Subject: Mathematics 12-13	**Timeframe Needed for Completion:** 8 weeks
Grade Level: 8th	**Grading Period: 1st Nine weeks**
Unit Title: Number and Operations	

Big Idea/Theme: Is it Reasonable?

Understandings:

- Operations with integers
- Solving one-step equations, multi-step equations, variables on both sides
- Operations with real numbers
- Evaluating expressions with powers and exponents (including scientific notation)
- Rules for powers and exponents
- Classify real numbers.
- Using cube roots and square roots
- Solving systems of equations
- Think flexibly when encountering problems with real numbers.

Essential Questions:

How do you use a number line to compare the size of 2 irrational numbers?

How do you use scientific notation outside of the mathematics classroom?

What types of numbers are perfect squares and non perfect squares?

How can you apply the law of exponents to the real world?

How do you solve a linear equation algebraically with one solution or no solutions?

Guiding Questions:

How do you determine which categories a real number fits?

8.NS.1 Know that there are numbers that are not rational, and approximate them by rational numbers. Understand informally that every number has a decimal expansion; the rational numbers are those with decimal expansions that terminate in 0s or eventually repeat. Know that other numbers are called irrational.

8.NS.2 Know that there are numbers that are not rational, and approximate them by rational numbers. 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.

Is it possible for a number to be both rational and irrational?
What is the difference between a rational number and an irrational number?
Why solve equations?
How do you determine what steps to use when solving an equation/inequality?
How do you know when you have solved an equation correctly?
What are opposite operations?
What operation is opposite of square root? How do you know?
What operation is opposite of cubing a number? How do you know?

8.EE.1 Work with radicals and integer exponents. Know and apply the properties of integer exponents to generate equivalent numerical expressions. (from Algebra 1)

8.EE.2 Work with radicals and integer exponents. Use square root and cube root symbols to represent solutions to the equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational.

8.EE.3 Work with radicals and integer exponents. 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. (moved from 6th grade)

8.EE.4 Work with radicals and integer exponents. 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. Interpret scientific notation that has been generated by technology. (from Algebra 1)

8.EE.7 Give examples of linear equations in one variable with one solution, infinitely many solutions or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form x = a, a =

	a, or a = b results (where a and b are different numbers). Solve linear equations with rational number coefficient, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
	8.EE.8 Analyze and solve pairs of simultaneous linear equations. 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. Solve real-world and mathematical problems leading to two linear equations in two variables.

Essential Skills/Vocabulary:

Vocabulary	Essential Skills	Assessment Tasks:
Rational number Irrational number Decimal Repeating decimal Non—terminating decimal Approximation Greater than Less than Radical Square root Base Exponent	• Estimate radical numbers to the nearest integer and between two integers. • Order real numbers. • Classify real numbers into rational and irrational. • Determine factors and multiples of sets of numbers • Solve real-world word problems involving rational numbers • Simplify radical expressions • Determine when two radical expressions are equivalent	Class Discussions Learning Logs Cornell Notes Think-Pair-Share Assessment Tasks con't: Concept Maps Graphic Organizers/Venn Diagrams Graphic Organizers/Venn Diagrams Interactive Notebook Group work Projects

Integer Expression Monomial Coefficient Numerical expression Cube root Squared Cubed Solution Perfect square Perfect cube Exponent Inverse operation Index Rational Irrational Scientific Notation Magnitude Standard Form Estimate Expand Decimal notation Powers of 10 Equation Variable Infinite solution Linear No solution Inverse operation Distributive property Combine like terms Distributive property Combine like terms Coefficient Inverse operations Equations Rational numbers	Problem Solving Skills • guess and test • make a table/chart/ • make a diagram/picture • make an organized list • work backwards • work a simpler problem • extraneous information	Quick writes Foldables RAFTS

System of equations Solution Point of intersection Elimination Substitution Algebraically Graphically One solution No solution Infinitely many solutions Systems of equations		

Materials Suggestions:

NCDPI Resources:

> http://www.ncpublicschools.org/curriculum/mathematics/middlegrades/grade08/
>
> http://mathlearnnc.sharpschool.com/cms/One.aspx?portalId=4507283&pageId=5149151

National Library of Manipulatives

> http://nlvm.usu.edu/en/nav/vlibrary.html

NCTM Illuminations

> http://illuminations.nctm.org/

Lesson Plan sites and Activities:

> http://www.lessonplanspage.com/Math.htm
>
> http://www.ilovemath.org

Math Graphic Organizers

> http://www.enchantedlearning.com/graphicorganizers/math/

Problem Solving/Problem Websites

http://library.thinkquest.org/25459/learning/problem/

http://www.geom.uiuc.edu/~lori/mathed/problems/problist.html

http://www.rhlschool.com/math.htm

http://nces.ed.gov/nationsreportcard/itmrlsx/search.aspx

Currituck County Website-Common Core Resources
http://www.currituck.k12.nc.us/Page/3021

AVID Library/Mathematics Write Path Books I and II