

## NJDOE MODEL CURRICULUM PROJECT

**CONTENT AREA: Mathematics**

**GRADE: 8**

**UNIT #: 2**

**UNIT NAME: The Number System**

STUDENT LEARNING OBJECTIVES		CORRESPONDING CCSS	
<b>1</b>	Compare rational and irrational numbers to demonstrate that the decimal expansion of irrational numbers do not repeat; show that every rational number has a decimal expansion which eventually repeats and convert such decimals into rational numbers.	<b>8.NS.1</b>	Know that numbers that are not rational are called irrational. Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number.
<b>2</b>	Use rational numbers to approximate and locate irrational numbers on a number line and estimate the value of expressions involving irrational numbers.	<b>8.NS.2</b>	Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions. <i>For example, by truncating the decimal expansion of the square root of 2, show that the square root of 2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.</i>
<b>3</b>	Apply the properties of integer exponents to simplify and write equivalent numerical expressions.	<b>8.EE.1</b>	Know and apply the properties of integer exponents to generate equivalent numerical expressions.
<b>4</b>	Use scientific notation to estimate and express the values of very large or very small numbers and compare their values (how many times larger/smaller is one than the other).	<b>8.EE.3</b>	Use numbers expressed in the form of a single digit times an integer power of 10 estimate very large or very small quantities, and to express how many times as much one is than the other. <i>For example, estimate the population of the United States as <math>3 \times 10^8</math> and the population of the world as <math>7 \times 10^9</math> and determine that the world population is more than 20 times larger.</i>
<b>5</b>	Perform operations using numbers expressed in scientific notation, including problems where both decimals and scientific notation are used (interpret scientific notation generated when technology has been used for calculations).	<b>8.EE.4</b>	Perform operations with numbers expressed in scientific notation, including problems where both decimals and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.
<b>6</b>	In real-world problem solving situations choose units of appropriate size for measurement of very small and very large quantities.		

**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.**

SLO 6 Use problems that describe complex real-world conditions.

2. Reason abstractly and quantitatively.

3. Construct viable arguments and critique the reasoning of others.

4. Model with mathematics.

5. Use appropriate tools strategically.

**6. Attend to precision.**

SLO 6 Determine appropriate sized units for a given context.

**7. Look for and make use of structure.**

SLO 3 Examine the form of expressions involving integer exponents and apply the correct property of exponents to create equivalent expressions .

**8. Look for and express regularity in repeated reasoning.**

SLO 1 Explain orally or in written language the difference between a rational and an irrational number.

*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 #: 2		
Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
1	Real numbers		To determine readiness for furth content	<i>What do I know to help me learn about rational and irrational numbers?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.4-6
2	Rational numbers	1	<ul style="list-style-type: none"> <li>• To define a rational number</li> <li>• To convert rational numbers between forms</li> </ul>	<i>Why is there value in writing numbers in different forms?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.7-14
3	Powers and Exponents	3	To define and evaluate bases raised to powers with exponents	<i>How can I simplify when a number is multiplied by itself repeatedly?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.15-22
4	Multiply and divide monomials	3	To evaluate/simplify monomials using the law of exponents	<i>What happens to the exponents when I multiply or divide their bases?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.23-30
5	Powers of monomials	3	To evaluate a power of an exponented monomial	<i>What happens to the exponent when I raise a base with an exponent to another power?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.31-38top
6	Monomials and exponents	1, 3	To determine areas of weakness for improvement			<ul style="list-style-type: none"> <li>• Differentiated intervention as needed</li> <li>• Review practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.38btm, p.42, for all p.39-41 for achievers while strugglers work with teacher intervention
7	Monomials and exponents	1, 3				<ul style="list-style-type: none"> <li>• Review</li> <li>• Assessment</li> </ul>	
8	Negative exponents	3	<ul style="list-style-type: none"> <li>• To simplify monomials containing negative exponents</li> <li>• To convert a rational number to a base with a negative exponent</li> </ul>	<i>How do negative exponents make it easier to use the Law of Exponents?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.43-50

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Day	Topic	SLO	Learning Objectives	Essential Questions	Suggested Student Activities		Possible Resources
					Whole Group	Small Group / Stations	
9	Scientific notation	4	To convert between numbers and scientific notation	<i>How can scientific notation help calculate with large numbers?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.51-58
10	Computing with scientific notation	4, 5	To calculate large number using scientific notation			<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.59-66
11	Scientific notation and calculator displays	4, 5	To recognize similarities and differences between scientific notation and the numerical display of large numbers on their calculators	<i>How does my calculator match up with scientific notation?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.67-70
12	<ul style="list-style-type: none"> <li>• Negative exponents</li> <li>• Scientific notation</li> </ul>	4, 5	To determine areas of weakness for improvement			<ul style="list-style-type: none"> <li>• Differentiated intervention as needed</li> <li>• Review practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	Negative exponents <a href="#">HomeSchoolMath</a> <a href="#">MathWkshtsland1</a> <a href="#">MathWkshtsland2</a> Scientific notation <a href="#">Mathwkshtsforkids</a> <a href="#">Kutaworksheets</a> <a href="#">Mathwkshts4kids</a>
13	<ul style="list-style-type: none"> <li>• Negative exponents</li> <li>• Scientific notation</li> </ul>	4, 5				<ul style="list-style-type: none"> <li>• Review</li> <li>• Assessment</li> </ul>	
14	Roots	2	To evaluate roots	<i>Why is there value in writing numbers in different forms?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.71-78
15							
16	Roots of non-perfect squares	2	To approximate roots of non-perfect squares	<i>How can I find the side of a square whose area isn't a perfect square?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.79-80

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					Whole Group	Small Group / Stations	
17	Estimate roots	2	To approximate roots of non-perfect squares and cubes	<i>How can I find the root of a number that isn't a perfect square or cube?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.81-88
18	Comparing Real Numbers	2	<ul style="list-style-type: none"> <li>• To locate estimated roots on a number line</li> <li>• Compare rational and irrational numbers</li> </ul>	<i>How can I evaluate a value if I can't get a number from it?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.89-94
18					<ul style="list-style-type: none"> <li>• Differentiated intervention as needed</li> <li>• Review practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.95-96	
19	Applications in real world	4, 5, 6	To experience a real world avocation using these math skills	<i>When could I ever use this stuff?</i>		<ul style="list-style-type: none"> <li>• Warm-up/Re-practice</li> <li>• Lesson &amp; Guided practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.97-98
20	Exponents Roots Scientific notation	1,2, 2, 3, 4, 5, 6	To determine areas of weakness for improvement			<ul style="list-style-type: none"> <li>• Differentiated intervention as needed</li> <li>• Review practice</li> <li>• Independent practice</li> <li>• i-Ready</li> </ul>	GlencoeMath p.99-102
21	Exponents Roots Scientific notation	1,2, 2, 3, 4, 5, 6				<ul style="list-style-type: none"> <li>• Review</li> <li>• Assessment</li> </ul>	
22	Unit Project		Complete choice of unit project			Create student teams with each to complete one of the Unit Projects	GlencoeMath p.
23							
24							
Remaining days can be used as added days needed to master the content and skills of this unit or to begin Unit 3 that will utilize Chapters 2 and 3 of the text.							

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<u>Word Wall Candidates</u>							
	Base	Root	Power	Square root	Cube root		
	Terminating decimal	Repeating decimal	Exponent	Perfect square	Perfect cube		
	Rational number	Irrational number	Monomial	Radical sign	Scientific notation		
<u>Authentic Application</u>							
	Select from Unit Projects on p.103						