.g., -(-3)).

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| Understand a rational number as a point on a number line.  |

Recognize that zero is its own opposite.  |

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|  Understand that the signs of numbers in ordered pairs represent a singular location on the coordinate plane. Understand that changing the sign of one or both numbers in the ordered pair will create a reflection of the point. Understand that a reflection on the coordinate plane is defined as a transformation of a point or shape across one or both of the axes  |

 | **Representational**:

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|  Plot points on a coordinate plane given an ordered pair using rational numbers. Extend number line diagrams and coordinate axes to represent points with rational number coordinates.  |

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|  Plot points in all four quadrants for any given ordered pair.  |

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|  Extend number line diagrams to include negative numbers. Plot opposites on a number line.  |

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. |

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| **Procedural**:

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|  Place rational numbers on horizontal and vertical number lines. Write an ordered pair using rational numbers to represent a point on the coordinate plane.  |

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| Find the opposite of a number.  |

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|  Find reflection points across axes. Recognize the components of the coordinate plane (Quadrant I (+,+), Quadrant II (-,+) , Quadrant III (-,-) Quadrant IV (+, -), *x* and *y* axes, origin)  |

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?   |

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***Mathematical Practices Mathematical Practices***6.MP.4. Model with mathematics. 6.MP.2. Reason abstractly and quantitatively. |
| Website Resources: learnzillion.com (email me if you need a code), connected.mcgraw-hill.com (see my website for logon details) [Cutting Up Lesson](http://www.learner.org/courses/learningmath/geometry/session5/part_b/index.html)Geoboards (NLVM) <http://nlvm.usu.edu/en/nav/frames_asid_282_g_3_t_3.html?open=activities>Online dot paper: [http://illuminations.nctm.org/lessons/DotPaper.pdf#search=%22dot paper%22](http://illuminations.nctm.org/lessons/DotPaper.pdf%23search%3D%22dot%20paper%22) Lessons on area: <http://illuminations.nctm.org/LessonDetail.aspx?ID=L580> |

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| Resources/Instructional Materials Needed: *(What do students need in order to learn what is required of this lesson)*Paper, pencil, binder, math notebook, 6th grade textbook (housed in the classroom), attention and focus. |
| Notes: Differentiation – Students will use models, hands-on, remediation where needed, small group with peers and small groups with the teacher, online resources, dot paper. |