

# KINGSWAY REGIONAL SCHOOL DISTRICT



*Committed to Excellence*

<b>Course Name: Math 8 Lab</b>	<b>Grade Level(s): 8th</b>
<b>Department: Mathematics</b>	<b>Credits:</b>
<b>BOE Adoption Date: September 22, 2014</b>	<b>Revision Date(s): October 22, 2015</b>

## **ABSTRACT**

The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the 8<sup>th</sup> grade math PARCC exam. Students who do not meet the Minimal Level of Proficiency on the 7<sup>th</sup> grade PARCC assessment (formerly NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Math 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the 8<sup>th</sup> grade math PARCC assessment aligned with college and career readiness. These skills will include: order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.

In Grade 8, instructional time should focus on three critical areas: (1) formulating and reasoning about expressions and equations, including modeling an association in bivariate data with a linear equation, and solving linear equations and systems of linear equations; (2) grasping the concept of a function and using functions to describe quantitative relationships; (3) analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem. The Mathematical Practice Standards apply throughout each course and, together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. There are three critical areas in which to focus on for Math 8:

Critical Area 1: Students use linear equations and systems of linear equations to represent, analyze, and solve a variety of problems. Students recognize equations for proportions ( $y/x = m$  or  $y = mx$ ) as special linear equations ( $y = mx + b$ ), understanding that the

constant of proportionality ( $m$ ) is the slope, and the graphs are lines through the origin. They understand that the slope ( $m$ ) of a line is a constant rate of change, so that if the input or  $x$ -coordinate changes by an amount  $A$ , the output or  $y$ -coordinate changes by the amount  $m \cdot A$ . Students also use a linear equation to describe the association between two quantities in bivariate data (such as arm span vs. height for students in a classroom). At this grade, fitting the model, and assessing its fit to the data are done informally. Interpreting the model in the context of the data requires students to express a relationship between the two quantities in question and to interpret components of the relationship (such as slope and  $y$ -intercept) in terms of the situation.

Students strategically choose and efficiently implement procedures to solve linear equations in one variable, understanding that when they use the properties of equality and the concept of logical equivalence, they maintain the solutions of the original equation. Students solve systems of two linear equations in two variables and relate the systems to pairs of lines in the plane; these intersect, are parallel, or are the same line. Students use linear equations, systems of linear equations, linear functions, and their understanding of slope of a line to analyze situations and solve problems.

Critical Area 2: Students grasp the concept of a function as a rule that assigns to each input exactly one output. They understand that functions describe situations where one quantity determines another. They can translate among representations and partial representations of functions (noting that tabular and graphical representations may be partial representations), and they describe how aspects of the function are reflected in the different representations.

Critical Area 3: Students use ideas about distance and angles, how they behave under translations, rotations, reflections, and dilations, and ideas about congruence and similarity to describe and analyze two-dimensional figures and to solve problems. Students show that the sum of the angles in a triangle is the angle formed by a straight line, and that various configurations of lines give rise to similar triangles because of the angles created when a transversal cuts parallel lines. Students understand the statement of the Pythagorean Theorem and its converse, and can explain why the Pythagorean Theorem holds, for example, by decomposing a square in two different ways. They apply the Pythagorean Theorem to find distances between points on the coordinate plane, to find lengths, and to analyze polygons. Students complete their work on volume by solving problems involving cones, cylinders, and spheres.

## TABLE OF CONTENTS

<b>Mission Statement</b>	<i>Page 4</i>
<b>Curriculum and Instruction Goals</b>	<i>Page 4</i>
<b>Philosophy of Shared Curriculum Service with South Harrison Township Elementary</b>	<i>Page 4</i>
<b>How to Read this Document</b>	<i>Page 5</i>
<b>Terms to Know</b>	<i>Page 5</i>
<b>Pacing Guide</b>	<i>Page 8</i>
<b>Curriculum Units</b>	<i>Page 17</i>

### **Mission Statement**

The Kingsway Regional School District believes that this school district is responsible for developing and maintaining a comprehensive educational program that will foster the academic, social, and personal growth of all students. The Kingsway Regional School District provides a secure, supportive environment. It also provides high quality resources to challenge and empower each individual to pursue his/her potential, to develop a passion for learning in a diverse and challenging world, to encourage active citizenship, and to reach a high standard of achievement at all grade levels as defined by the New Jersey Core Curriculum Content Standards (NJCCCS) & Common Core State Standards (CCSS).

### **Curriculum & Instruction Goals**

**Goal(s):**

1. To ensure students are college and career ready upon graduation
2. To vertically and horizontally align curriculum K-12 to ensure successful transition of students at each grade level
3. To identify individual student strengths and weaknesses utilizing various assessment measures (formative, summative, alternative, etc.) so as to differentiate instruction while meeting the rigor of the applicable content standards
4. To improve student achievement as assessed through multiple measures including, but not limited to, state testing, local assessments, and intermediate benchmarking

### **Philosophy of the Shared Curriculum Service with South Harrison Township Elementary**

The ultimate goal of the newly established shared curriculum service with South Harrison Township Elementary is to provide clearly coherent curriculum for grades K-12 to enhance student growth and achievement and provide learning experiences that assist in providing an inherent love of learning. With true vertical and horizontal curricular alignment all students will be effectively prepared for their arrival onto the campus of Kingsway Regional Middle School. Through this shared vision, both school districts are able to work earlier and more productively with students to ensure they are properly equipped with the knowledge and skills necessary to be successful in college and career upon graduation from high school. The alignment of curriculum K-12 safeguards countless benefits for our children; it is the very foundation for the improved teaching and learning that is our goal as educators, parents, and community members. Most notably, an aligned curriculum K-12 creates a common ownership and understanding of what must be taught and learned at each grade level for each subject area. No matter where a student attends, the curriculum requirements are the same across buildings, grade levels and teachers. Additionally, an aligned curriculum serves to provide valuable information to parents who will know what each child is expected to learn while in the classroom.

## How to Read this Document

This curricular document contains both *pacing guides* and *curriculum units*. The pacing guides serve to communicate an estimated timeframe as to *when* skills and topics will be taught throughout the year. The pacing, however, may differ slightly depending upon the unique needs of each learner. The *curriculum units* contain more detailed information as to the content, goals, and objectives of the course well as how students will be assessed. The terms and definitions below will assist the reader to better understand the sections and components of this curriculum document.

## Terms to Know

- 1. Accommodation(s):** The term "accommodation" may be used to describe an *alteration* of environment, curriculum format, or equipment that allows an individual with a disability to gain access to content and/or complete assigned tasks. They allow students with disabilities to pursue a regular course of study. The term accommodation is often used interchangeable with the term modification. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with added assistance in that achievement. Since accommodations do not alter what is being taught, instructors should be able to implement the same grading scale for students with disabilities as they do for students without disabilities.
- 2. Differentiated Instruction:** Differentiation of instruction relies on the idea that instructional approaches should be tailored to each individual student's learning needs. It provides students an array of options during the learning process that allows them make sense of ideas as it relates to them. The integration of differentiated instructional techniques is a curriculum design approach to increase flexibility in teaching and decrease the barriers that frequently limit student access to materials and learning in classrooms.
- 3. Enduring Understanding:** Enduring understandings (aka big ideas) are statements of understanding that articulate deep conceptual understandings at the heart of each content area. Enduring understandings are noted in the alongside essential questions within each unit in this document.
- 4. Essential Question:** These are questions whose purpose is to stimulate thought, to provoke inquiry, and to spark more questions. They extend beyond a single lesson or unit. Essential questions are noted in the beginning of each unit in this document.
- 5. Formative Assessments:** Formative assessments monitor student learning to provide ongoing feedback that can be used by (1) instructors to improve teaching and (2) by students to improve their learning. Formative assessments help identify students' strengths and weaknesses and address problems immediately.

6. **Learning Activity(s):** Learning activities are those activities that take place in the classroom for which the teacher facilitates and the students participate in to ensure active engagement in the learning process. (Robert J. Marzano, *The Art and Science of Teaching*)
7. **Learning Assignment(s):** Learning assignments are those activities that take place independently by the student inside the classroom or outside the classroom (i.e. homework) to extend concepts and skills within a lesson.
8. **Learning Goal(s):** Learning goals are broad statements that note what students “should know” and/or “be able to do” as they progress through a unit. Learning goals correlate specifically to the NJCCCS and CCSS are noted within each unit.
9. **Learning Objective(s):** Learning objectives are more specific skills and concepts that students must achieve as they progress towards the broader learning goal. These are included within each unit and are assessed frequently by the teacher to ensure students are progressing appropriately.
10. **Model Assessment:** Within the model curriculum, model assessments are provided that included assessments that allow for measuring student proficiency of those target skills as the year of instruction progresses.
11. **Model Curriculum:** The model curriculum has been provided by the state of New Jersey to provide a “model” for which districts can properly implement the Common Core State Standards and New Jersey Core Curriculum Content Standards by providing an example from which to work and/or a product for implementation.
12. **Modification(s):** The term "modification" may be used to describe a *change* in the curriculum. Modifications are typically made for students with disabilities who are unable to comprehend all of the content an instructor is teaching. The term modification is often used interchangeable with the term accommodations. However, it is important to remember that modifications change or modify the intended learning goal while accommodations result in the same learning goal being expected but with assistance in that achievement.
13. **Performance Assessments:** (aka alternative or authentic assessments) Performance assessments are a form of assessment that requires students to perform tasks that generate a more authentic evaluation of a student’s knowledge, skills, and abilities. Performance assessments stress the application of knowledge and extend beyond traditional assessments (i.e. multiple-choice question, matching, true & false, etc.).
14. **Standards:** Academic standards, from which the curriculum is built, are statements that of what students “should know” or “be able to do” upon completion of a grade-level or course of study. Educational standards help teachers ensure their students have the skills and knowledge they need to be successful by providing clear goals for student learning.

- o **State:** The New Jersey Student Learning Standards (NJSLSs) include Preschool Teaching and Learning Standards as well as K-12

standards for: *Visual and Performing Arts; Comprehensive Health and Physical Education; Science; Social Studies; World Languages; Technology; 21st-Century Life and Careers; Language Arts Literacy; and, Mathematics*

15. **Summative Assessments:** Summative assessments evaluate student learning at the end of an instructional time period by comparing it against some standard or benchmark. Information from summative assessments can be used formatively when students or faculty use it to guide their efforts and activities in subsequent courses.
16. **21<sup>st</sup> Century Skills:** These skills emphasize the growing need to focus on those skills that prepare students successfully by focusing on core subjects and 21<sup>st</sup> century themes; learning and innovation skills; information, media and technology skills; and life and career skills. These concepts are embedded in each unit of the curriculum.

