Standards for Mathematical Practice – Grade 8

Standards for Mathematical Practice	Explanations and Examples
1. Make sense of problems and persevere in solving them.	In grade 8, students solve real world problems through the application of algebraic and geometric concepts. Students seek the meaning of a problem and look for efficient ways to represent and solve it. They may check their thinking by asking themselves, "What is the most efficient way to solve the problem?", "Does this make sense?", and "Can I solve the problem in a different way?"
2. Reason abstractly and quantitatively.	In grade 8, students represent a wide variety of real world contexts through the use of real numbers and variables in mathematical expressions, equations, and inequalities. They examine patterns in data and assess the degree of linearity of functions. Students contextualize to understand the meaning of the number or variable as related to the problem and decontextualize to manipulate symbolic representations by applying properties of operations.
3. Construct viable arguments and critique the reasoning of others.	In grade 8, students construct arguments using verbal or written explanations accompanied by expressions, equations, inequalities, models, and graphs, tables, and other data displays (i.e. box plots, dot plots, histograms, etc.). They further refine their mathematical communication skills through mathematical discussions in which they critically evaluate their own thinking and the thinking of other students. They pose questions like "How did you get that?", "Why is that true?" "Does that always work?" They explain their thinking to others and respond to others' thinking.
4. Model with mathematics.	In grade 8, students model problem situations symbolically, graphically, tabularly, and contextually. Students form expressions, equations, or inequalities from real world contexts and connect symbolic and graphical representations. Students solve systems of linear equations and compare properties of functions provided in different forms. Students use scatterplots to represent data and describe associations between variables. Students need many opportunities to connect and explain the connections between the different representations. They should be able to use all of these representations as appropriate to a problem context.
5. Use appropriate tools strategically.	Students consider available tools (including estimation and technology) when solving a mathematical problem and decide when certain tools might be helpful. For instance, students in grade 8 may translate a set of data given in tabular form to a graphical representation to compare it to another data set. Students might draw pictures, use applets, or write equations to show the relationships between the angles created by a transversal.
6. Attend to precision.	In grade 8, students continue to refine their mathematical communication skills by using clear and precise language in their discussions with others and in their own reasoning. Students use appropriate terminology when referring to the number system, functions, geometric figures, and data displays.
7. Look for and make use of	Students routinely seek patterns or structures to model and solve problems. In grade 8, students apply properties to generate

structure.	equivalent expressions and solve equations. Students examine patterns in tables and graphs to generate equations and describe relationships. Additionally, students experimentally verify the effects of transformations and describe them in terms of congruence and similarity.
8. Look for and express regularity in repeated reasoning.	In grade 8, students use repeated reasoning to understand algorithms and make generalizations about patterns. Students use iterative processes to determine more precise rational approximations for irrational numbers. They analyze patterns of repeating decimals to identify the corresponding fraction. During multiple opportunities to solve and model problems, they notice that the slope of a line and rate of change are the same value. Students flexibly make connections between covariance, rates, and representations showing the relationships between quantities.

Grade 8 Critical Areas

The Critical Areas for eighth grade can be found on page 52 in the *Common Core State Standards for Mathematics.*

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**

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.

2. **Grasping the concept of a function and using functions to describe quantitative relationships**

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.

3. **Analyzing two- and three-dimensional space and figures using distance, angle, similarity, and congruence, and understanding and applying the Pythagorean Theorem**

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.

Expressions and Equations

• Work with radicals and integer exponents.

Know and apply the properties of integer exponents to generate equivalent numerical expressions. *For example, $3^2 \times$*

Student Friendly/"I Can" statements	Resources	A
1. Explain the properties of integer exponents to generate equivalent numerical expressions. For example, $3^2 \times 3^{-5} = 3^{-3} = 1/3^3 = 1/27$. 2. Apply the properties of integer exponents to produce equivalent numerical expressions.	http://nlvm.usu.edu	

Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a
Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.

