

Eighth Grade Math Curriculum Map

Unit	Unit Focus	Common Core Math Standards
Unit 1 - Equation Solving	• Solving Equations • Analyzing Solutions • Write equations	EE 7 Solve linear equations in one variable. • a) Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solution. 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. • b) Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.
Unit 2 - Geometry (angles)	• Triangle Theorems • Types of angles • Similar Triangles • Similar Triangles and Slope • Parallel Lines Cut by a Transversal	G5 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.
Unit 3 - Transformation	• Translations • Reflections • Rotations • Dilations • Congruence and Similarity	G1 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. b) Verify experimentally the properties of rotations, reflections, and translations; b) Angles are taken to angles of the same measure. c) Verify experimentally the properties of rotations, reflections, and translations: c) parallel lines are taken to parallel lines. G2 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 translation; given two congruent figures, describe a sequence that exhibits the congruence between them. G3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

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		G4 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.
Unit 4 - Linear Relationships	• Functions • Tables • Graphs • Graphing Linear Functions • Rate of Change/Slope • Slope-intercept Form	F1 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. F2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). F3 Interpret the equation $y=mx+b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. F4 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 form two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. F5 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. EE5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. EE6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y= mx$ for a line through the origin and the equations $y = mx + b$ for a line intercepting the vertical axis at b.
Unit 5 - System of Equations	• Solving System of equations by graphing • Solving system of equations by	EE8 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 intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions

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	elimination • Solving system of equations by substitution	by graphing the equations. Solve simple cases by inspection. c. Solve real-world and mathematical problems leading to two linear equations in two variables.
Unit 6 - Exponents	• Integer Exponents • Scientific Notation	EE 1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. EE 3 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. EE 4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation to choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.
Unit 7 - Irrational Numbers & Pythagorean Theorem	• Rational and Irrational Numbers • Square Roots and Cube Roots • Pythagorean Theorems	NS 1 Know that numbers that are not rational are called irrational. Understand informally that every rational number has a decimal expansion; for decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. NS 2 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. EE 2 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. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that square root of 2 is irrational. G6 Explain a proof of the Pythagorean Theorem and its converse. G7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. G8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

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Unit 8 - Volume	Volume of cones, cylinders, and spheres	G9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.
Unit 9 - Scatter Plots	- Scatter Plots and associations - Scatter Plots and predictions	SP1 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. SP2 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. SP3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. SP4 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 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.
Unit 10 - Review	All major 8th grade common core vocabulary and main concepts	Reteach any necessary objectives with students. Use previous CFA's, classroom assessments, and other formative assessments to choose re-teaching lessons. Visit NC department of education website: http://www.ncpublicschools.org/accountability to verify which common core objectives may be heavily weighted.

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Unit 1: Equation solving EE7

Standard	Learning Target	Academic Vocabulary
EE7 Solve linear equations a. Give examples of linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form $x=a$, $a=a$, or $a=b$ results (where a and b are different numbers). b. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms.	8.EE.7 • I can solve linear equations with one variable. • I can simplify equations to solve problems. • I can solve different types of linear equations.	Coefficient distributive property like terms variable



Unit 2: Geometry with Angles and Triangles G5

Standard	Learning Target	Academic Vocabulary
G5 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.	8.G.5 • I can determine relationships between angle sums and exterior angle sums of triangles. • I can determine relationships between angles created when parallel lines are cut by a transversal.	interior angles exterior angles transversal parallel lines alternate interior angles vertical angles adjacent angles corresponding angles complementary angles supplementary angles

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Unit 3: Transformations G1, G2, G3, G4

Standard	Learning Target	Academic Vocabulary
G1 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. b) Verify experimentally the properties of rotations, reflections, and translations; b) Angles are taken to angles of the same measure. c) Parallel lines are taken to parallel lines. G2 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 translation; given two congruent figures, describe a sequence that exhibits the congruence between them. G3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. G4 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.	8.G.1 - I can determine the length of lines and angles after a translation. - I can determine the length of lines and angles after a reflection. - I can determine the length of lines and angles after a rotation. 8.G.2 - I can demonstrate that congruent figures have the same shape and size even after a rotation, reflection or translation. 8.G.3 - I can describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. 8.G.4 - I can demonstrate that similar figures have angles with the same measure and sides that are proportional. - I can describe a sequence of events that goes from the pre-image to image.	translations rotations reflections dilations line of reflection center of rotation clockwise counterclockwise scale factor pre-image rigid transformations line segments congruence (and symbol) reading A' as "A prime" similarity

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Unit 4: Linear Relationships

