NJDOE MODEL CURRICULUM PROJECT

CONTENT AREA: Mathematics	GRADE: 8	UNIT #: 2	UNIT NAME: The Number System

	STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS
1	Graph and analyze the different representations of proportional relationships and interpret the unit rate as the slope of the graph which indicates the rate of change.	8.EE.5	Graph proportional relationships, interpreting the unit rate as the slope of a graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.*
2	Derive the equation of a line ($y = mx$ for a line through the origin and the equation $y = mx +b$ for a line intercepting the vertical axis at b) and use similar triangles to explain why the slope (m) is the same between any two points on a non-vertical line in the coordinate plane.	8.EE.6	Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx +b$ for a line intercepting the vertical axis at b.

3	Solve linear equations in one variable with rational number coefficients that might require expanding expressions using the distributive property and/or combining like terms, including examples with one solution, infinite solutions, or no solution.	8.EE.7	Solve linear equations in one variable.
			   a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a = a, or a = b results (where a and b are different numbers).
			   b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.

4	Solve systems of linear equations in two variables by inspection, algebraically, and/or graphically (estimate solutions) to demonstrate solutions correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.	8.EE.8	Analyze and solve pairs of simultaneous linear equations.
			   a. Understand the solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
			   b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.

5	Construct a function to model the linear relationship between two variables and determine the rate of change and initial value of the real world data it represents from either graphs or tabulated values.	8.F.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

	STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS
6	Sketch a graph of a function from a qualitative description and give a qualitative description of a graph of a function.	8.F.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g. where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

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.**   SLO 1 Describe the relationship between the slope of a graph and the rate of change in proportional relationships.
3. **Construct viable arguments and critique the reasoning of others.**   SLOs 3 and 4 Determine and justify the steps to the solution to equations.
4. **Model with mathematics.**   SLO 6 Create a graph from a description of a real-world condition and give a real-world context for a graphic display.
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.
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:	8			Subject:	Math		Unit #:	3

Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	**Small Group / Stations**	
1	Equations in 2 variables	5	To determine readiness for study	*What do I know that will help me learn about equations?*		• Vocabulary review • Real world applications • Independent practice • i-Ready	Glencoe Math p. 167-170
2	Constant rate of change	1, 5	To determine the constant rate of change in a linear relationship between two variables	*How does the rate of change help me predict values for the dependent variable?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.1 p. 171-175
3						• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.1 P 176-178
4	Graphing calculator	1	To effectively use a graphing calculator to confirm graphs drawn by hand.		This is an optional activity. If you have graphing calculators, it is recommended	• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math p 179-180
5	Slope	1	To compute the slope of a line given two points on the line	*How can graphs help me see the values and predict what they will be?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.2 p. 181-187
6	Equations in y=mx form	1	To graph equations in y=mx form and determine that the slope of the line = the rate of change	*How do graphs make it easier to find the direct variation between two variables?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.3 P. 189-197
7	Equations in y=mx+b form Slope-intercept form	1	To know the affect of the constant in an equation on its graph.	*How can I tell where to start the graph just by looking at the equation?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.4 p. 199-203

					Suggested Student Activities		Possible Resources
Day	Topic	SLO	Learning Objectives	Essential Questions	Whole Group	Small Group / Stations	
8	Slope-intercept form	1	To know the affect of the constant in an equation on its graph.	*How can I tell where to start the graph just by looking at the equation?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.4 p. 204-205
9	Analyzing graphs	1	To notice and determine the sides of the right triangle formed by a line being the hypotenuse	*What can I call the sides of the triangle these slanted lines form?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math p. 207-208
10	Graphing simple linear equations	1	Assessment	*What do I know so far?*		• Review • Assessment	
11	Equations in y=mx+b form	1, 2	To confidently sketch linear graphs from inspection of the equation in y=mx+b form	*How can I tell what the graph will look like from looking at the eqution?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.5 p.209-213
12	Include the mid-chapter check here.				Take your time with this nd use the time to also catch up anything lacking	• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math p.214-220
13	Point-slope form of an equation	1, 2	To find the equation of a line using the point-slope form	*How can I figure out the equation and more values on the line from seeing the graph?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.6 p.221-228
14	Point-slope form of an equation	1, 2	To find the equation of a line using the point-slope form		Draw plenty of extra lines for more practice forming the equations	• Work with strugglers • Assign stronger students the Inquiry Lab activities	Glencoe Math 3.6 p. 229-232
15	Systems of equations	3, 4	To find the one point solution to a system of two equations in two variables by using their graphs	*How do I find what x and y will make two different equations true?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.7 p. 233-239
16					Give pairs of lines to stronger students, have them find equations and confirm intersection fits both equations	• Work with strugglers • Assign stronger students pairs of lines to create the actual equations of the system.	Glencoe Math 3.7 p. 240-242

