

NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Mathematics, Pre-Algebra

GRADE: 7

UNIT #: 1

UNIT NAME: Algebra Basics

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
1	Describe and model, on a horizontal and vertical number line, real-world situations in which rational numbers are combined.	7.NS.1	<p>Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.</p> <p>a. Describe situations in which opposite quantities combine to make 0. <i>For example, a hydrogen atom has 0 charge because its two constituents are oppositely charged.</i></p> <p>b. Understand $p + q$ as the number located a distance q from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.</p> <p>c. Understand subtraction of rational numbers as adding the additive inverse, $p - q = p + (-q)$. Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.</p> <p>d. Apply properties of operations as strategies to add and subtract rational numbers.</p>
2	Apply the additive inverse property to subtraction problems and develop the argument that the distance between two points is the absolute value of the difference between their coordinates.		
3	Explain why a divisor cannot be zero and why division of integers results in a rational number.	7.NS.2	<p>Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.</p> <p>a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as $(-1)(-1) = 1$ and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.</p> <p>b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If p and q are integers, then $-(p/q) = (-p)/q = p/(-q)$. Interpret quotients of rational numbers by describing real-world contexts.</p> <p>c. Apply properties of operations as strategies to multiply and divide rational numbers.</p> <p>d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.</p>
4	Model the multiplication and division of signed numbers using real-world contexts, such as taking multiple steps backwards.		
5	Convert a rational number to a decimal using long division and explain in oral or written language why the decimal is either a terminating or repeating decimal.		
6	Apply properties of operations as strategies to add, subtract, multiply,	7.NS.3	<p>Solve real-world and mathematical problems involving the four operations with rational numbers.</p>

	and divide rational numbers.		
7	Solve mathematical and real-world problems involving addition, subtraction, multiplication, and division of rational numbers.		

Major Content Supporting Content Additional Content (Identified by PARCC Model Content Frameworks). **Bold 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.
- 3. Construct viable arguments and critique the reasoning of others.**
SLO #3 Present oral and written arguments.
- 4. Model with mathematics.**
SLOs #1 and #4 Apply the mathematics to describe situations that arise from their environments.
5. Use appropriate tools strategically.
6. Attend to precision.
- 7. Look for and make use of structure.**
SLO #6 Discern a structure then perform calculations appropriate for the 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

Day	Topic	SLO CCSS	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Words and Expressions		Translate verbal sentences into math expressions	<i>How is math its own language?</i>	For these students that qualify for a pre-algebra class in Grade 7, these first 12 lessons should all be easy review for them. If they aren't, it may be an indication of more trouble to come.	<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 1-2
2	Math Rules		Make a pattern into a rule	<i>How can I predict farther than I can know?</i>		<ul style="list-style-type: none"> • Lesson • Collaboration • Investigation • i-Ready 	GlencoePre-Alg Inquiry Lab
3	Variables & Expressions		Evaluate math expressions	<i>From those rules I just made, what can I predict?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 1-3
4	Operation properties		Use properties to solve expressions	<i>What do I remember from Grade 6 and how can I use it now?</i>		<ul style="list-style-type: none"> • Review both lessons • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 1-4, 1-5
5	Ordered Pairs and Graphs		Use ordered pairs to plot graphs to solve expressions	<i>How can seeing my data on a graph help me solve expressions and predict outcomes?</i>		<ul style="list-style-type: none"> • Review both lessons • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 1-6, 1-7
6	Algebra foundations					<ul style="list-style-type: none"> • Review • Assessment 	
7	Integers & Absolute value	1, 2	<ul style="list-style-type: none"> • Order numbers • Determine the absolute value of a number 	<i>Why do they call it absolute?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-1
8	Multiplying integers	4	Multiply integers to simplify expressions	<i>Do I remember how these signs work from last year?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-4

Day	Topic	SLO CCSS	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
9	Dividing integers	4	Divide integers to simplify expressions	<i>Did I remember the rules for signs are the same in division as they are in multiplication?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-5
10	Adding integers	4	Add integers	<i>How can the rules for multiplication help me with addition?</i>	Encourage the use of the multiplication rules to make expressions like $-(-3)$ into $+3$ or $+(-5)$ into -5 . "Multiplying the signs" to simplify multiple signs.	<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-2
11	Subtracting integers	4	Subtract integers	<i>How can the rules for multiplication help me with subtraction?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-3
12	Ordered pairs		Plot ordered pairs	<i>What do I remember from the last two years?</i>	This is not really part of the Model Curriculum here, but it is only a one day reminder of skills they've already mastered, if they are in a pre-algebra class.	<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 2-6
13	This is an additional day built into the unit just in case students have not progressed as well as hoped over the review content and skills.						
14	Operation Basics	1,2,4				<ul style="list-style-type: none"> • Review • Assessment 	
15	Fractions and Decimals	5	<ul style="list-style-type: none"> • Convert fractions to decimals • Compare values of fractions to decimals 	<i>Why don't all decimals end?</i>		<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 3-1
16	Rational numbers	5	<ul style="list-style-type: none"> • Convert decimals (terminating and repeating) to fractions • Convert mixed numbers to improper fractions 	<i>How can I write a repeating decimal as a fraction?</i>	Be sure to focus attention on the one skill they may not have yet learned: i.e. $0.833333... = 5/6$	<ul style="list-style-type: none"> • Lesson • Guided Practice • Independent Practice • i-Ready 	GlencoePre-Alg Lesson 3-2