Student Friendly/"I Can" statements	Resources	A
1. Explain square root and cube root. 2. Explain the rule for multiplying and dividing integers. 3. Explain the difference between rational and irrational. 4. Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. 5. Evaluate square roots of small perfect squares. 6. Evaluate cube roots of small perfect cubes. 7. Know that the square root of 2 is irrational.		

Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very smal
how many times as much one is than the other. *For example, estimate the population of the United States as 3 × 108*
world as 7 × 109, and determine that the world population is more than 20 times larger.

Student Friendly/"I Can" statements	Resources	A
1. Express numbers as a single digit times an integer power of 10. 2. Use scientific notation to estimate very large and/or very small quantities. 3. Compare quantities to express how much larger one is compared to the other.		

Perform operations with numbers expressed in scientific notation, including problems where both decimal and scien
scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g.,
seafloor spreading). Interpret scientific notation that has been generated by technology.

Student Friendly/"I Can" statements	Resources	As
1. Choose appropriate units of measure when using scientific notation. 2. Use scientific notation to express very large and very small quantities. 3. Perform operations using numbers expressed in scientific notations. 4. Interpret scientific notation that has been generated by technology.		

• **Understand the connections between proportional relationships, lines, and linear equations.**

Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proporti
represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine
objects has greater speed.*

Student Friendly/"I Can" statements	Resources	As
1. Graph proportional relationships. 2. Interpret the unit rate of proportional relationships as the slope of the graph. 3. 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.)	http://nlvm.usu.edu graph paper	

Use similar triangles to explain why the slope *m* is the same between any two distinct points on a non-vertical line in
derive the equation *y* = *mx* for a line through the origin and the equation *y* = *mx* + *b* for a line intercepting the vertica

Student Friendly/"I Can" statements	Resources	A
1. Identify characteristics of similar triangles. 2. Find the slope of a line. 3. Determine the y-intercept of a line. (Interpreting unit rate as the slope of the graph is included in 8.EE.) 4. Analyze patterns for points on a line through the origin. 5. Derive an equation of the form y = mx for a line through the origin. 6. Analyze patterns for points on a line that do not pass through or include the origin. 7. Derive an equation of the form y=mx + b for a line intercepting the vertical axis at b (the y-intercept). 8. Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane.	Coordinate Planes	

• **Analyze and solve linear equations and pairs of simultaneous linear equations.**

Solve linear equations in one variable.

a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Sho possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equat or $a = b$ results (where a and b are different numbers).

Student Friendly/"I Can" statements	Resources	A
1. Give examples of linear equations in one variable with one solution and show that the given example equation has one solution by successively transforming the equation into an equivalent equation of the form $x = a$. 2. Give examples of linear equations in one variable with infinitely many solutions and show that the given example has infinitely many solutions by successively transforming the equation into an equivalent equation of the form $a = a$. 3. Give examples of linear equations in one variable with no solution and show that the given example has no solution by successively transforming the equation into an equivalent equation of the form $b = a$, where a and b are different numbers.		

b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding e distributive property and collecting like terms.

Student Friendly/"I Can" statements	Resources	A
1. Solve linear equations with rational number coefficients. 2. Solve equations whose solutions require expanding expressions using the distributive property and/ or collecting like terms.		

Analyze and solve pairs of simultaneous linear equations.

a. Understand that solutions to a system of two linear equations in two variables correspond to points of intersectio points of intersection satisfy both equations simultaneously.

Student Friendly/"I Can" statements	Resources	A
1. Identify the solution(s) to a system of two linear equations in two variables as the point(s) of intersection of their graphs. 2. Describe the point(s) of intersection between two lines as points that satisfy both equations simultaneously.		

b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equat inspection. *For example, 3x + 2y = 5 and 3x + 2y = 6 have no solution because 3x + 2y cannot simultaneously be 5 and*		
Student Friendly/"I Can" statements 1. Define "inspection". 2. Identify cases in which a system of two equations in two unknowns has no solution 3. Identify cases in which a system of two equations in two unknowns has an infinite number of solutions. 4. Solve a system of two equations (linear) in two unknowns algebraically. 5. Estimate the point(s) of intersection for a system of two equations in two unknowns by graphing the equations. 6. Solve simple cases of systems of two linear equations in two variables by inspection.	Resources	A

c. Solve real-world and mathematical problems leading to two linear equations in two variables. *For example, given* *points, determine whether the line through the first pair of points intersects the line through the second pair.*