**Proficiencies and Pacing:**

**Course Title: Math 8 Lab**

**Prerequisite(s): Math 7**

Unit Title:	Duration/ Month(s)	Related Standards:	Learning Goals:	Topics and Skills:	
<b>Unit 1: 2-D Geometry</b>	6 weeks  September / October	<b>Subject Area:</b>  Geometry: 8.G1-5  <b>Interdisciplin            ary:</b>  9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1	1. Students will be able to compare transformations, including translations, reflections, rotations and dilations with and without a coordinate plane.  2. Students will understand and apply the principles of congruence and similarity.  3. Students will be able to determine relationships that exist between (a) angle sums & exterior angles of triangles, (b) angles created when parallel lines are cut by a transversal and apply the angle-angle criterion for similarity of triangles.	<b>Concepts –            (What Students Need to Know)</b> <ul style="list-style-type: none"> <li>• Rotation</li> <li>• Reflection</li> <li>• Translation</li> <li>• Dilation</li> <li>• Congruence</li> <li>• Similarity</li> <li>• Informal proof</li> <li>• Angle sum and exterior angle of triangles</li> <li>• Parallel lines cut by a transversal               <ul style="list-style-type: none"> <li>○ Angles formed</li> </ul> </li> <li>• Angle-angle criterion for similar triangles</li> </ul>	<b>Skills ---            (What Students Need To Be Able To Do)</b> <ul style="list-style-type: none"> <li>• VERIFY (Experimentally properties of)               <ul style="list-style-type: none"> <li>○ Rotations</li> <li>○ Reflections</li> <li>○ Translations</li> <li>○ Dilations</li> </ul> </li> <li>• UNDERSTAND (Congruence)               <ul style="list-style-type: none"> <li>○ DESCRIBE (Sequence of rotations, reflections, translations)</li> </ul> </li> <li>• UNDERSTAND (Similarity)               <ul style="list-style-type: none"> <li>○ DESCRIBE (Sequence of rotations, reflections, translations, dilations)</li> </ul> </li> <li>• DESCRIBE (effect of dilations, translations, rotations and reflections using coordinates)</li> <li>• PROVE (informally)               <ul style="list-style-type: none"> <li>○ angle relationships in parallel lines cut by a transversal</li> <li>○ sum of angles in a triangle = <math>180^\circ</math></li> </ul> </li> </ul>

<p><b>Unit 2: Numerical Roots and Radicals</b></p>	<p>5 weeks October/Nov ember</p>	<p><b>Subject Area:</b>  Number System- 8.NS.1-2 Expressions and Equations 8.EE.1-2</p> <p><b>Interdisciplin ary:</b>  9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1</p>	<p>1. Students will be able to differentiate between rational and irrational numbers and be able to compare and estimate the size of irrational numbers and locate them on a number line.</p> <p>2. Students will be able to apply properties of exponents and radicals to generate equivalent expressions and solve equations.</p>	<p><b>Concepts – (What Students Need to Know)</b></p> <ul style="list-style-type: none"> <li>• Rational number</li> <li>• Irrational number</li> <li>• Decimal expansion</li> <li>• Properties of integer exponents</li> <li>• Square root</li> <li>• Perfect square</li> <li>• Cube root</li> <li>• Perfect cube</li> </ul>	<p><b>Skills – (What Students Need To Be Able To Do)</b></p> <ul style="list-style-type: none"> <li>• KNOW (rational and irrational numbers)</li> <li>• UNDERSTAND (decimal expansion)</li> <li>• SHOW (decimal expansion repeats)</li> <li>• CONVERT (repeating decimal expansion to a rational number)</li> <li>• EXPRESS (rational approximations of irrational numbers)</li> <li>• COMPARE (sizes of rational numbers)</li> <li>• LOCATE (rational numbers approximately on a number line)</li> <li>• ESTIMATE (value of expressions)</li> <li>• USE (square root and cube root symbols)</li> <li>• REPRESENT (solutions to equations)</li> <li>• EVALUATE <ul style="list-style-type: none"> <li>• (square roots of perfect squares)</li> <li>• (cube roots of perfect cubes)</li> </ul> </li> <li>• KNOW/APPLY (properties of integer exponents)</li> <li>• GENERATE (equivalent numerical expressions)</li> </ul>
--	--	---	---	--	--

<p><b>Unit 3: Scientific Notation Switch this unit to be taught after unit 4.</b></p>	<p>3 weeks January</p>	<p><b>Subject Area:</b>  Expressions and Equations - 8.EE.3-4</p> <p><b>Interdisciplin ary:</b>  9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1</p>	<p>1. Students will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.</p>	<p><b>Concepts – (What Students Need to Know)</b></p> <ul style="list-style-type: none"> <li>• Integer power of 10</li> <li>• Scientific notation</li> </ul>	<p><b>Skills – (What Students Need To Be Able To Do)</b></p> <ul style="list-style-type: none"> <li>• USE (integer power of 10) <ul style="list-style-type: none"> <li>• ESTIMATE (large or small quantities)</li> <li>• EXPRESS (magnitude of numbers using powers of 10)</li> </ul> </li> <li>• REPRESENT (very large and very small numbers)</li> <li>• CHOOSE (units of appropriate size)</li> <li>• CALCULATE/CONVERT (numbers expressed in scientific notation/decimal form)</li> <li>• INTERPRET (scientific notation generated by technology)</li> </ul>
<p><b>Unit 4: Pythagore an Theorem, Distance</b></p>	<p>4 weeks December</p>	<p><b>Subject Area:</b>  8.G.6 8.G.7 8.G.8</p> <p><b>Interdisciplin</b></p>	<p>1. Students will be able to use the Pythagorean Theorem to solve a right triangle for a missing side, find the distance between two points, and explain a proof of the Pythagorean Theorem and its converse. (8.G.6, 8.G.7, 8.G.8)</p>	<p><b>Concepts – (What Students Need to Know)</b></p> <ul style="list-style-type: none"> <li>• Pythagorean Theorem <ul style="list-style-type: none"> <li>○ Proof of and its converse</li> </ul> </li> <li>• Right triangles</li> <li>• Coordinate system</li> </ul>	<p><b>Skills – (What Students Need To Be Able To Do)</b></p> <ul style="list-style-type: none"> <li>• APPLY (Pythagorean Theorem) <ul style="list-style-type: none"> <li>○ DETERMINE (unknown side lengths in right triangles)</li> <li>○ FIND (distance between two points in a coordinate system)</li> </ul> </li> <li>• EXPLAIN (a proof of the Pythagorean Theorem and its</li> </ul>

		<b>ary</b> 9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.4.B.1 9.1.8.B.1 9.4.12.O.(2). 1 9.4.12.O.(2). 2		converse)	
<b>Unit 5: Solving Equations</b>	4-5 weeks  January/ February	<b>Subject Area:</b> 8.EE.7  <b>Interdisciplin ary</b>  9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.4.B.1 9.1.8.A.2 9.1.8.B.1	1. Students will be able to solve equations in one variable.  2. Students will be able to transform a formula to a different form of the formula.	<b>Concepts – (What Students Need to Know)</b> <ul style="list-style-type: none"> <li>• Rational Number Coefficients</li> <li>• Linear Equations w/ One variable               <ul style="list-style-type: none"> <li>○ One solution</li> <li>○ Many solutions</li> <li>○ No solutions</li> </ul> </li> <li>• Equations into simpler forms               <ul style="list-style-type: none"> <li>○ Expanding Expressions</li> <li>○ Distributive Property</li> <li>○ Combining Like Terms</li> <li>○ Variables on both sides</li> </ul> </li> </ul>	<b>Skills – (What Students Need To Be Able To Do)</b> <ul style="list-style-type: none"> <li>• Solve (linear equations)</li> <li>• Show (simpler forms)</li> <li>• Understand (solutions)</li> <li>• Estimate (solutions)</li> </ul>

<b>Unit 6a: Graphing Linear Equations</b>	6 weeks - February / March	<b>Subject Area:</b> Expressions & Equations – 8.EE.5-6 Functions 8.F.1-5  <b>Interdisciplin ary:</b> 9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1	1. Students will be able to compare and contrast proportional relationships, lines and linear equations and apply the concepts of slope to linear equations.	

				<p><b>Concepts – (What Students Need to Know)</b></p> <ul style="list-style-type: none"> <li>• Functions <ul style="list-style-type: none"> <li>○ Properties <ul style="list-style-type: none"> <li>▪ Linear</li> <li>▪ Non-linear</li> </ul> </li> <li>○ Input/output</li> <li>○ Ordered pairs</li> </ul> </li> <li>• Linear/functional relationship</li>   <li>• Proportional relationships</li> <li>• Unit rate</li> <li>• Slope (m)</li> <li>• Y-intercept (b)</li> <li>• Linear equations (<math>y = mx</math> and <math>y = mx + b</math>)</li> <li>• Coefficients</li> <li>• Linear equations w/ 1 variable <ul style="list-style-type: none"> <li>○ One solution</li> <li>○ Infinitely many solutions</li> <li>○ No solutions</li> </ul> </li> <li>• Tables &amp; Graphs</li> <li>• Similar triangles</li> </ul>	<p><b>Skills – (What Students Need To Be Able To Do)</b></p> <ul style="list-style-type: none"> <li>• READ (table or graph)</li> <li>• COMPARE (functions) <ul style="list-style-type: none"> <li>○ Algebraically</li> <li>○ Graphically</li> <li>○ Numerically in tables</li> <li>○ Verbal descriptions</li> </ul> </li> <li>• UNDERSTAND (function is a rule) <ul style="list-style-type: none"> <li>○ GRAPH (sets of ordered pairs)</li> </ul> </li> <li>• CONSTRUCT (function) <ul style="list-style-type: none"> <li>○ Model (linear relationship)</li> </ul> </li> <li>• DETERMINE (rate of change)</li> <li>• INTERPRET <ul style="list-style-type: none"> <li>○ unit rate as slope</li> <li>○ <math>y = mx + b</math></li> </ul> </li> <li>• GIVE (examples of non-linear functions)</li> <li>• DESCRIBE &amp; DRAW <ul style="list-style-type: none"> <li>○ functional relationship between two quantities</li> <li>○ graph from a verbal description</li> </ul> </li> <li>• GRAPH (proportional relationships)</li> <li>• COMPARE (proportional relationships)</li> <li>• EXPLAIN (why slope is the same between any two points on a non-vertical line using similar triangles)</li> <li>• DERIVE (linear equations (<math>y = mx</math> and <math>y = mx + b</math>))</li> </ul>

<b>Unit 6b: Systems of Equations</b>	3 weeks- March/ April	<b>Subject Area:</b> Expressions & Equations – 8.EE.8(a-c)  <b>Interdisciplin ary</b> 9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1	1. Students will be able to analyze and solve systems of equations.	<b>Concepts – (What Students Need to Know)</b> <ul style="list-style-type: none"> <li>• Systems of Linear Equations w/ 2 Variables             <ul style="list-style-type: none"> <li>○ One solution</li> <li>○ Infinitely many solutions</li> <li>○ No solutions</li> </ul> </li> </ul>	<b>Skills – (What Students Need To Be Able To Do)</b> <ul style="list-style-type: none"> <li>• GRAPH (solution of systems of equations)</li> <li>• INTERPRET (solution of systems of equations)</li> <li>• SOLVE (solution of systems of equations algebraically)</li> <li>• CONSTRUCT (equation for a real-world situation in 2 variables)</li> </ul>
<b>Unit 7: Functions</b>	3 weeks  April/May	<b>Subject Area:</b> Functions 8.F.1 8.F.2 8.F.3 8.F.4 8.F.5  <b>Interdisciplin ary</b> 9.1.4.A.1 9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1	1. Students will be able to define a function & compare properties of two functions each represented in a different way, and interpret the equation $y=mx+b$ as defining a linear relationship between the two quantities.  2. Students will be able to construct a function to model linear relationships and describe qualitatively the function relationship between two quantities by analyzing a graph.	<b>Concepts – (What Students Need to Know)</b> <ul style="list-style-type: none"> <li>• Proportional relationships</li> <li>• Unit rate</li> <li>• Slope (m)</li> <li>• Y-intercept (b)</li> <li>• Linear equations (<math>y = mx</math> and <math>y = mx + b</math>)             <ul style="list-style-type: none"> <li>○ Rational Number Coefficients</li> <li>○ One variable                 <ul style="list-style-type: none"> <li>▪ One solution</li> <li>▪ Infinitely many solutions</li> <li>▪ No solutions</li> </ul> </li> </ul> </li> <li>• Equations into simple forms             <ul style="list-style-type: none"> <li>○ Expanding Expressions</li> <li>○ Distributive property</li> </ul> </li> </ul>	<b>Skills – (What Students Need To Be Able To Do)</b> <ul style="list-style-type: none"> <li>• GRAPH (proportional relationships)</li> <li>• INTERPRET (unit rate as slope)</li> <li>• COMPARE (proportional relationships)</li> <li>• EXPLAIN (why slope is the same between any two points on a non-vertical line)</li> <li>• DERIVE (linear equations (<math>y = mx</math> and <math>y = mx + b</math>))</li> <li>• SOLVE (linear equations)</li> <li>• GIVE (example of linear equations)</li> <li>• TRANSFORM (equations)</li> <li>• EXPAND (expressions)             <ul style="list-style-type: none"> <li>○ Use (distributive property)</li> <li>○ Collect (like terms)</li> </ul> </li> <li>• UNDERSTAND (function is a rule)</li> </ul>

