Chapter 3 Rational Numbers
Overview & Support

Standards:

Apply and extend previous understandings of numbers to the system of rational numbers.

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.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.
   a. 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.
   b. 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.
   c. 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.7 Understand ordering and absolute value of rational numbers.
   a. 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.*
   b. 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.*
   c. 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.*
   d. 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.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.

Suggested Routines:

Number Talks
Spiral review of concepts covered in chapters one and two
Modeling using manipulatives
Constructed responses and written explanations

Manipulatives:

- number lines horizontal and vertical
- coordinate plane templates
- thermometers
- integer tiles

Vocabulary:

integers	opposites	rational number	absolute value	coordinate plane
x axis	y axis	origin	ordered pair	x coordinate
y coordinate	quadrants	line of symmetry	line symmetry	horizontal
vertical	distance	perimeter	reflections	

Strategies for Chapter:

Use number lines.
Use coordinate planes.
Plot rational numbers to identify opposites and ordered pairs and distances between points.
Interpret absolute value and compare absolute value.

Color Coding:

Green (G)- The lesson accurately reflects the Framework standard(s).
Yellow (Y) - This lesson includes notes to refer to while planning the lesson.
Red (R) - This lesson does not accurately reflect the Framework standard(s). Skip the lesson.

Essential Question:

How do you write, interpret, and use rational numbers?

Lesson by Lesson Overview:

Lesson # Standard (Appox. # Days)	Title	Materials	Vocabulary	Notes
	Show What You know	-Fraction strips, tape diagrams -Coordinate plane	-Compare -Equivalent fractions -Decimals	Model comparing fractions and decimals using fraction strips Model coordinate plane on whiteboard, p. 100 TE Understand Vocabulary
3.1 Y	Understand	-Number lines	-Integers -Opposites	This is students first experience with negative numbers

		(both vertical and horizontal)	-Left of zero	
(6.NS.5)	Positive and Negative Numbers	(both vertical and horizontal) -Thermometer (real or image) -Images displaying elevation above and below sea level, elevator floors, thermometer -Read *How Much Should It Cost?* From Differentiated Centers Kit	-Left of zero -Right of zero -Directionality on the # line -Thermometer -Temperature -Elevation -neutral/Origin -Points -Location -Altitude -Withdraws -Deposits	==Include realia and images for examples. Opportunity to use **Notice and Wonder** with images of real life integers. For example, a thermometer, barometer, etc.== There is a lot of work with 0 on p. 101 of the TE - 0 is neutral (not a positive or negative number) Much of the vocabulary is related to real world situations, but students may not be familiar with the contexts, so it may be helpful to have images prepared to illustrate these words for the lesson. ==Understand format of opposite of an opposite ie -(-3)==
3.2 G (6.NS.7a, b) Pgs. 105-108	Compare and Order Integers	-Number lines (both vertical and horizontal) -Thermometer	-Compare -Order	**Choral Counting** - Have students choral count by 1's starting at -10. Use a variety of starting points and count bys. The real world examples include temperature, elevation, money, sports. - Left of zero - Right of zero - Directionality on the # line - Inequality symbols <, >, =
3.3 G (6.NS.6a, c) Pgs. 109-112	Rational Numbers and the Number Line	-Number lines template in PB (both vertical and horizontal)	-Rational number -Freezing point -Celsius °C -Relation (closest to or near) -Magnitude (star's brightness) -Plot	Students need to plot decimals up to hundredths, and fractions on a number line. Common Error on p. 110 – Students may see a negative mixed number separately as a negative whole number and a positive fraction.
3.4 G (6.NS.7a.b) Pgs. 113-116	Compare and Order Rational Numbers	-Number lines template in PB (both vertical and horizontal)	-Compare -Order	Plot decimals and fractions on number lines, both horizontal and vertical
Mid-Chapter Checkpoint				

3.5 **G** (6.NS.7c) Pgs. 119-122	Absolute Value	-Number lines template in WB (both vertical and horizontal)	-Absolute value -Distance from zero -Surface -Depth -Diver	Includes distance between points using addition and subtraction of absolute value
3.6 **Y** (6.NS.7d) Pgs. 123-125	Compare Absolute Values		-Debt -Depth -Elevation -Account balance	It may be helpful for students to find the absolute value of the number before comparing them as they may just compare the numerals without thinking about the absolute value of the number When words represent a negative value, don't represent the situation with a negative symbol; instead use absolute value. See Framework for more information.
3.7 **Y** (6.NS.6c) Pgs. 127-130	Rational Numbers and the Coordinate Plane	-Coordinate plane template in WB -Additional practice for plotting integers on a coordinate plane	-Coordinate plane (grid) -Plot/graph -Points -Units (up/down) -x-axis -y-axis -Origin -Ordered pair -x-coordinate -y-coordinate -Located (location) -Quadrants I, II, III, IV	First exposure to plotting coordinates on a plane with all four quadrants, 1st quadrant began in 5th grade. Students must be able to graph decimals and fractions. (See Framework) Students must recognize equivalent decimals and fractions Teacher may need to model plotting points as direction and coordinates may be mixed up
3.8 **Y** (6.NS.6b) Pgs. 131-134	Ordered Pair Relationships	-Coordinate plane template in WB	-Quadrants I, II, III, IV -Plot/graph -Line symmetry -Line of symmetry -Reflection	Students need to recognize that when two ordered pairs differ only by signs, the locations of the points are related by reflections across one or both axes. (symmetry on the coordinate plane)
3.9 **Y** (6.NS.8) Pgs. 135-138	Distance on the Coordinate Plane	-Coordinate plane template in WB	-Horizontal line -Vertical line -Distance -Plot/graph -Points	● Distance is always written as a positive number (absolute value can be used) ● _Don't teach subtraction rules for integers_ as integers are not added or subtracted at this grade level.

			-Pair of points -Units	● Students may: o Count the distance between by counting units o Finding the distance to zero (absolute value) from each point and adding if different quadrants or subtracting if in same quadrant.
3.10 G (6.NS.8) Pgs. 139-142	Problem Solving The Coordinate Plane		-Coordinate plane -Units -Ordered pairs -Location -Vertex (vertices) -Rectangular -Perimeter	● Consider the Advanced Learner activity on Pg. 141 in TE (Battleship game)
Reteach Options (1 day)	Reteach standards from this unit to help meet students' need. Some ideas for reteach activities are listed below: ● Math centers or math games (provided in Grab and Go kit) focused on unit standards ● Small group instruction focused on a single standard ● Whole group instruction focused on a single standard ● My Favorite No – Rewrite student work with an error and work as a class to identify positives in the work and areas that need to be revised ● Select 1 – 3 problems to resolve in their groups and discuss whole class. We want new learning to occur on this day that helps students over misconceptions. ● Complete the "Performance Task" from Go Math! In the Assessment Book in small groups. Share strategies and discuss whole class. ● Use the Reteach activities based on standards that need intervention.			