

NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Mathematics

GRADE: 6

UNIT #2

UNIT NAME: Rational Numbers

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Locate positive and negative rational numbers on the number line and explain the meaning of absolute value of a rational number as indicating locations on opposite sides of zero on the number line and as magnitude for a positive or negative quantity in a real-world situation.	6.NS.6	<p>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.</p> <ol style="list-style-type: none"> 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. 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. 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.
2	Use statements of inequality to determine relative positions of two rational numbers on a number line; Write and explain statements of order for rational numbers in real-world contexts.	6.NS.7	<p>Understand ordering and absolute value of rational numbers.</p> <ol style="list-style-type: none"> 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. Write, interpret, and explain statements of order for rational numbers in real-world contexts. For example, write $-3^{\circ}\text{C} > -7^{\circ}\text{C}$ to express the fact that -3°C is warmer than -7°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. 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.
3	Plot ordered pairs in all four quadrants on the coordinate plane and describe their reflections.	6.NS.6	<p>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.</p> <ol style="list-style-type: none"> 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. 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. 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.

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
4	Solve real world problems mathematically by graphing points in all four quadrants of the coordinate plane. Use the absolute value of the differences of their coordinates to find distances between points with the same first coordinate or same second coordinate.	6.NS.8	Solve real-world and mathematical problems by graphing points in all four quadrants of the coordinate plane. Include the use of coordinates and absolute value to find distances between points with the same first coordinate or the same second coordinate.
5	Explain the relationship of two quantities or measures of a given ratio and use ratio language to describe the relationship between the two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." <i>"For every vote candidate A received, candidate C received nearly three votes."</i>	6.RP.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. For example, "The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak." <i>"For every vote candidate A received, candidate C received nearly three votes."</i>
6	Use rate language in the context of a ratio relationship to describe a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." <i>"We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i>	6.RP.2	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is $3/4$ cup of flour for each cup of sugar." <i>"We paid \$75 for 15 hamburgers, which is a rate of \$5 per hamburger."</i>
7	Use ratio and rate reasoning to solve real world and mathematical problems that include making tables of equivalent ratios, solving unit rate problems, finding percent of a quantity as a rate per 100.	6.RP.3	Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. a. Make tables of equivalent ratios relating quantities with whole number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. b. Solve unit rate problems including those involving unit pricing and constant speed. For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed? c. Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent. d. Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
8	Use ratio and rate reasoning to convert measurement units (manipulate and transform units appropriately when multiplying or dividing quantities).		

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). **Italic type indicates grade level fluency requirements.** (Identified by PARCC Model Content Frameworks).

Selected Opportunities for Connection to Mathematical Practices

1. Make sense of problems and persevere in solving them.
2. **Reason abstractly and quantitatively.**
SLO #2 Use inequality symbols to make comparisons.
3. Construct viable arguments and critique the reasoning of others.
4. **Model with mathematics.**
SLO #6 Represent polygons on a coordinate plane.
5. **Use appropriate tools strategically.**
SLO #7 Use spreadsheets when working with data sets with a large quantity of data points.
6. Attend to precision.
7. Look for and make use of structure.
8. Look for and express regularity in repeated reasoning.

All of the content presented at this grade level has connections to the standards for mathematical practices.

Bold type identifies possible starting points for connections to the SLOs in this unit.

Greater Brunswick Charter School Curriculum

Grade level: 6		Subject: Math			Unit #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Dividing decimals		To review skills in dividing decimals	<i>What can I still do from Unit 1?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.245 or p.250
2	Estimating fractions	7, 8	<ul style="list-style-type: none"> • To determine readiness for further work • To estimate fractional products 	<i>What do I know from last year?</i> <i>How can I work with fractions if I don't have paper with me?</i>	<i>This lesson on p.257 is optional. It may have value for later mental math – the book has it here – but it is isolated and not used in successive work</i>	<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.255-256 p.257-264
3	Multiplying fractions and integers	7, 8	To convert integers to fractions for multiplying	<i>How can an integer actually be a fraction?</i>	<i>Help students see the pattern that all three of these operations are the same thing. The difference is in only what you are given to start. In the end, you just make things into two fractions and multiply the same way.</i>	<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.265-272
4	Multiplying fractions	7, 8	To multiply two fractions	<i>Why does this look just like the last work?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.273-280
5	Multiplying mixed numbers	7, 8	To multiply with mixed numbers	<i>Why does this look basically like the last work?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.281-287
6	Applying multiplying fractions	7, 8	To use the fraction multiplication algorithm for a really useful purpose.	<i>How can multiplying fractions help me convert feet to yards or pints to gallons?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.289-296
7	Multiplying fractions	7,8	To identify weaknesses for improvement	<i>What do I know well or not so well?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.297-304 <i>These can be used for achievers while additional help on fractions is given to strugglers.</i>