				<ul style="list-style-type: none"> <li>○ Combining Like terms</li> <li>• Functions <ul style="list-style-type: none"> <li>○ Properties <ul style="list-style-type: none"> <li>▪ Linear</li> <li>▪ Non-linear</li> </ul> </li> <li>○ Input/output</li> <li>○ Ordered pairs</li> </ul> </li> <li>• Linear/functional relationship</li> <li>• rate of change</li> <li>• initial value (function)</li> <li>• table</li> <li>• graph</li> <li>•</li> </ul>	<ul style="list-style-type: none"> <li>○ GRAPH (sets of ordered pairs)</li> <li>• COMPARE (functions) <ul style="list-style-type: none"> <li>○ Algebraically</li> <li>○ Graphically</li> <li>○ Numerically in tables</li> <li>○ Verbal descriptions</li> </ul> </li> <li>• CONSTRUCT (function) <ul style="list-style-type: none"> <li>○ Model (linear relationship)</li> </ul> </li> <li>• DETERMINE (rate of change and initial value of function)</li> <li>• READ (table or graph)</li> <li>• INTERPRET <ul style="list-style-type: none"> <li>○ <math>y = mx + b</math></li> <li>○ rate of change and initial value of function</li> </ul> </li> <li>• GIVE (examples of non-linear functions)</li> <li>• DESCRIBE (functional relationship between two quantities)</li> <li>• DRAW (graph from a verbal description)</li> </ul>
<b>Unit 8: Data</b>	2-3 weeks - May	<b>Subject Area:</b>  Statistics and Probability 8.SP.1-4  <b>Interdisciplin ary:</b>  9.1.4.A.1	<ol style="list-style-type: none"> <li>1. Students will be able to construct and interpret scatter plots and assess a line of best fit.</li> <li>2. Students will be able to investigate patterns of association in bivariate data using linear models and two-ways tables.</li> </ol>	<b>Concepts – (What Students Need to Know )</b> <ul style="list-style-type: none"> <li>• Scatter Plots</li> <li>• Patterns <ul style="list-style-type: none"> <li>○ Clustering</li> <li>○ Outliers</li> <li>○ Positive or Negative</li> <li>○ Linear</li> <li>○ Nonlinear</li> </ul> </li> <li>• Frequencies</li> <li>• Two-way table</li> </ul>	<b>Skills – (What Students Need To Be Able To Do)</b> <ul style="list-style-type: none"> <li>• CONSTRUCT (scatter plots)</li> <li>• INTERPRET (scatter plots)</li> <li>• INVESTIGATE (patterns)</li> <li>• DESCRIBE (patterns)</li> <li>• USE (equation of a linear model)</li> <li>• SOLVE (in context)</li> <li>• INTERPRET (slope and intercept)</li> <li>• UNDERSTAND (patterns of association in data)</li> </ul>

		<p>9.1.4.A.5 9.1.12.A.1 9.1.8.A.2 9.1.4.B.1 9.1.8.B.1</p>		<ul style="list-style-type: none"> <li>○ variables</li> <li>• Equation of Linear Model <ul style="list-style-type: none"> <li>○ Slope and Intercept</li> </ul> </li> <li>• Line of best fit</li> </ul>	<ul style="list-style-type: none"> <li>• DISPLAY (frequencies and relative frequencies)</li> <li>• DESCRIBE (association between variables)</li> <li>• DRAW (line of best fit)</li> </ul>
<p><b>Unit 9: 3D Geometry</b></p>	<p>4 weeks May/ June</p>	<p><b>Subject Area:</b> 8.G.9</p> <p><b>Interdisciplinary:</b> 9.1.4.A.5 9.1.8.A.2 9.4.12.O.(2). 1 9.4.12.O.(2). 2</p>	<p>1. Students will know the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p>	<p><b>Concepts – (What Students Need to Know)</b></p> <ul style="list-style-type: none"> <li>• Formulas (volume) <ul style="list-style-type: none"> <li>○ Cones</li> <li>○ Cylinders</li> <li>○ Spheres</li> </ul> </li> </ul>	<p><b>Skills – (What Students Need To Be Able To Do)</b></p> <ul style="list-style-type: none"> <li>• Know (formulas for volumes)</li> <li>• Use (formulas for volumes)</li> <li>• Solve (in context)</li> </ul>

<b>Unit: 1- 2D Geometry</b>	<b>Recommended Duration: 6 weeks – September/October</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> Geometric awareness will be developed throughout this unit of study which includes coordinate plane geometry and an introduction to angle relationships. Students will investigate transformations, congruence, similarity, and angle relationships using physical models, transparencies and/or geometry software. An exploration of rigid transformations in the coordinate plane (translations, reflections and rotations) will develop an understanding of the effects of a sequence of transformations and the resulting congruent images. Students will use mathematical language and symbols to write statements of congruency. Students will draw conclusions about dilations to gain a firm understanding of similar figures, noting congruent angles and sides that are proportional and discovering scale factors. Finally, students will use exploration and deductive reasoning to determine relationships that exist between the following: a) angle sums and exterior angle sums of triangles, b) angles created when parallel lines are cut by a transversal, and c) the angle-angle criterion for similarity of triangle. This unit of study will include an emphasis on the use of precise mathematical language and the application of geometric concepts to practical situations.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>• What test-taking strategies, study skills, approaches to problem solving and/or math tools can I utilize to improve my mathematical precision and conceptual understanding of transformations and angle relationships?</li> <li>• What changes do figures undergo when transformed on the coordinate plane?</li> <li>• How can I use scale factors to determine missing side lengths and areas of similar figures?</li> <li>• How can angle relationships be used to solve real-world problems?</li> </ul>	<ul style="list-style-type: none"> <li>• Transformations of figures performed on a coordinate plane result in an image of the original with new coordinates derived from the rules of the transformation (reflection, translation, rotation and dilations).</li> <li>• Reflections, translations, and rotations are actions that produce congruent geometric objects.</li> <li>• Congruent figures have the same size and shape.</li> <li>• Dilation is a transformation that changes the size of a figure, but not the shape (similar figures).</li> <li>• Two shapes are similar if the lengths of all the corresponding sides are proportional and all the corresponding angles are congruent. Two similar figures are related by a scale factor, which is the ratio of the lengths of the corresponding sides.</li> </ul>

Essential Questions:	Enduring Understandings:
	<ul style="list-style-type: none"> <li>• If the scale factor of dilation is greater than 1, the image resulting from the dilation is an enlargement. If the scale factor is less than 1, the image is a reduction.</li> <li>• When parallel lines are cut by a transversal, corresponding, alternate interior and alternate exterior angles are congruent.</li> <li>• The sum of the interior angle measures of a triangle is <math>= 180^\circ</math>.</li> <li>• The measure of an exterior angle of a triangle is equal to the sum of the measures of the two nonadjacent interior angles.</li> <li>• When two angles in one triangle are congruent to two angles in another triangle, the third angles are also congruent and the triangles are similar.</li> <li>• Deconstructing and rearranging provide a geometric way of both <i>seeing that</i> a measurement formula is the right one and <i>seeing why</i> it is the right one.</li> <li>• Geometric awareness develops through practice in visualizing, diagramming, and constructing.</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards: 8.G. (Geometry)</b></p> <p><b>Primary(Power):</b></p> <p><b>8.G.A.1.</b> Verify experimentally the properties of rotations, reflections, and translations:  <b>a.</b> Lines are taken to lines, and line segments to line segments of the same length.</p>	<ul style="list-style-type: none"> <li>• Students will be able to compare transformations, including translations, reflections, rotations and dilations with and without a coordinate plane.</li> <li>• Students will understand and apply the principles of congruence and similarity.</li> </ul>	<p>Communicate precisely using appropriate mathematical language. The terms students will learn to use with increasing precision within this unit are: <b>coordinate plane, ordered pair, origin, x-axis, y-axis, line, line segment, angle, translations, rotations, reflections, line of reflection, center of rotation, clockwise, counterclockwise, congruence (<math>\cong</math>), reading A' as "A prime", similarity, scale factor, dilations, pre-</b></p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>b.</b> Angles are taken to angles of the same measure.</p> <p><b>c.</b> Parallel lines are taken to parallel lines.</p> <p><b>8.G.A.2.</b> Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.</p> <p><b>8.G.A.3.</b> Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.</p> <p><b>8.G.A.4.</b> Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.</p> <p><b>8.G.A.5.</b> Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.</p> <p><b>B Secondary(Supportive):</b></p> <p><u>Standards of Mathematical Practice:</u></p>	<ul style="list-style-type: none"> <li>Students will be able to determine relationships that exist between (a) angle sums &amp; exterior angles of triangles, (b) angles created when parallel lines are cut by a transversal and apply the angle – angle criterion for similarity of triangles.</li> </ul>	<p><b>image, image, rigid transformations, exterior angles, interior angles, parallel lines, transversal, alternate interior angles, angle-angle criterion, vertical angles, adjacent, supplementary, complementary, corresponding.</b></p> <p>Graph one and two dimensional figures on the coordinate plane and derive ordered pairs from points on the coordinate plane.</p> <p>Demonstrate through transformations: lines are taken to lines, line segments to line segments of the same length, angles are taken to angles of the same measure, parallel lines are taken to parallel lines.</p> <p>Transform two-dimensional figures with a coordinate plane.</p> <p>Transform two-dimensional figures <u>without</u> a coordinate plane</p> <p>Compare translations, rotations, reflections dilations, with and without a coordinate plane</p> <p>Recognize transformations and symmetry from basic pictures.</p> <p>Identify line symmetry and rotational symmetry.</p> <p>Compare and contrast congruence &amp; similarity</p> <p>Show congruence through a sequence of</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>1. Make sense of problems and persevere in solving them.</p> <p>2. Reason abstractly and quantitatively.</p> <p>3. Construct viable arguments and critique the reasoning of others.</p> <p>4. Model with mathematics.</p> <p>5. Use appropriate tools strategically.</p> <p>6. Attend to precision.</p> <p>7. Look for and make use of structure.</p> <p>8. Look for and express regularity in repeated reasoning.</p> <p><b>Pre-Requisite Skills</b> [standard]:</p> <ul style="list-style-type: none"> <li>• Graph points on the coordinate plane to solve real-world and mathematical problems. [5.G.A.1]</li> <li>• Understand signs of numbers in ordered pairs as indicating locations in quadrants of the coordinate plane [6.NS.C.6b]</li> <li>• Addition and subtraction of integers, decimals and fractions [7.NS.A.1]</li> <li>• Use proportional reasoning [7.RP.A.2]</li> <li>• Use scale factors [7.G.A.1]</li> </ul>		<p>rotations, reflections and translations.</p> <p>Show similarity through a sequence of rotations, reflections, translations and <b>dilations</b>.</p> <p>Investigate the effects of a sequence of transformations using coordinates to determine congruency or similarity.</p> <p>Derive the scale factor of two similar triangles.</p> <p>Identify special pairs of angles:</p> <ul style="list-style-type: none"> <li>• Vertical Angles</li> <li>• Alternate Interior Angles</li> <li>• Alternate Exterior Angles</li> <li>• Same Side Interior Angles</li> <li>• Adjacent Angles</li> <li>• Corresponding Angles</li> </ul> <p>Calculate a missing angle in a pair of special angles.</p> <p>Find the sum of the angles in a triangle and calculate a missing angle.</p> <p>Compare angles formed by parallel lines and transversals</p> <p>Determine relationships between angle sums and exterior angles of triangles</p> <p>Determine relationships between angles created when parallel lines are cut by a transversal</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<ul style="list-style-type: none"> <li>Identify and classify two-dimensional geometric shapes, lines and angles by properties their lines [4.G.1-3]</li> <li>Solve real-life and mathematical problems involving angle measures (vertical, adjacent, complementary, supplementary) [7.G.B.5]</li> </ul>		<p>Apply the angle-angle criterion to determine the missing side length and the scale factor of two similar triangles.</p>