Student Friendly/"I Can" statements	Resources	A
1. Give equations and context that include whole number and/or decimals/fractions. 2. Define variables and create a system of linear equations in two variables. 3. Recognize that graphed lines with one point of intersection (different slopes) will have one solution, parallel lines (same slope, different *y*-intercepts) have no solutions, and lines that are the same (same slope, same *y*-intercept) will have infinitely many solutions. 4. Connect algebraic and graphical solutions and the context of the system of linear equations. 5. Make sense of solutions.		

Functions

• Define, evaluate, and compare functions.

Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set o
an input and the corresponding output.

Student Friendly/"I Can" statements	Resources	
1. Understand rules that take *x* as input and gives *y* as output is a function. 2. Identify when functions occur as when there is exactly one *y*-value is associated with any *x*-value. 3. Use *y* to represent the output to represent this function with the equations. 4. Identify functions from equations, graphs, and tables/ordered pairs. 5. Recognize graphs as a function using the vertical line test, showing that each *x*-value has only one *y*-value. 6. Recognize when graphs are not functions when there are 2 *y*-values for multiple *x*-value.	http://nlvm.usu.edu/en/nav/category_g_4_t_2.html lineplotter – draws lines with slopes shodor.org	

Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in ta
descriptions). *For example, given a linear function represented by a table of values and a linear function represented*
determine which function has the greater rate of change.

Student Friendly/"I Can" statements	Resources	
1. Identify functions algebraically including slope and y intercept. 2. Identify functions using graphs. 3. Identify functions using tables. 4. Identify functions using verbal descriptions. 5. Compare and Contrast 2 functions with different representations. 6. Draw conclusions based on different representations of functions.	http://nlvm.usu.edu/en/nav/category_g_4_t_2.html lineplotter – draws lines with slopes shodor.org	

Interpret the equation *y = mx + b* as defining a linear function, whose graph is a straight line; give examples of functi
example, the function A = s2 giving the area of a square as a function of its side length is not linear because its graph
(2,4) and (3,9), which are not on a straight line.

Student Friendly/"I Can" statements	Resources	
1. Recognize that a linear function is graphed as a straight line. 2. Recognize the equation y=mx+b is the equation of a function whose graph is a straight line where m is the slope and b is the y-intercept. 3. Provide examples of nonlinear functions using multiple representations. 4. Compare the characteristics of linear and nonlinear functions using various representations.	http://nlvm.usu.edu/en/nav/category_g_4_t_2.html lineplotter – draws lines with slopes shodor.org Graph paper Coordinate planes	

• Use functions to model relationships between quantities.

Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial
description of a relationship or from two (*x*, *y*) values, including reading these from a table or from a graph. Interpre
initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.

Student Friendly/"I Can" statements	Resources	
1. Recognize that slope is determined by the constant rate of change. 2. Recognize that the y-intercept is the initial value where x=0. 3. Determine the rate of change from two (x,y) values, a verbal description, values in a table, or graph. 4. Determine the initial value from two (x,y) values, a verbal description, values in a table, or graph. 5. Construct a function to model a linear relationship between two quantities. 6. Relate the rate of change and initial value to real world quantities in a linear function in terms of the situation modeled and in terms of its graph or a table of values.	http://nlvm.usu.edu/en/nav/category_g_4_t_2.html lineplotter – draws lines with slopes shodor.org graph paper Coordinate planes	

Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the funct
decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been des

Student Friendly/"I Can" statements	Resources	
1. Analyze a graph and describe the functional relationship between two quantities using the qualities of the graph. 2. Sketch a graph given a verbal description of its qualitative features. 3. Interpret the relationship between x and y values by analyzing a graph.	http://nlvm.usu.edu/en/nav/category_g_4_t_2.html lineplotter – draws lines with slopes shodor.org Graph paper Coordinate planes	

The Number System

• 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 exp
or eventually repeat. Know that other numbers are called irrational.