Grade level: 6		Subject: Math			Unit #: 2		
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					Whole Group	Small Group / Stations	
8	Multiplying fractions	7, 8				<ul style="list-style-type: none"> • Review • Assessment 	
9	Dividing fractions	7, 8	To identify the reciprocal then use to fraction multiplication algorithm to divide	<i>Why does dividing fractions look so much like multiplying them?</i>	<i>These lesson are juxtaposed to introduce students to reciprocal multiplication as soon as possible. Then show them the pattern exists just like it did a few days ago.</i>	<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.317-324
10	Dividing fractions with integers and mixed numbers	7, 8	To divide these types of numbers	<i>When I divide up a whole number, what does that really look like?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.305-316 and p.325-332 <i>Select problems as needed or useful for further practice.</i>
11	Multiplying and dividing fractions	7,8	To identify weaknesses for improvement	<i>What do I know well or not so well?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.336-338
12	Multiplying and dividing fractions	7, 8				<ul style="list-style-type: none"> • Review • Assessment 	GlencoeMath p.
13	Integer representation	1	To plot integers on a number line	<i>How can I represent integers in one dimension and intuitively compare them?</i>	<i>This is a review of the last lesson in the previous unit.</i>	<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.345-352
14	Absolute value	2	To identify the absolute value of a number	<i>How can I find two numbers that are the same distance from 0?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.353-354
15	Absolute value	1, 2	To perform operations with absolute values	<i>How does absolute value tell me how much or how far without telling me which way?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.355-362
16	Comparing integers	2	To place (especially) negative numbers in order	<i>When is a number less even though it looks like it's more?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.363-370

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					Whole Group	Small Group / Stations	
17	Absolute values in the real world	2	To use absolute value and negative numbers to solve real world situations	<i>How does absolute value help me compare negative numbers?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.371-373
18	More number lines	1, 2, 3	To place positive and negative numbers on a number line	<i>How can I compare numbers using a number line?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.375-378
19	Absolute values Number lines	1, 2	To identify weaknesses for improvement	<i>What do I know well or not so well?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.374
20	Absolute values Number lines	1, 2				<ul style="list-style-type: none"> • Review • Assessment 	
21	Changing fractions to decimals	1, 2	To convert fractions to decimals and determine if each is terminating or repeating	<i>What decides whether a decimal is terminating or repeating?</i>	<i>The main reason the first 12 lessons of this unit were inserted in a curriculum that doesn't require them here is that this text wants students to plot fractions and decimals in their initial exercises on a coordinate plane on Day 23 after converting fractions of decimals on Day 21..</i>	<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.379-386
22	Placing rational numbers on a number line		To compare values of rational numbers in a visually easier way	<i>How does a number line help me compare fractions with decimals?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.387-394
23	The coordinate plane	1, 3	To identify part of the plane and plot points on it	<i>How can I compare numbers in two dimensions?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.395-401
24	Ordered pairs	1, 3, 4	To plot ordered pairs on a coordinate plane		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.403-410	

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25	Applying absolute value to find distance between points on a plane	4	To find the distance between points on a plane	<i>How is distance not about direction?</i>		<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	GlencoeMath p.411-414
26	More plotting and finding the distance	1, 2, 3, 4	To be fluent in plotting ordered pairs on a plane			<ul style="list-style-type: none"> • Warm-up/re-practice • Lesson & Guided practice • Independent practice • i-Ready 	KhanAcademyvideo Mathworksheets Mathaids CommonCoremanyvaried
27	Fraction types and the coordinate plane	1, 2, 3, 4	To identify weaknesses for improvement	<i>What do I know well or not so well?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.415-416 <i>These can be used for achievers while additional help on fractions is given to strugglers.</i>
28	Fraction types and the coordinate plane	1, 2, 3, 4	To identify weaknesses for improvement	<i>What do I know well or not so well?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.417-420
29	Fraction types and the coordinate plane	1, 2, 3, 4				<ul style="list-style-type: none"> • Review • Assessment 	
30	Ratios and rates	5, 6, 7	To identify weaknesses from Unit 1 and areas for improvement	<i>What do I remember how to do from Unit 1?</i>		<ul style="list-style-type: none"> • Differentiated intervention as needed • Review practice • Independent practice • i-Ready 	GlencoeMath p.76-78, p81-82, p.84 KhanAcadreviewvideos Mathaidssheets CommonCoremanyvaried
31	Additional days, if needed						
32							
Word Wall Candidates							
Reciprocal		Absolute value		Integer		Negative integer	
Bar notation		Quadrant		Rational number		Repeating decimal	
						Opposites	
						Terminating decimal	

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<u>Authentic Application</u> The Unit Projects on p.421 are effective applications								