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Unit Tests, Extended Constructed Responses Questions, Projects, Quizzes, Graded Homework		Essential Vocabulary Quizzes Investigating Transformation Project <ul style="list-style-type: none"> <li>Stations Activities (transformations)</li> <li>Instagram Project (transformations)</li> <li>Parallel City Project (transversals)</li> </ul>

Possible Assessment Modifications /Accommodations:
Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet, Modified Grading (Retake Opportunities), Tiered Rubrics

### Instructional Strategies (refer to *Robert Marzano's 41 Elements*):

#### Differentiation Strategies:

- Multiple means to present content - Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites, Interactive *NearPod* Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer

Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, Examining Similarities and Differences, Examining Errors in Reasoning (“My Favorite No” and Misconception Check), Practicing Skills, Strategies and Processes, Engaging Students in Cognitively Complex Tasks Involving Hypothesis Generation and Testing, Exit Slips, Think-Pair-Share, Turn to You Partner, Games & Tournaments, Cooperative Groups

### Possible Instructional Modifications /Accommodations/Differentiation:

Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (such as proportions and ratios to derive scale factors), Review and Re-teaching of Difficult Concepts, Flexible Grouping, Varied supplemental materials, Leveled Rubrics, Stations & Centers, Comments-Only Grading to Drive Mastery of Concepts and Skills, Provide study outlines and guides (Taking Note of What I’ve Learned), Provide options to demonstrate understanding of concepts

### Unit Vocabulary:

**Essential:** coordinate plane, ordered pair, origin, x-axis, y-axis, translations, rotations, reflections, line of reflection, center of rotation, clockwise, counterclockwise, congruence ( $\cong$ ), similarity, scale factor, dilations, exterior angles, interior angles, parallel lines, transversal, alternate interior angles, angle-angle criterion, vertical angles, adjacent, supplementary, complementary, corresponding

**Non-Essential:** line, line segment, angle, pre-image, image, rigid transformations

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
<p>Mathematics:</p> <p>Science:</p> <p>Visual and Performing Arts:</p> <p>Health/PE:</p> <p>World Languages:</p> <p>Social Studies:</p> <p>Technology:</p> <p>21<sup>st</sup> Century Life and Careers: 9.1.4.A.1, 9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1</p> <p>Library:</p>	<p>Technology:</p> <p>Students may be provided an opportunity to use interactive software such as the Geometer’s Sketchpad app for iPads to perform and experiment with transformations and angle relationships. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize where students can engage in interactive practice with transformations.</p>	<p><input type="checkbox"/> Global Awareness</p> <p><input type="checkbox"/> Civic Literacy</p> <p><input checked="" type="checkbox"/> Financial, Economic, Business, &amp; Entrepreneurial Literacy</p> <p><input type="checkbox"/> Health Literacy</p>	<p><input type="checkbox"/> Creativity &amp; Innovation</p> <p><input type="checkbox"/> Media Literacy</p> <p><input checked="" type="checkbox"/> Critical Thinking and Problem Solving</p> <p><input checked="" type="checkbox"/> Life and Career Skills</p> <p><input type="checkbox"/> Information &amp; Communication Technologies Literacy</p> <p><input checked="" type="checkbox"/> Communication &amp; Collaboration</p> <p><input type="checkbox"/> Information Literacy</p>

## Resources:

### Texts/Materials:

- Jump Math 8.1 & 8.2
- Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <http://map.mathshell.org/>
- New Jersey Resource Exchange <http://njcore.org/>
- Resources from Other State Sites:
  - **Visualizing Mathematics (Kentucky)** <http://visualizingmathematics.wikispaces.com/>
  - **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes [www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):** Essential Vocabulary Quizzes

**Major Activities (required):** Investigating Transformations Activity

<b>Unit: 2- Numerical Roots and Radials</b>	<b>Recommended Duration: 3-4 weeks – October/November</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> Students will evaluate squares and radicals. In addition, they will explore how to simplify and approximate square roots to help solve expressions. The unit will also introduce different properties of exponents and develop skills and thought processes to solve equations using exponents. Such skills are necessary when solving not only scientific notation problems but also Pythagorean Theorem problems. This unit of study will include the application of these skills to concrete situations, such as working backward to find the radius of a sphere when given the volume.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>• What test-taking strategies, study skills, and approaches to problem solving and/or math tools can I utilize to improve my mathematical precision and conceptual understanding of rational and irrational numbers?</li> <li>• How do radicals and squares help solve real world problems?</li> <li>• How are radicals and squares useful for solving equations and manipulating numbers?</li> <li>• When are exponents used and why are they important?</li> </ul>	<ul style="list-style-type: none"> <li>• Rational numbers can be expressed as fractions (<math>\frac{a}{b}, b \neq 0</math>); irrational numbers cannot be expressed as fractions because they never terminate nor repeat. An example of an irrational number is <math>\pi</math>.</li> <li>• Square roots can be rational or irrational.</li> <li>• Squares and radicals affect the numbers used within an operation.</li> <li>• Finding the square root or cube root of a number is the inverse operation of squaring or cubing that number.</li> <li>• The rules for radicals can be applied to variable expressions.</li> <li>• Exponents are useful for representing very large or very small numbers.</li> <li>• Properties of integer exponents can be used to generate equivalent numerical expressions.</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards: 8.G. (Geometry)</b></p> <p><b>Primary(Power):</b>  <b>8.EE.1</b> Know and apply the properties of integer exponents to generate equivalent numerical expressions.</p> <p><b>8.EE.2</b> Use square root and cube root symbols to represent solutions to equations of the form <math>x^2 = p</math> and <math>x^3 = p</math>, where <math>p</math> is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that <math>\sqrt{2}</math> is irrational.</p> <p><b>Secondary(Supportive):</b></p> <p><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.</p> <p><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.</p> <p><u>Standards of Mathematical Practice:</u>  1. Make sense of problems and persevere in solving them.</p>	<ul style="list-style-type: none"> <li>• Students will be able to differentiate between rational and irrational numbers and be able to compare and estimate the size of irrational numbers and locate them on a number line. (8.NS.1-2)</li> <li>• Students will be able to apply properties of exponents and radicals to generate equivalent expressions and solve equations. (8.EE.1-2)</li> </ul>	<p>Communicate precisely using appropriate mathematical language. The terms students will learn to use with increasing precision within this unit are: <b>Perfect square, Square root, Terminating decimal, Repeating decimal, Rational Number, Irrational Number, Whole Number, Integer, Exponent, Power, Base, and Cube Root.</b></p> <p>Simplify perfect squares.  Classify rational &amp; irrational numbers.  Evaluate the square root of a fraction or decimal.  Approximate irrational numbers using rational numbers.  For rational numbers, show that the decimal expansion repeats.  Illustrate values of exponential numbers in expanded form.  Evaluate cube roots of perfect cubes.  Simplify expressions of exponents.  Evaluate cube roots of perfect cubes.  Simplify expressions of exponents.</p> <p>Simplify perfect squares</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
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. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.		

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended Constructed Responses Questions, Projects, Quizzes, Graded Homework		Skill Check Quizzes Choice Menu Essential Vocabulary Quizzes

**Possible Assessment Modifications /Accommodations:**

Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet, Exponents Graphic Organizer/Chart, Perfect Squares Chart, Modified Grading (Retake Opportunities)

**Instructional Strategies (refer to Robert Marzano's 41 Elements):****Differentiation Strategies:**

- Multiple means to present content - Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites, Interactive *NearPod* Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Performance Tasks (Applying Properties of Exponents)

Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, Examining Similarities and Differences, Examining Errors in Reasoning ("My Favorite No" and Misconception Check), Practicing Skills, Strategies and Processes, Engaging Students in Cognitively Complex Tasks Involving Hypothesis Generation and Testing, Exit Slips, Think-Pair-Share, Turn to You Partner, Games & Tournaments, Cooperative Groups Math Stations, Guided Practice, Think-Pair-Share, Cooperative Groups, Differentiation, Instructional Scaffolds, Using Manipulatives and Other Tools, Making Cross-Curricular Connections

**Possible Instructional Modifications /Accommodations/Differentiation**

Individualized Instructional Scaffolds, "Interleave"-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills, Review and Re-teaching of Difficult Concepts, Perfect Squares Chart

**Unit Vocabulary:**

**Essential:** Perfect square, Square root, Terminating decimal, Repeating decimal, Rational Number, Irrational Number, Exponent, Power, Base, Cube root

**Non-Essential:** real number, natural number, whole number, integer, radius, diameter

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
<p>Mathematics:</p> <p>Science: 5.4.8.A.2, 5.4.8.A.3</p> <p>Visual and Performing Arts:</p> <p>Health/PE:</p> <p>World Languages:</p> <p>Social Studies:</p> <p>Technology:</p> <p>21<sup>st</sup> Century Life and Careers: 9.1.4.A.1, 9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1</p> <p>Library:</p>	<p>Technology:</p> <p>Students may be provided an opportunity to use interactive software such as the LearnZillion or KhanAcademy apps for iPads to perform formative assessments. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize, Sumdog.com, or Arcademickillbuilders.com where students can engage in interactive practice.</p>	<p><input checked="" type="checkbox"/> Global Awareness</p> <p><input type="checkbox"/> Civic Literacy</p> <p><input checked="" type="checkbox"/> Financial, Economic, Business, &amp; Entrepreneurial Literacy</p> <p><input type="checkbox"/> Health Literacy</p>	<p><input type="checkbox"/> Creativity &amp; Innovation</p> <p><input type="checkbox"/> Media Literacy</p> <p><input checked="" type="checkbox"/> Critical Thinking and Problem Solving</p> <p><input checked="" type="checkbox"/> Life and Career Skills</p> <p><input type="checkbox"/> Information &amp; Communication Technologies Literacy</p> <p><input checked="" type="checkbox"/> Communication &amp; Collaboration</p> <p><input type="checkbox"/> Information Literacy</p>

Resources:
<p><b>Texts/Materials:</b></p> <ul style="list-style-type: none"> <li>• Jump Math 8.1 &amp; 8.2</li> <li>• Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <span style="float: right;"><a href="http://map.mathshell.org/">http://map.mathshell.org/</a></span></li> <li>• New Jersey Resource Exchange <a href="http://njcore.org/">http://njcore.org/</a></li> <li>• Resources from Other State Sites: <ul style="list-style-type: none"> <li>○ <b>Visualizing Mathematics (Kentucky)</b> <a href="http://visualizingmathematics.wikispaces.com/">http://visualizingmathematics.wikispaces.com/</a></li> </ul> </li> </ul>

**Resources:**

- **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes  
[www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):** Essential Vocabulary Quizzes and Skill Check Quizzes

**Major Activities (required):** Unit 2 Learning Menu

<b>Unit: 3- Scientific Notation</b>	<b>Recommended Duration: 2-3 weeks – November/December</b>
-------------------------------------	--

**Course Information:** The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.

**Unit Description:** Students will learn the importance of scientific notation and how to use it to not only convert and order numbers but also perform operations in scientific notation. Additionally, students explore the use of scientific notation in real world applications. Using scientific notation requires the acquisition of skills and concepts from the previous unit as the rules of exponents are applied in scientific notation. This unit of study identifies a strong cross-curricular connection as the skills and concepts are widely used in many science courses and fields of study.