Grade level: 8   **Subject:** Math   **Unit #:** 3

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	**Small Group / Stations**	
17	Systems of equations	3, 4	To find the solution to a system of equations by using substitution	*How can I find the point of intersection without having the graph both equations?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 3.8 p. 243-247
18						• Work with strugglers • Also assign stronger students the Inquiry Lab	Glencoe Math 3.8 p. 248-252
18	Finding solutions to equations	1, 2, 3, 4	Assessment		If you've been addressing strugglers along the way, you should not need a day of review here.	• Review • Assessment	
19	Functions		To determine readiness for further study			• Review test results • Introduce chapter	Glencoe Math p. 264-266
20	Relationships	5	To create an equation to represent a relationship between two variables that is stated in words	*How can I take words and make them into an equation I can use?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.1 p. 267-275
21	Relations		To create relations given values for two variables	*How is a relation different from what I just did?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.2 p.277-283
22	Relations		To create relations given values for two variables	*What am I missing?*	Give strugglers plenty of additional practice ops with your help	• Work with strugglers • Assign stronger students the Inquiry Lab	Glencoe Math p.28
23	Functions	5	To determine if a relation is a function To use f(x) notation	*Why is it important that something be a function instead of just a relation?* *When is f(x) not multiplication?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.3 p. 287-294

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	**Small Group / Stations**	
24	Linear functions	5	To determine if a function is linear and continuous or discrete.	*Is it discrete or continuous functions that look different than I am used to?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.4 p. 295-304
25	Linear functions	5	To determine if a function is linear and continuous or discrete.	*What am I missing so far?*		• Work with strugglers • Assign stronger students the Problem Solving Lab	Glencoe Math 305-307
26	Functions	5	Assessment		If you've been addressing strugglers along the way, you should not need a day of review here.	• Review • Assessment	
27	Properties of functions	5, 6	To draw a function form a word-based description	*If I was making equations a couple weeks ago, how is making a function different?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.5 p.309-314
28						• Work with strugglers • Let stronger students work collaboratively	Glencoe Math 4.5 p. 315-317
29	Construct functions from data	5, 6	To create a function based on a table of data	*What can I use from the point-slope method to make my function?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.6 p.319-325
30	Non-linear functions	5, 6	To recognize when a function is non-linear	*What makes a function or a set of data be non-linear? How can I tell?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.7 p.327-334
31	Quadratic functions	5	To graph a quadratic function by plotting points	*What is the difference between plotting points for a linear function and a quadratic function?*	Suggest you just power through 4.7 into 4.8 since both topics are very related.	• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.8 p.335-340

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					Whole Group	**Small Group / Stations**	
32	Non-linear and quadratic functions	5, 6	To evaluate non-linear functions, some of which may be quadratic	*What am I missing?*	Bring plenty of non-linear function examples to the lesson	• Work with strugglers • Let stronger students work collaboratively on the Inquiry Lab	Glencoe Math 4.8 p.331-346
33	Qualitative graphs	5, 6	To sketch a graph/model from descriptions of behavior	*How can I draw that?*		• Warm-up/Re-practice • Lesson & Guided practice • Independent practice • i-Ready	Glencoe Math 4.9 p.347-354
34	Qualitative graphs	5, 6	To sketch a graph/model from descriptions of behavior	*How can I draw that?*	Give this a second day if you think it is worth the investment	• Work with strugglers • Let stronger students work collaboratively on the Career activity	Glencoe Math 4.9 p.353-356
35	Functions	5, 6	To determine readiness for assessment	*What am I missing*		• Work with strugglers • Provide challenging practice for stronger students to work collaboratively.	
36	Functions	5, 6	Assessment			• Review • Assessment	

Word Wall Candidates

Constant	Proportionality	Variation	Rate of Change	Linear
Rise	Run	Slope	Point-slope form	Slope-intercept form
X-intercept	Y-intercept	Substitution	Standard form	System of Equations
Independent variable	Dependent variable			

Authentic Application

Use a project listed on p. 361