Student Friendly/"I Can" statements	Resources	A
1. Define irrational numbers 2. Show that the decimal expansion of rational numbers repeats eventually. 3. Convert a decimal expansion which repeats eventually into a rational number. 4. Show informally that every number has a decimal expansion	http://nlvm.usu.edu graph paper number lines	

Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approxima
diagram, and estimate the value of expressions (e.g., ð2). *For example, by truncating the decimal expansion of √2, sh
2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*

1. Student Friendly/"I Can" statements	Resources	A
2. Approximate irrational numbers as rational numbers. 3. Approximately locate irrational numbers on a number line. 4. Estimate the value of expressions involving irrational numbers using rational approximations. (For example, by truncating the decimal expansion of $\sqrt{2}$, show that $\sqrt{2}$ is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.) 5. Compare the size of irrational numbers using rational approximations.	Number lines	

Statistics and Probability

• Investigate patterns of association in bivariate data.

Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between
patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.

Student Friendly/"I Can" statements	Resources	A
1. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association 2. Construct scatter plots for bivariate measurement data 3. Interpret scatter plots for bivariate (two different variables such as distance and time) measurement data to investigate patterns of association between two quantities	http://nlvm.usu.edu graph paper	

Know that straight lines are widely used to model relationships between two quantitative variables. For scatter plots
association, informally fit a straight line, and informally assess the model fit by judging the closeness of the data poi

Student Friendly/"I Can" statements	Resources	A
1. Know straight lines are used to model relationships between two quantitative variables 2. Informally assess the model fit by judging the closeness of the data points to the line. 3. Fit a straight line within the plotted data.	Graph paper Coordinate planes rulers	

Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the
example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hou
associated with an additional 1.5 cm in mature plant height.

Student Friendly/"I Can" statements	Resources	A
1. Find the slope and intercept of a linear equation. 2. Interpret the meaning of the slope and intercept of a linear equation in terms of the situation. (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.) 3. Solve problems using the equation of a linear model.	Graph paper Coordinate planes	

Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and r
two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected fro
relative frequencies calculated for rows or columns to describe possible association between the two variables. *For e*
students in your class on whether or not they have a curfew on school nights and whether or not they have assigned
evidence that those who have a curfew also tend to have chores?

Student Friendly/"I Can" statements	Resources	A
1. Recognize patterns shown in comparison of two sets of data. 2. Know how to construct a two-way table. 3. Interpret the data in the two-way table to recognize patterns. (For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?) 4. Use relative frequencies of the data to describe relationships (positive, negative, or no correlation)	Graph paper Coordinate planes	

Geometry

• Understand congruence and similarity using physical models, transparencies, or geometry software.

Verify experimentally the properties of rotations, reflections, and translations:

a. Lines are taken to lines, and line segments to line segments of the same length.

Student Friendly/"I Can" statements	Resources	A
1. Define & identify rotations, reflections, and translations. 2. Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (ie. Lines are taken to lines and 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.) 3. Identify corresponding sides & corresponding angles. 4. Understand prime notation to describe an image after a translation, reflection, or rotation. 5. Identify line of reflection.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

b. Angles are taken to angles of the same measure.

Student Friendly/"I Can" statements	Resources	A
1. Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (ie. Lines are taken to lines and 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.) 2. Identify corresponding sides & corresponding angles. 3. Identify center of rotation. 4. Identify direction and degree of rotation.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

c. Parallel lines are taken to parallel lines.