Essential Questions:	Enduring Understandings:
<ul style="list-style-type: none"> <li>• What test-taking strategies, study skills, approaches to problem solving and/or math tools can I utilize to improve my mathematical precision and conceptual understanding of scientific notation?</li> <li>• How is scientific notation used?</li> <li>• How can you read numbers written in scientific notation?</li> <li>• How can you write a number in scientific notation?</li> <li>• How can you perform operations with numbers written in scientific notation?</li> </ul>	<ul style="list-style-type: none"> <li>• Scientific notation is widely utilized in the fields of science and medicine for applications and operations with very large numbers and very small numbers. Scientific notation eases communication and decreases errors.</li> <li>• The absolute value of the exponent indicated how many places to move the decimal point. If the exponent is positive, move the decimal to the right. If the exponent is negative, move the decimal to the left.</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards: 8.EE.3 &amp; 8.EE.4</b></p> <p><b>Primary(Power):</b>  <b>8.EE.3</b> Use numbers expressed in the form of a single digit times an integer power of 10 to 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 3 times <math>10^8</math> and the population of the world as 7 times <math>10^9</math>, and determine that the world population is more than 20 times larger.</i>  <b>8.EE.4</b> Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology</p> <p><b>Secondary(Supportive):</b></p> <p><u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> </ol>	<ul style="list-style-type: none"> <li>• Students will be able to convert numbers between scientific notation and standard form, as well as perform different operations within equations.</li> </ul>	<p>Communicate precisely using appropriate mathematical language. The terms students will learn to use with increasing precision within this unit are: <b>scientific notation, coefficient, base, power.</b></p> <p>Read numbers in scientific notation.</p> <p>Estimate large or small quantities.</p> <p>Choose units of appropriate size.</p> <p>Convert numbers into standard form.</p> <p>Convert numbers into scientific notation.</p> <p>Compare numbers in scientific notation.</p> <p>Interpret scientific notation generated by technology.</p> <p>9. Add, subtract, multiply and divide numbers written in scientific notation.</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>4. Model with mathematics.</p> <p>5. Use appropriate tools strategically.</p> <p>6. Attend to precision.</p> <p>7. Look for and make use of structure.</p> <p>8. Look for and express regularity in repeated reasoning.</p>		

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
<p>Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts &amp; Reflections, Constructive Quizzes, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts &amp; Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey &amp; Defend Your Answer, Comments Only Marking</p>	<p>Unit Tests, Extended Constructed Responses Questions, Projects, Quizzes, Graded Homework</p>		<p>Skill Check Quizzes Choice Menu Essential Vocabulary Quizzes</p> <ul style="list-style-type: none"> <li>• Math With Pizzazz! Scientific Notation Puzzles</li> </ul>

**Possible Assessment Modifications /Accommodations:**

Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet, Scientific Notation Graphic Organizer/Chart, Modified Grading (Retake Opportunities)

**Instructional Strategies (refer to *Robert Marzano's 41 Elements*):**

Differentiation Strategies:

- Multiple means to present content - Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites, Interactive *NearPod* Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Performance Tasks & Classroom Challenges (Estimating Length Using Scientific Notation)

Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, Examining Similarities and Differences, Examining Errors in Reasoning (“My Favorite No” and Misconception Check), Practicing Skills, Strategies and Processes, Engaging Students in Cognitively Complex Tasks Involving Hypothesis Generation and Testing, Exit Slips, Think-Pair-Share, Turn to You Partner, Games & Tournaments, Cooperative Groups, Math Stations, Guided Practice, Think-Pair-Share, Cooperative Groups, Differentiation, Instructional Scaffolds, Using Manipulatives and Other Tools, Making Cross-Curricular Connections

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills, Review and Re-teaching of Difficult Concepts

**Unit Vocabulary:**

**Essential:** scientific notation, standard form

**Non-Essential:** coefficient, base, power, exponent

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Mathematics:  Science: 5.4.8.A.3, 5.4.8.A.4  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers: 9.1.4.A.1, 9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1  Library:	Technology:  Students may be provided an opportunity to use interactive software such as the NearPod, LearnZillion or KhanAcademy apps for iPads to perform formative assessments. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize, Sumdog.com, or Arcademicskillbuilders.com where students can engage in interactive practice.	<input checked="" type="checkbox"/> Global Awareness  <input checked="" type="checkbox"/> Civic Literacy  <input type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy  <input type="checkbox"/> Health Literacy	<input checked="" type="checkbox"/> Creativity & Innovation  <input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input type="checkbox"/> Information & Communication Technologies Literacy  <input checked="" type="checkbox"/> Communication & Collaboration  <input type="checkbox"/> Information Literacy

Resources:
<b>Texts/Materials:</b> <ul style="list-style-type: none"> <li>• Jump Math 8.1 &amp; 8.2</li> <li>• Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lesson <a href="http://map.mathshell.org/">http://map.mathshell.org/</a></li> <li>• New Jersey Resource Exchange <a href="http://njcore.org/">http://njcore.org/</a></li> <li>• Resources from Other State Sites:             <ul style="list-style-type: none"> <li>○ <b>Visualizing Mathematics (Kentucky)</b> <a href="http://visualizingmathematics.wikispaces.com/">http://visualizingmathematics.wikispaces.com/</a></li> <li>○ <b>Common Core Math Tasks (NC)</b> <a href="http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-">http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-</a></li> </ul> </li> </ul>

**Resources:**

[Grade8.pdf](#)

- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes  
[www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):** Skill Check Quizzes

**Major Activities (required):**

<b>Unit: 4 The Pythagorean Theorem</b>	<b>Recommended Duration: [ 2-3 Weeks– December/January]</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> This unit will provide a deeper understanding of the Pythagorean Theorem and its converse for students. They will apply the theorem to problems involving right triangles that model real world problems. They will also find distances between two points.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>• What test-taking strategies, study skills, approaches to problem solving and/or math tools can I utilize to improve my mathematical precision and conceptual understanding of the Pythagorean Theorem? <ul style="list-style-type: none"> <li>• Why was the Pythagorean Theorem developed?</li> <li>• When can the Pythagorean Theorem be applied?</li> <li>• How can the Pythagorean Theorem be applied to the real world?</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>• Right triangles have a special relationship between its sides.</li> <li>• Right triangles can be used to solve many types of problems in mathematics and science.</li> <li>• The Pythagorean Theorem can be used both algebraically and geometrically to solve problems involving right triangles.</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards:</b>  <b>Primary(Power):</b></p> <p><b>8.G.6</b> Explain a proof of the Pythagorean Theorem and its converse.</p> <p><b>8.G.7</b> Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two or three dimensions.</p> <p><b>8.G.8</b> Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.</p> <p><b>Secondary(Supportive):</b></p> <p><u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> </ol>	<ul style="list-style-type: none"> <li>• Students will be able to use the Pythagorean Theorem to solve a right triangle for a missing side, find the distance between two points, and explain a proof of the Pythagorean Theorem and its converse. (8.G.6, 8.G.7, 8.G.8)</li> </ul>	<ul style="list-style-type: none"> <li>• The students will understand the development of the Pythagorean Theorem.</li> <li>• The students will be able to determine whether or not a triangle with three sides given is a right triangle.</li> <li>• The students will be able to use the Pythagorean Theorem to find the missing side of a right triangle.</li> <li>• The students will be able to apply the Pythagorean Theorem to real-world problems.</li> <li>• The students will be able to apply the Pythagorean Theorem to find the distance between two given points.</li> </ul>

<p>7. Look for and make use of structure.</p> <p>8. Look for and express regularity in repeated reasoning.</p>		
--	--	--

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
<p>Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts &amp; Reflections, Constructive Quizzes, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts &amp; Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey &amp; Defend Your Answer, Comments Only Marking</p>	<p>Extended constructed response questions, Quizzes, Graded Homework</p>	<p>Pythagorean Theorem Puzzle Proof, <u>Around the Room 3D Pythagorean Theorem</u></p>	<p>Choice Menu Essential Vocabulary Quizzes</p> <ul style="list-style-type: none"> <li>• Math with Pizzazz! (Pythagorean theorem riddle puzzles)</li> </ul>

Possible Assessment Modifications /Accommodations:
<p>Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet/Provide Formulas, Modified Grading (Retake Opportunities)</p>

**Instructional Strategies (refer to *Robert Marzano's 41 Elements*):**

**Differentiation Strategies:**

- Multiple means to present content - Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites, Interactive *NearPod* Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Performance Tasks (Finding the Shortest Routes – The School Yard Problem)

Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, Examining Similarities and Differences, Examining Errors in Reasoning (“My Favorite No” and Misconception Check), Practicing Skills, Strategies and Processes, Engaging Students in Cognitively Complex Tasks Involving Hypothesis Generation and Testing, Exit Slips, Think-Pair-Share, Turn to You Partner, Games & Tournaments, Cooperative Groups, Math Stations, Guided Practice, Think-Pair-Share, Cooperative Groups, Differentiation, Instructional Scaffolds, Using Manipulatives and Other Tools, Making Cross-Curricular Connections

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills, Review and Re-teaching of Difficult Concepts,

**Unit Vocabulary:**

**Essential:** hypotenuse, legs, square root, square, Pythagorean Theorem

**Non-Essential:** distance formula, theorem

<b>Interdisciplinary Connections (Applicable Standards):</b>	<b>Integration of Technology:</b>	<b>21<sup>st</sup> Century Themes:</b>	<b>21<sup>st</sup> Century Skills:</b>
Mathematics:	Technology:	____ Global Awareness	____ Creativity & Innovation

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Science:  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers:  Library:	Students may be provided an opportunity to use interactive software such as the NearPod, LearnZillion or KhanAcademy apps for iPads to perform formative assessments. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize, Sumdog.com, or Arcademicskillbuilders.com where students can engage in interactive practice.	<input type="checkbox"/> Civic Literacy  <input type="checkbox"/> Financial, Economic, Business,  & Entrepreneurial Literacy  <input type="checkbox"/> Health Literacy	<input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem  Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input type="checkbox"/> Information & Communication  Technologies Literacy  <input type="checkbox"/> Communication & Collaboration  <input type="checkbox"/> Information Literacy

**Resources:****Texts/Materials:** Jump Math 8.1 & 8.2

- Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <http://map.mathshell.org/>
- New Jersey Resource Exchange <http://njcore.org/>
- Resources from Other State Sites:
  - **Visualizing Mathematics (Kentucky)** <http://visualizingmathematics.wikispaces.com/>
  - **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes [www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):** Skill Check Quizzes**Major Activities (required):**

<b>Unit: 5 Solving Equations</b>	<b>Recommended Duration: [ 4-5 Weeks – January/February]</b>
----------------------------------	--

**Course Information:** The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.

**Unit Description:** Through the course of this study, students build on their knowledge of solving equations to realize that there may be a single solution, infinite solutions, or no solutions. Generalizations of form for each situation are arrived at by noticing patterns in successive simplification of equations. The focus should be on the reasoning behind a solution or solution method as well as the actual procedure for solving. For example, when solving the equation  $2 + 16 = 2 + 14$ , students could reason by inspection noting that a number 2 plus sixteen will never equal that same number 2 plus fourteen. In this case the solution method would not be procedural but conceptual justification.