Day	Topic	SLO CCSS	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
17	Multiplying fractions	6	Evaluate expressions with fractions	<i>How is multiplying fractions now different than when I learned it before?</i>	Let them have plenty of practice over two days.	<ul style="list-style-type: none"> Lesson Guided Practice Independent Practice i-Ready 	GlencoePre-Alg Lesson 3-3
18						<ul style="list-style-type: none"> Review previous work RTI as needed HOT Problems i-Ready 	
19	Dividing fractions	5, 6	Divide algebraic fractions	<i>How can I use what I know about dividing fractions to divide entire algebraic expressions?</i>	Let them have plenty of practice over two days.	<ul style="list-style-type: none"> Lesson Guided Practice Independent Practice i-Ready 	GlencoePre-Alg Lesson 3-4
21						<ul style="list-style-type: none"> Review previous work RTI as needed HOT Problems i-Ready 	
22	Decimals and Fractions	5, 6				<ul style="list-style-type: none"> Review Assessment 	
23	Adding & subtracting fractions	5, 6, 7	Add or subtract fractions with common denominators	<i>What do I remember about adding like fractions?</i>	Remind them to use the multiplication rules to simplify the signs before working on the numbers.	<ul style="list-style-type: none"> Lesson Guided Practice Independent Practice i-Ready 	GlencoePre-Alg Lesson 3-5
24						<ul style="list-style-type: none"> Review lesson RTI as needed Independent Practice i-Ready 	Khan Academy WyzAnt Kuta worksheet
25	Adding & subtracting fractions	5, 6, 7	Add or subtract fractions with different denominators		Remember, allow them to use any common denominator that will work. Don't force a LCD. $-\frac{1}{12} + (-\frac{1}{4}) = -\frac{4}{48} - \frac{12}{48}$	<ul style="list-style-type: none"> Lesson Guided Practice Independent Practice i-Ready 	GlencoePre-Alg Lesson 3-6 Use the problems over two assignments
26						<ul style="list-style-type: none"> Lesson Guided Practice Independent Practice i-Ready 	

Day	Topic	SLO CCSS	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
27	Unit 1 topics					<ul style="list-style-type: none"> • Small group concept review • RTI as needed • i-Ready 	GlencoePre-Alg Chapter Review
28						<ul style="list-style-type: none"> • More practice on problems • i-Ready 	GlencoePre-Alg Problem Solving Reflect
29	Another day built into the sequence to allow for slower achievement through the dense content of adding and subtracting fractions.						
30	Unit 1 topics	1, 2, 3, 4, 5, 6, 7				<ul style="list-style-type: none"> • Review • Assessment 	
<u>Word Wall Candidates</u>							
Algebra		Expression		Coordinate plane		Variable	
Equation		Evaluate		Range		Simplify	
Y-axis		Numerical		Absolute value		Additive inverse	
Integer		Quadrant		Zero pair		Negative	
Bar notation		Multiplicative inverse		Rational number		Reciprocal	
Repeating decimal						Terminating decimal	

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					Whole Group	Small Group / Stations	

Authentic Application

Your Goal: Design a theme park

Your Role: Designer architect

Your Audience: Patrons who will want to come to your park

The Situation: You must:

- Choose your backyard theme.
- Choose the 12 areas or things that will go into your coolest backyard design.
- Play a fraction/percent game.
- Choose your graph paper & the difficulty of your landscape design.
- Assign the fractions to the 12 areas or things in the backyard.
- Do the math to calculate the number of squares for each area.
- Design a layout for your backyard.
- Add color and labels to your design.
- Create a key for your design.

By doing the following:

Day 1

- Choose your backyard theme. (20 min)
 - You can choose a theme that has been suggested or create your own theme.
 - Go to [Google](#) & do an Image search for a "blank mind map".
 - Choose an example to create a mindmap of your theme. You need at least 12 areas or things to go in your backyard for your theme.
 - Highlight your final 12 choices.
 - Show your highlighted mind map to your teacher to be signed off.
- Play the game: (20 min.)
 - Go to [BBC School website](#) to play the landscape game.
 - If you need help, click on the orange "Help" button. Then click on the green "Next" button.
 - When you're done with the help, click on the "x" at the top, "Close Help".
 - Play using the percentages (50%). Print out your final design before clicking "Done".
 - Play using the fractions (1/2). Print out your final design before clicking "Done".
 - Play using the decimals (0.50). Print out your final design before clicking "Done".

Day 2

- Graph Paper & Difficulty (10 min.)
 - You will choose your graph paper and the difficulty of your final design.
 - Discuss this decision with your group.
 - The more squares per inch you choose will give you more creativity, but it will be a little more difficult. The fewer squares per inch you choose will give you less creativity, but will be less difficult.