Student Friendly/"I Can" statements	Resources	A
1. Use physical models, transparencies, or geometry software to verify the properties of rotations, reflections, and translations (ie. Lines are taken to lines and 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.) 2. Identify corresponding sides & corresponding angles. 3. Understand prime notation to describe an image after a translation, reflection, or rotation. 4. Identify line of reflection.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a s
reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence betwee

Student Friendly/"I Can" statements	Resources	A
1. Define congruency. 2. Identify symbols for congruency. 3. Apply the concept of congruency to write congruent statements. 4. Reason that a 2-D figure is congruent to another if the second can be obtained by a sequence of rotations, reflections, translation. 5. Describe the sequence of rotations, reflections, translations that exhibits the congruence between 2-D figures using words.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates

Student Friendly/"I Can" statements	Resources	A
1. Define dilations as a reduction or enlargement of a figure. 2. Identify scale factor of the dilation. 3. Describe the effects of dilations, translations, rotations, & reflections on 2-D figures using coordinates.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequ
reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits t

Student Friendly/"I Can" statements	Resources	A
1. Define similar figures as corresponding angles are congruent and corresponding sides are proportional. 2. Recognize symbol for similar. 3. Apply the concept of similarity to write similarity statements. 4. Reason that a 2-D figure is similar to another if the second can be obtained by a sequence of rotations, reflections, translation, or dilation. 5. Describe the sequence of rotations, reflections, translations, or dilations that exhibits the similarity between 2-D figures using words and/or symbols.	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

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. *For exam the same triangle so that the sum of the three angles appears to form a line, and give an argument in terms of transv*

Student Friendly/"I Can" statements	Resources	A
1. Define similar triangles 2. Define and identify transversals 3. Identify angles created when parallel line is cut by transversal (alternate interior, alternate exterior, corresponding, vertical, adjacent, etc.) 4. Justify that the sum of interior angles equals 180. (For example, arrange three copies of the same triangle so that the three angles appear to form a line.) 5. Justify that the exterior angle of a triangle is equal to the sum of the two remote interior angles. 6. Use Angle-Angle Criterion to prove similarity among triangles. (Give an argument in terms of transversals why this is so.)	http://nlvm.usu.edu 6-8th grade Geometry – Congruent triangles Mathwarehouse – similar figures, triangles, angels, circles Mimio resources – Geometry Sketchpad Cuttheknot – area of a triangle	

• Understand and apply the Pythagorean Theorem.

Explain a proof of the Pythagorean Theorem and its converse.

Student Friendly/"I Can" statements	Resources	A
1. Define key vocabulary: square root, Pythagorean Theorem, right triangle, legs a & b, hypotenuse, sides, right angle, converse, base, height, proof. 2. Be able to identify the legs and hypotenuse of a right triangle. 3. Explain a proof of the Pythagorean Theorem. 4. Explain a proof of the converse of the Pythagorean Theorem.	http://nlvm.usu.edu Mimio resources – Geometry Sketchpad Cuttheknot – Pythagorean Triples, Find Hypotenuse, Find Leg	

Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematica dimensions.

Student Friendly/"I Can" statements	Resources	A
1. Recall the Pythagorean Theorem and its converse. 2. Solve basic mathematical Pythagorean Theorem problems and its converse to find missing lengths of sides of triangles in two and three-dimensions. 3. Apply Pythagorean theorem in solving real-world problems dealing with two and three-dimensional shapes.	http://nlvm.usu.edu Mimio resources – Geometry Sketchpad Cuttheknot – Pythagorean Triples, Find Hypotenuse, Find Leg	

Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Student Friendly/"I Can" statements	Resources	A
1. Recall the Pythagorean Theorem and its converse. 2. Determine how to create a right triangle from two points on a coordinate graph. 3. Use the Pythagorean Theorem to solve for the distance between the two points.	http://nlvm.usu.edu Mimio resources – Geometry Sketchpad Cuttheknot – Pythagorean Triples, Find Hypotenuse, Find Leg	

Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and math

Student Friendly/"I Can" statements	Resources	A
1. Identify and define vocabulary: cone, cylinder, sphere, radius, diameter, circumference, area, volume, pi, base, height 2. Know formulas for volume of cones, cylinders, and spheres 3. Compare the volume of cones, cylinders, and spheres. 4. Determine and apply appropriate volume formulas in order to solve mathematical and real-world problems for the given shape. 5. Given the volume of a cone, cylinder, or sphere, find the radii, height, or approximate for π.	http://nlvm.usu.edu learner.org/interactives/geometry – 3D shapes, volume learner.org/interactives/geometry/index.html softschalk nsdl.org – link to CCSS and Science	