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>• How do we express a relationship mathematically?</li> <li>• How do we determine the value of an unknown quantity?</li> </ul>	<ul style="list-style-type: none"> <li>• Linear equations can have one solution, infinitely many solutions, or no solution.</li> </ul>

<b>Relevant Standards:</b>	<b>Learning Goals:</b>	<b>Learning Objectives:</b>
<p><b>Content Standards:</b>  <b>Primary(Power):</b>  <b>8.EE.7</b> Solve linear equations in one variable.</p> <p>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</p>	<ul style="list-style-type: none"> <li>• Students will be able to solve equations in one variable. (8.EE.7b)</li> <li>• Students will be able to transform a formula to a different form of the formula. (8.EE.7a)</li> </ul>	<ul style="list-style-type: none"> <li>• Simplify linear expressions utilizing the distributive property and collecting like terms.</li> <li>• Create a multi-step linear equation to represent a real-life situation.</li> <li>• Solve equations with linear expressions on either or both sides including equations with</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>transforming the given equation into simpler forms, until an equivalent equation of the form <math>x = a</math>, <math>a = a</math>, or <math>a = b</math> results (where <math>a</math> and <math>b</math> are different numbers).</p> <p>b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.</p> <p><b>Secondary(Supportive):</b>  <u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure.</li> <li>8. Look for and express regularity in repeated reasoning.</li> </ol>		<p>one solution, infinitely many solutions, and no solutions</p> <ul style="list-style-type: none"> <li>• Give examples of and identify equations as having one solution, infinitely many solutions, or no solutions.</li> </ul>

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Popsicle Sticks, Thumbs Up/Thumbs Down, Stomp on Three, Student Progress Charts & Reflections, Graded Classwork Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended constructed response questions, Quizzes	Solving Equations Posters	Choice Menu Essential Vocabulary Quizzes

**Possible Assessment Modifications /Accommodations:**

Provide Formulas, Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet

**Instructional Strategies (refer to *Robert Marzano’s 41 Elements*):**

Differentiation Strategies:

- Multiple means to present content – Whiteboard Graphing Practice, Math Stations/Centers, Manipulatives, Models, Video Clips, Brain Pop (Distance Rate Time, Graphing Linear Equations, Interactive/Instructional websites, Interactive *NearPod* Presentations on iPads, Content-related songs, Khan Academy & Learn Zillion Videos, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes, Khan Academy – [rearranging formulas video](#)
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, SumDog.com, Scavenger Hunt ([Rearranging Formulas Hunt](#)) Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Partnered Equations Bingo, Show Me App, [Create-A-Cube](#), [Comic Creator](#)

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (such as combining like terms, distributive property, solving 1-step equations), Review and Re-teaching of Difficult Concepts

**Unit Vocabulary:**

**Essential:** Simplify, Distributive property, Like terms, Solution, Inverse operations

**Non-Essential:** Expand, Factor, Variable, Unknown

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Mathematics: Science: Visual and Performing Arts: Health/PE: World Languages: Social Studies: Technology: 21 <sup>st</sup> Century Life and Careers: 9.1.4.A.1, 9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1	Technology: Students may be provided an opportunity to use interactive software such as the NearPod, Show Me, LearnZillion or KhanAcademy apps for iPads to perform formative assessments. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize, where students can engage in interactive practice.	<input type="checkbox"/> Global Awareness <input type="checkbox"/> Civic Literacy <input checked="" type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy <input type="checkbox"/> Health Literacy	<input type="checkbox"/> Creativity & Innovation <input type="checkbox"/> Media Literacy <input checked="" type="checkbox"/> Critical Thinking and Problem Solving <input checked="" type="checkbox"/> Life and Career Skills <input type="checkbox"/> Information & Communication Technologies Literacy <input checked="" type="checkbox"/> Communication & Collaboration <input type="checkbox"/> Information Literacy

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Library:			

Resources:
<p><b>Texts/Materials:</b></p> <p>Jump Math 8.1 &amp; 8.2</p> <ul style="list-style-type: none"> <li>• Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <a href="http://map.mathshell.org/">http://map.mathshell.org/</a></li> <li>• New Jersey Resource Exchange <a href="http://njcore.org/">http://njcore.org/</a></li> <li>• SAS Curriculum Pathways <a href="http://www.sascurriculumpathways.com">http://www.sascurriculumpathways.com</a> (EXPLORING RATES OF CHANGE)</li> <li>• Resources from Other State Sites: <ul style="list-style-type: none"> <li>○ <b>Visualizing Mathematics (Kentucky)</b> <a href="http://visualizingmathematics.wikispaces.com/">http://visualizingmathematics.wikispaces.com/</a></li> <li>○ <b>Common Core Math Tasks (NC)</b> <a href="http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf">http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf</a></li> </ul> </li> <li>• NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork &amp; Homework Problems and Quizzes <a href="http://www.njctl.org">www.njctl.org</a></li> <li>• Glencoe Mathematics Applications and Concepts (Course 3)</li> </ul> <p><b>Major Assignments (required):</b> Solving Equations Posters</p> <p><b>Major Activities (required):</b></p>

<b>Unit: 6a- Graphing Linear Equations &amp; Unit: 6b – Systems of Equations</b>	<b>Recommended Duration: 8-9 weeks – February / March / April</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> In this unit, students will apply algebraic reasoning and the concepts of linear functions, slope and proportional relationships to build a strong algebraic foundation. Through the exploration of functions, students will recognize a relationship as a function when each input is assigned to exactly one output; reason from a context, a graph, or a table, and explain how to verify that for each input there is exactly one output. The mastery of these skills and concepts will allow students to translate functions numerically, graphically, verbally, and algebraically. This unit examines the characteristic of linear functions and requires students to determine if a function is linear or non-linear. Students will also compare two linear functions and determine which equation represents a greater rate of change. Students will explore real-world applications of slope by graphing proportional relationships and interpreting unit rate as the slope and through the comparison of two different proportional relationships represented in different ways. Students will apply knowledge of similar triangles to explain why the slope is the same between any two points on a non-vertical line. Slope-intercept form will be a main focus in this unit as students derive the equations for lines and interpret equations in <math>y = mx + b</math> form as linear functions.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<p>How can the same mathematical idea be represented in a different way? Why would that be useful?</p> <p>When and how can a graph of a proportional relationship be helpful? How can you recognize a linear equation? How can you draw its graph?</p> <p>How are equations in the form <math>y = mx</math> similar to equations in the form <math>y = mx + b</math>? How do you know when to use each form?</p> <p>What does the slope of a line tell me about the unit rate?</p> <p>What is the solution to a system of equations?</p> <p>How can you utilize systems of equations to solve real-world problems?</p>	<p>Several ways of reasoning, all grounded in sense making, can be generalized into algorithms for solving proportion problems.</p> <p>The unit rate can be interpreted as the slope of the graph in proportional relationships.</p> <p>The equation <math>y = mx + b</math> can be derived for a line intercepting the vertical axis at <math>b</math>.</p> <p>Knowledge of systems of equations can be applied to real-world situations.</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards:</b></p> <p><b>Primary(Power):</b>  <b>8.EE.B.5</b>            Graph proportional relationships, interpreting the unit rate as the slope of the 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.</p> <p><b>8.EE.B.6</b>            Use similar triangles to explain why the slope <math>m</math> is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation <math>y = mx</math> for a line through the origin and the equation <math>y = mx + b</math> for a line intercepting the vertical axis at <math>b</math>.</p> <p><b>8.EE.8.A</b>            Understand that 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.</p> <p><b>8.EE.8.B</b>            Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by</p>	<ul style="list-style-type: none"> <li>• Students will be able to compare and contrast proportional relationships, lines and linear equations and apply the concepts of slope to linear equations.</li> <li>• Students will be able to analyze and solve systems of equations.</li> </ul>	<p>Communicate precisely using appropriate mathematical language. The terms students will learn to use with increasing precision within this unit are: coefficient, linear equation, solution, ordered pair, coordinates, slope, rise, run, similar triangles, parallel, perpendicular, direct variation, proportion, ratios, constant of proportionality, unit rate, x-intercept, y-intercept, slope-intercept form, standard form.</p> <p>Graph a linear equation using a function table</p> <p>Calculate the slope of a line.</p> <p>Interpret unit rate as slope.</p> <p>Use similar triangles to explain slope of a line.</p> <p>Compare proportional relationships given in different ways (a graph vs. an equation).</p> <p>Sketch a graph that represents a situation.</p> <p>Graph linear equations using <math>y = mx + b</math></p> <p>Convert the equation of a line from standard form to slope intercept form.</p> <p>Derive the equation <math>y = mx+b</math> for a line.</p> <p>Graph two linear equations to locate the point of intersection and explain what that point means.</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>inspection. For example, <math>3x + 2y = 5</math> and <math>3x + 2y = 6</math> have no solution because <math>3x + 2y</math> cannot simultaneously be 5 and 6.</p> <p><b>8.EE.8.C</b> Solve real-world and mathematical problems leading to two linear equations in two variables. For example, given coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.</p> <p><b>Secondary(Supportive):</b> <u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure.</li> <li>8. Look for and express regularity in repeated reasoning.</li> </ol>		<p>Classify solutions</p> <ol style="list-style-type: none"> <li>a. 1 solution</li> <li>b. Infinitely many solutions</li> <li>c. No solution</li> </ol> <p>Solve systems of equations using elimination.</p> <p>Solve systems of equations using substitution.</p> <p>Solve word problems using systems of equations.</p> <p>Analyze a real world problem and <u>determine the best method</u> to solve a system of equations.</p>

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Slope Stories, Slope Foldable, Graphing Activities, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended Constructed Responses Questions, Projects, Quizzes, Graded Homework	<ul style="list-style-type: none"> <li>• Text Messaging Rates Assignment</li> <li>• Between the Lines Graphing Assignment</li> <li>• Matching Graphs &amp; Equations Cooperative Activity</li> <li>• <u>Talk or Text Illuminations Assignment</u></li> </ul>	Choice Menu Essential Vocabulary Quizzes <ul style="list-style-type: none"> <li>• TI Graphing Calculator Activities with motion and temperature sensors</li> </ul>

**Possible Assessment Modifications /Accommodations:**

Provide Formulas, Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet

**Instructional Strategies (refer to *Robert Marzano’s 41 Elements*):**

Differentiation Strategies:

- Multiple means to present content - Real-World Situations for Linear Equations, Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites (Learn Zillion), Interactive *NearPod* Presentations on iPads, Content-related songs (Slope Official Video, Flocabulary Slope), Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes, Systems Review Game
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Alternative Assessments, Mathematics Assessment Project Classroom Challenge for Systems of Equations, Performance Tasks (Baseball Jerseys Systems of Equations Project)

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (such as setting up graphs, solving proportions and calculating unit rate), Review and Re-teaching of Difficult Concepts

**Unit Vocabulary:**

**Essential:** linear equation, solution, ordered pair, slope, rise, run, similar triangles, parallel, perpendicular, proportion, unit rate, x-intercept, y-intercept, slope-intercept form, standard form

**Non-Essential:** coefficient, coordinates, ratios, direct variation, constant of proportionality

<b>Interdisciplinary Connections (Applicable Standards):</b>	<b>Integration of Technology:</b>	<b>21<sup>st</sup> Century Themes:</b>	<b>21<sup>st</sup> Century Skills:</b>
Mathematics:  Science:  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers: 9.1.4.A.1, 9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1	<b>Technology:</b> Students may be provided an opportunity to use interactive software such as the NearPod, Show Me, LearnZillion or KhanAcademy apps for iPads to perform formative assessments. Activities aligned with the common core standards linked to this unit may also be explored through the use of educational sites, such as LearnZillion.com and interactive mathematics sites, such as BBC Math KS3 BiteSize, where students can engage in interactive practice.	<input type="checkbox"/> Global Awareness  <input checked="" type="checkbox"/> Civic Literacy  <input checked="" type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy  <input checked="" type="checkbox"/> Health Literacy	<input checked="" type="checkbox"/> Creativity & Innovation  <input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input type="checkbox"/> Information & Communication Technologies Literacy  <input checked="" type="checkbox"/> Communication & Collaboration  <input type="checkbox"/> Information Literacy

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Library:			

**Resources:**

**Texts/Materials:**

Jump Math 8.1 & 8.2

- Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <http://map.mathshell.org/>
- New Jersey Resource Exchange <http://njcore.org/>
- SAS Curriculum Pathways <http://www.sascurriculumpathways.com> (EXPLORING RATES OF CHANGE)
- Resources from Other State Sites:
  - **Visualizing Mathematics (Kentucky)** <http://visualizingmathematics.wikispaces.com/>
  - **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes [www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):**

**Major Activities (required):**

<b>Unit: 7 Functions</b>	<b>Recommended Duration: 3 Weeks– April/May</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> Students will understand that functions describe relationships and will be able to compare and construct a function. The equation <math>y = mx + b</math> will be interpreted as a straight line, where <math>m</math> and <math>b</math> are constants. Students learn to recognize linearity in a table when constant differences between input values produce constant differences between output values, and they can use the constant rate of change and initial value appropriately in a verbal description of a context. Students will establish a routine of exploring functional relationships algebraically, graphically, and numerically in tables and verbal descriptions. When using functions to model a linear relationship between quantities, students learn to determine the rate of change of the function which is the slope of a graph.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>• What defines a function and how can it be represented?</li> <li>• What makes a function linear?</li> <li>• How can linear relationships be modeled and used in real-life situations?</li> </ul>	<ul style="list-style-type: none"> <li>• A function is a specific topic of relationship in which each input has a unique output which can be represented in a table.</li> <li>• A function can be represented graphically using ordered pairs that consist of the input and the output of the function in the form (input, output).</li> <li>• A function can be represented with an algebraic rule.</li> <li>• The equation <math>y = mx + b</math> is a straight line and that slope and <math>y</math>-intercept are critical to solving real problems involving linear relationships.</li> <li>• Changes in varying quantities are often related by patterns which can be used to predict outcomes and solve problems.</li> <li>• Linear functions may be used to represent and generalize real situations</li> </ul>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards:</b> <b>Primary(Power):</b></p> <p><b>8.F.1</b> Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.</p> <p><b>8.F.2</b> Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change.</p> <p><b>8.F.3</b> Interpret the equation <math>y = mx + b</math> as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. For example, the function <math>A = x^2</math> giving the area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line.</p> <p><b>8.F.4</b> 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</p>	<ul style="list-style-type: none"> <li>• Students will be able to define a function and compare properties of two functions each represented in a different way, and interpret the equation <math>y = mx + b</math> as defining a linear relationship between the two quantities. (8.F.1,8.F.2, 8.F.3)</li> <li>• Students will be able to construct a function to model linear relationships and describe qualitatively the function relationship between two quantities by analyzing a graph. (8.F.4, 8.F.5)</li> </ul>	<p>Verify that a relationship is a function or not.</p> <p>Reason from a context, graph, or table after knowing which quantity is the input and which is the output.</p> <p>Represent and compare functions numerically, graphically, verbally and algebraically.</p> <p>Interpret equations in <math>y = mx + b</math> form as a linear function.</p> <p>Determine whether a function is linear or non-linear.</p> <p>Identify and contextualize the rate of change and the initial value from tables, graphs, equations, or verbal descriptions.</p> <p>Construct a model for a linear function.</p> <p>Describe the qualities of a function using a graph (e.g., where the function is increasing or decreasing).</p> <p>Sketch a graph when given a verbal description of a situation.</p> <p>Use similar triangles to explain why the slope <math>m</math> is the same between any two distinct points on a non-vertical line in the coordinate plane.</p> <p>Derive the equation <math>y = mx + b</math> for a line through the origin.</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>from two <math>(x, y)</math> 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.</p> <p><b>8.F.5</b> 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.</p> <p><b>Secondary(Supportive):</b>  <u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure.</li> <li>8. Look for and express regularity in repeated</li> </ol>		

Relevant Standards:	Learning Goals:	Learning Objectives:
reasoning.		

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Graphing Activities, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended Constructed Responses Questions, Projects, Quizzes, Graded Homework, Learning Menus		Essential Vocab Quizzes <ul style="list-style-type: none"> <li>JUMP math input/output skills work</li> </ul>

Possible Assessment Modifications /Accommodations:
Provide Formulas, Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet

Instructional Strategies (refer to <i>Robert Marzano’s 41 Elements</i> ):
<p><b>Differentiation Strategies</b></p> <ul style="list-style-type: none"> <li><u>Multiple means to present content</u> - Math Stations/Centers, Manipulatives, Models, Video Clips, Interactive/Instructional websites (Learn Zillion), Interactive <i>NearPod</i> Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities, Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes</li> <li><u>Multiple means for students to demonstrate conceptual understanding &amp; skill acquisition</u> - Choice Assignments, Learning Menus / Choice Boards, Games &amp; Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Mathematics Assessment Project – Classroom Challenge – <u>Interpreting Distance Time Graphs</u>, Performance Tasks (<u>Generalizing Patterns: The Difference of Two Squares</u>, <u>Buying Cars</u>)</li> </ul>

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (such as setting up graphs, solving proportions and calculating unit rate), Review and Re-teaching of Difficult Concepts

**Unit Vocabulary:**

**Essential:** Function, Graph of a function, Domain, Range

**Non-Essential:** Input/output, Ordered pairs/coordinate plane, Slope, Rate of change, Unit rate, Linear/non-linear

<b>Interdisciplinary Connections (Applicable Standards):</b>	<b>Integration of Technology:</b>	<b>21<sup>st</sup> Century Themes:</b>	<b>21<sup>st</sup> Century Skills:</b>
Mathematics:  Science:  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers:  Library:	Technology:	<input type="checkbox"/> Global Awareness  <input type="checkbox"/> Civic Literacy  <input type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy  <input type="checkbox"/> Health Literacy	<input type="checkbox"/> Creativity & Innovation  <input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input type="checkbox"/> Information & Communication Technologies Literacy  <input type="checkbox"/> Communication & Collaboration  <input type="checkbox"/> Information Literacy

**Resources:****Texts/Materials:**

Jump Math 8.1 & 8.2

- Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <http://map.mathshell.org/>
- New Jersey Resource Exchange <http://njcore.org/>
- Resources from Other State Sites:
  - **Visualizing Mathematics (Kentucky)** <http://visualizingmathematics.wikispaces.com/>
  - **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes [www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):****Major Activities (required):**

<b>Unit: 8 - Graphing Linear Equations</b>	<b>Recommended Duration: 3-4 weeks – May</b>
--	--

**Course Information:** The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.

**Unit Description:** In this unit, students will explore patterns in bivariate data. Data will be organized into scatter plots and two-way tables. Students will seek to not only construct but also interpret data in order to draw conclusions and make predictions. Students will analyze data to derive a line of best fit on scatter plots and be able to calculate relative frequencies in two-way tables. The use of equations to solve problems and model real-world applications will require critical thinking and the use of abstract and quantitative reasoning. This unit draws heavily on the standards of mathematical practices.

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
-----------------------------	---------------------------------

- Why is it important to organize data into visual representations?
- How can you display data in a way that helps you make a decision?
- What kind of patterns can be found in bivariate data?
- How can you use data and lines of best fit to make predictions?

- When data is organized into tables and/or graphs, associations become apparent and conclusions can be drawn based on the visual model of the data.
- Data can be characterized as having a positive association, negative association, a linear or nonlinear relationship or even no correlation.
- A line of fit can be used to estimate and predict the results of events.

Relevant Standards:	Learning Goals:	Learning Objectives:
<p><b>Content Standards:</b></p> <p><b>Primary(Power):</b></p> <p><b>Secondary(Supportive):</b></p> <ul style="list-style-type: none"> <li>• 8.SP.1 - Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.</li> <li>• 8.SP.2 - Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line.</li> <li>• 8.SP.3 - Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr. as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.</li> <li>• 8.SP.4 - Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table</li> </ul>	<ol style="list-style-type: none"> <li>1. Students will be able to construct and interpret scatter plots and linear models to assess a line of best fit. (8.SP.1-3)</li> <li>2. Students will be able to investigate patterns of association in bivariate data using two-way tables. (8.SP.4)</li> </ol>	<p>Make a scatter plot.</p> <p>Describe the relationship between the data using these key terms:</p> <ol style="list-style-type: none"> <li>a. Positive Linear</li> <li>b. Negative Linear</li> <li>c. Nonlinear</li> <li>d. No Relationship</li> <li>e. Clustering, Outliers</li> </ol> <p>Recognize when a scatter plot is a useful tool for making a prediction (MP 5).</p> <p>Find lines of fit (MP 4).</p> <p>Write an equation of the line of best fit.</p> <p>Interpret the slope and y-intercept.</p> <p>Use the line of best fit to solve problems and make predictions.</p> <p>Read a two-way table and find the relative frequencies.</p> <p>Make and interpret a two-way table.</p> <p>Analyze a two-way table.</p>

Relevant Standards:	Learning Goals:	Learning Objectives:
<p>summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew.</p> <p><u>Standards of Mathematical Practice:</u></p> <ol style="list-style-type: none"> <li>1. Make sense of problems and persevere in solving them.</li> <li>2. Reason abstractly and quantitatively.</li> <li>3. Construct viable arguments and critique the reasoning of others.</li> <li>4. Model with mathematics.</li> <li>5. Use appropriate tools strategically.</li> <li>6. Attend to precision.</li> <li>7. Look for and make use of structure.</li> <li>8. Look for and express regularity in repeated reasoning.</li> </ol>		

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Scatter Plots, Two-Way Tables, Graphing Activities, Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended Constructed Responses Questions, Projects, Quizzes,		<ul style="list-style-type: none"> <li>Unit 8 ~ “What’s the Stat?” UDL Learning Menu</li> <li>Data Project</li> </ul>

**Possible Assessment Modifications /Accommodations:**

Provide Formulas, Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet

**Instructional Strategies (refer to *Robert Marzano’s 41 Elements*):**

**Differentiation Strategies**

- Multiple means to present content - Math Centers, Manipulatives (spaghetti noodles for line of best fit), Models (everyday data for scatter plots & two-way tables; survey your class), Video Clips, Interactive/Instructional websites ([NY Times Rock Paper Scissors Interactive for Two-Way Tables](#)), Interactive *NearPod* Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities ([Rolling Car Matchbox Lab](#), [Bouncing Balls Lab](#), [Rock Paper Scissors](#)), Problem-Based Discovery Activities, My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes
- Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments, Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer, Performance Tasks ([Hand Span & Height](#), [Texting & Grades](#), [Laptop Battery Charge](#), [Drug Dosages](#), [Sports & Music](#))

**General Strategies:**

Math Stations, Guided Practice, Think-Pair-Share, Cooperative Groups, Differentiation, Instructional Scaffolds, Using Manipulatives and Other Tools, Making Cross-Curricular Connections, Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, (Graphic Organizers), Examining Errors in Reasoning (“My Favorite No”), Technology to Enhance Instruction: [Scatter Plot Generator](#), Learn Zillion,

**Instructional Strategies (refer to *Robert Marzano's 41 Elements*):**

Khan Academy, SumDog.com, Video Clips, Content-Related Songs, Exit Slips, Turn to You Partner

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, "Interleave"-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (such as setting up graphs, solving proportions and calculating unit rate), Review and Re-teaching of Difficult Concepts

**Unit Vocabulary:**

**Essential:** scatter plot, two-way table, line of best fit, frequency, relative frequency, positive relationship, negative relationship, nonlinear relationship, no relationship (no correlation), linear equation, slope, rise, run, y-intercept, slope-intercept form

**Non-Essential:** modeling, data, coefficient, coordinates, solution, ordered pair, function

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
Mathematics:  Science:  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers: 9.1.4.A.1,	Technology:  Students may utilize Microsoft Excel for Data Project. In addition, students may be introduced to line of best fit for online tools and graphing calculator applications for scatter plots and linear equations.	<input checked="" type="checkbox"/> Global Awareness  <input checked="" type="checkbox"/> Civic Literacy  <input checked="" type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy  <input checked="" type="checkbox"/> Health Literacy	<input checked="" type="checkbox"/> Creativity & Innovation  <input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input checked="" type="checkbox"/> Information & Communication Technologies Literacy  <input checked="" type="checkbox"/> Communication & Collaboration

Interdisciplinary Connections (Applicable Standards):	Integration of Technology:	21 <sup>st</sup> Century Themes:	21 <sup>st</sup> Century Skills:
9.1.4.A.5, 9.1.12.A.1, 9.1.8.A.2, 9.1.4.B.1, 9.1.8.B.1  Library:			✓ Information Literacy

Resources:
<p>Jump Math 8.1 &amp; 8.2</p> <ul style="list-style-type: none"> <li>• Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <a href="http://map.mathshell.org/">http://map.mathshell.org/</a></li> <li>• New Jersey Resource Exchange <a href="http://njcore.org/">http://njcore.org/</a></li> <li>• SAS Curriculum Pathways <a href="http://www.sascurriculumpathways.com">http://www.sascurriculumpathways.com</a> (EXPLORING RATES OF CHANGE)</li> <li>• Resources from Other State Sites: <ul style="list-style-type: none"> <li>○ <b>Visualizing Mathematics (Kentucky)</b> <a href="http://visualizingmathematics.wikispaces.com/">http://visualizingmathematics.wikispaces.com/</a></li> <li>○ <b>Common Core Math Tasks (NC)</b> <a href="http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf">http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf</a></li> </ul> </li> <li>• NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork &amp; Homework Problems and Quizzes <a href="http://www.njctl.org">www.njctl.org</a></li> <li>• Glencoe Mathematics Applications and Concepts (Course 3)</li> </ul> <p><b>Major Assignments (required):</b></p> <p><b>Major Activities (required):</b> Unit 8 Data Project</p>

<b>Unit: 9 3-D Geometry</b>	<b>Recommended Duration: [4Weeks– May- June]</b>
<p><b>Course Information:</b> The purpose of this course is to offer additional assistance to students who are expected to have difficulty in achieving a passing score on the PARCC exam. Students who do not meet the Minimal Level of Proficiency on the PARCC 7 (formerly the NJASK 7) will be assigned this course in place of an elective and will be required to take this course in addition to a regularly assigned math course. This program will cover many of the same concepts taught in the Pre-Algebra 8 course, but will enable the students to study the concepts in more depth and in a small-group setting. This course reviews and reinforces skills that will be necessary to successfully pass the PARCC 8. These skills will include order of operations, expressions, calculator skills, geometry, algebra concepts, number theory, and data analysis. Test-taking skills and practice with responses to open-ended questions will be reviewed as they apply to the PARCC 8.</p> <p><b>Unit Description:</b> Through application in real-world contexts, students learn the volume formulas for cylinders, cones and spheres. They then apply these formulas to not only find the volume of objects, but also missing dimensions such as the radius or height.</p>	

<b>Essential Questions:</b>	<b>Enduring Understandings:</b>
<ul style="list-style-type: none"> <li>How do we determine the volume of rounded objects?</li> </ul>	<ul style="list-style-type: none"> <li>Rounded object volume can be calculated with specific formulas.</li> <li>Pi is necessary when calculating volume of rounded objects.</li> </ul>

<b>Relevant Standards:</b>	<b>Learning Goals:</b>	<b>Learning Objectives:</b>
<p><b>Content Standards:</b>  <b>Primary(Power):</b>  <b>8.G.9</b> Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.</p> <p><b>Secondary(Supportive):</b></p> <p><u>Standards of Mathematical Practice:</u>  1. Make sense of problems and persevere in solving them.</p>	<p>1. Students will know the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (8. G. 9)</p>	<ol style="list-style-type: none"> <li>Find the volume of rounded objects in real-world contexts.</li> <li>Give volume in terms of <math>\pi</math> and using <math>\pi \approx 3.14</math> or <math>\frac{22}{7}</math></li> <li>Find a missing dimension given the volume of rounded object.</li> </ol>

Relevant Standards:	Learning Goals:	Learning Objectives:
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. 7. Look for and make use of structure. 8. Look for and express regularity in repeated reasoning.		

Formative Assessments	Summative Assessments:	Performance Assessments:	Major Activities/ Assignments (required):
Teacher Observation, Class Participation, Warm Ups, Homework, Exit Slips, Status Checks, Student Progress Charts & Reflections, Constructive Quizzes, My Favorite No, Classroom Shuffle, Math “Debates”, Sorting Tasks, Class Survey & Defend Your Answer, Comments Only Marking	Extended constructed response questions, Quizzes, Graded Homework, Poster Project	Volume Competition Project	

**Possible Assessment Modifications /Accommodations:**

Provide Formulas, Word Banks, Calculators, Bold Key Words within Questions, Reduce Answer Choices, Extended Time, Small Group Setting, Rephrase Questions, Reword Problems, Read Question and/or Answer Choices, Provide Examples within Assessment, Alternate Testing Location, Reference Sheet

**Instructional Strategies (refer to Robert Marzano's 41 Elements):****Differentiation Strategies**

Multiple means to present content - Math Stations/Centers, Manipulatives – Use of coins to represent different diameters, coins from various countries, *Geometric Solids & Nets Concrete Models & Everyday Examples*, Video Clips, Interactive/Instructional websites (*Volume Interactive Intro; Cylinders Cylinder Interactive Lesson, Cylinder Capacity Interactive*), Interactive NearPod Presentations on iPads, Content-related songs, Direct Instruction, Guided Practice, Independent-Paced Practice, Kinesthetic Activities, Group Investigation, Math Laboratory Activities Problem-Based Discovery Activities (*Derive formula for a cone by measuring rice and pouring into a cylinder*), My Favorite No, Misconception Checks, Three-Act-Lessons (to drive conceptual understanding), Small Group Instruction using feedback from Formative Assessments and MAP data, SLOT (spaced-learning over time), Instructional Scaffolding for problem-solving and mathematical processes

Multiple means for students to demonstrate conceptual understanding & skill acquisition - Choice Assignments, Learning Menus / Choice Boards, Games & Tournaments (*Volume Container Competition-cylinder, cones, spheres*), Comments-Only Grading, Math Debates, Classroom Shuffle, Sorting Tasks, Class Surveys / Defend Your Answer; Volume Performance Tasks (*Comparing Snow Cones, Glasses, Flower Vases, Shipping Rolled Oats*)

**General Strategies**

Math Stations, Guided Practice, Think-Pair-Share, Cooperative Groups, Differentiation, Instructional Scaffolds, Using Manipulatives and Other Tools, Making Cross-Curricular Connections, Celebrating Success, Chunking Content into Digestible Bites, Recording and Representing Knowledge, Reviewing Content, Using Homework, (Graphic Organizers), Examining Errors in Reasoning (“My Favorite No”), Technology to Enhance Instruction: Video Clips, Content-Related Songs, Exit Slips, Turn to You Partner

**Possible Instructional Modifications /Accommodations/Differentiation:**

Individualized Instructional Scaffolds, “Interleave”-style Homework Assignments (solutions are made available to students at home to utilize as references for homework assignments), Calculators, Small Group Review of Pre-Requisite Skills (*finding area, identify radius, diameter, estimating pi*), Review and Re-teaching of Difficult Concepts, Identify Common Errors (*square the radius, take half of the diameter, solving in terms of pi*)

**Unit Vocabulary:****Essential:** Volume, sphere, cone, cylinder, radius, cubic units**Non-Essential:** pi, diameter, height

<b>Interdisciplinary Connections (Applicable Standards):</b>	<b>Integration of Technology:</b>	<b>21<sup>st</sup> Century Themes:</b>	<b>21<sup>st</sup> Century Skills:</b>
Mathematics:  Science:  Visual and Performing Arts:  Health/PE:  World Languages:  Social Studies:  Technology:  21 <sup>st</sup> Century Life and Careers:  Library:	<b>Technology:</b>  Students will use virtual models of 3D objects and teachers may use interactive websites to supplement instruction (see instructional strategies for specific websites).	<input checked="" type="checkbox"/> Global Awareness  <input type="checkbox"/> Civic Literacy  <input type="checkbox"/> Financial, Economic, Business, & Entrepreneurial Literacy  <input type="checkbox"/> Health Literacy	<input type="checkbox"/> Creativity & Innovation  <input type="checkbox"/> Media Literacy  <input checked="" type="checkbox"/> Critical Thinking and Problem Solving  <input checked="" type="checkbox"/> Life and Career Skills  <input type="checkbox"/> Information & Communication Technologies Literacy  <input type="checkbox"/> Communication & Collaboration  <input type="checkbox"/> Information Literacy

**Resources:**

Jump Math 8.1 &amp; 8.2

- Mathematics Assessment Project ASSESSING 21<sup>ST</sup> CENTURY MATH Formative Assessment Lessons <http://map.mathshell.org/>
- New Jersey Resource Exchange <http://njcore.org/>

**Resources:**

- SAS Curriculum Pathways <http://www.sascurriculumpathways.com> (EXPLORING RATES OF CHANGE)
- Resources from Other State Sites:
  - **Visualizing Mathematics (Kentucky)** <http://visualizingmathematics.wikispaces.com/>
  - **Common Core Math Tasks (NC)** <http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/460716114/CCSSMathTasks-Grade8.pdf>
- NJCTL Progressive Mathematics Initiative (PMI) Presentations Notes, Classwork & Homework Problems and Quizzes  
[www.njctl.org](http://www.njctl.org)
- Glencoe Mathematics Applications and Concepts (Course 3)

**Major Assignments (required):****Major Activities (required):**