F1, F2, F3, F4, F5, EE5, EE6

Standard	Learning Target	Academic Vocabulary
F1 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. F2 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). F3 Interpret the equation $y=mx+b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear. F4 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 form two (x,y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values. F5 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.	8.F.1 • I can distinguish between functions and non-functions. • I can understand input and output. 8.F.2 • I can express functions algebraically, graphically, and in tables. • I can express functions verbally. 8.F.3 • I can identify functions as linear and non-linear. • I can understand that the rate of change is the same between any two points on a straight line. 8.F.4 • I can identify the slope and y-intercept from tables, graphs, equations or verbal descriptions. • I can construct a model of a linear relationship between two quantities. 8.F.5 • I can sketch a graph to model a verbal description of a situation 8.EE.5 • I can identify slope of proportional relationships. 8.EE.6 • I can use similar triangles to explain slope. • I can create $y=mx$ from a line. • I can use $y = mx$ to determine which lines have direct variation.	Functions y-value x-value vertical line test input output rate of change linear function non-linear function ordered pair corresponding equation of a line parabola quadratic functions cubic functions line of best fit trend line trend correlation relationship linear relationship rate of change slope initial value y-intercept model unit rate

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EE5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. EE6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equations $y = mx + b$ for a line intercepting the vertical axis at b.	I can construct $y = mx + b$ from a graph.	proportional relationships vertical horizontal similar triangles y-intercepts x-intercepts linear dependent variable independent variable equation of a line
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Unit 5: System of Equations

EE8

Standard	Learning Target	Academic Vocabulary
EE8 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 intersection of their graphs, because points of intersection satisfy both equations simultaneously. b. Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection.	8.EE.8 - I can understand and evaluate system of equations. - I can solve system of equations by graphing. - I can solve system of equations by algebraic expressions. - I can solve real life problems with system of equations.	Substitution

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• c. Solve real-world and mathematical problems leading to two linear equations in two variables.		
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Unit 6: Exponents

EE1, EE3, EE4

Standard	Learning Target	Academic Vocabulary
EE 1 Know and apply the properties of integer exponents to generate equivalent numerical expressions. EE 3 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. EE 4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Use scientific notation to choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology.	8.EE.1 • I can understand exponents. • I can perform mathematical operations with exponents. 8.EE.3 • I can express numbers in scientific notation. 8.EE.4 • I can use exponents to multiply or divide numbers in scientific notation.	laws of exponents power scientific notation standard form of a number

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Unit 7: Irrational Numbers and Pythagorean Theorem

NS1, NS2, EE2, G6, G7, G8

Standard	Learning Target	Academic Vocabulary
NS 1 Know that numbers that are not rational are called irrational. Understand informally that every rational number has a decimal expansion; for decimal expansion repeats eventually, and convert a decimal expansion which repeats eventually into a rational number. NS 2 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 EE 2 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. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that square root of 2 is irrational. G6 Explain a proof of the Pythagorean Theorem and its converse. G7 Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. G8 Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	8.NS.1 • I can understand which numbers are rational. • I can understand which numbers are irrational. 8.NS.2 • I can create a number line with rational and irrational numbers. • I can approximate irrational numbers and compare them to other irrational numbers. 8.EE.2 • I can understand and use square root and cube root. • I can remember the perfect squares and perfect cubes. 8.G.6 • I can explain a proof of Pythagorean Theorem. • I can understand the converse of Pythagorean Theorem. 8.G.7 • I can apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. 8.G.8 I can apply the Pythagorean Theorem to find the distance between two points in a coordinate system.	real numbers irrational numbers rational numbers integers whole numbers natural numbers terminating decimals truncate approximate perfect squares perfect cubes square root cube root Pythagorean Theorem right triangle hypotenuse legs Pythagorean triple

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Unit 8: Volume G9

Standard	Learning Target	Academic Vocabulary
G9 Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.	8.G.9 • I can apply the formulas for the volume of cones to solve real-world and mathematical problems. • I can apply the formulas for the volume of cylinders to solve real-world and mathematical problems. • I can apply the formulas for the volume of spheres to solve real-world and mathematical problems.	Cones conic cylinders spheres radius volume height



Unit 9: Scatter Plots SP1, SP2, SP3, SP4

Standard	Learning Target	Academic Vocabulary
SP1 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.	8.SP.1 • I can construct and interpret scatter plots. • I can describe patterns of clustering and outliers. • I can describe patterns of positive or negative association, linear association, and nonlinear association.	Bivariate scatter plot linear model clustering linear association non-linear Association outliers positive association negative

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SP2 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. SP3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. SP4 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 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.	8.SP.2 • I can understand that a straight line can represent a relationship in a scatter plot. 8.SP.3 • I can use the equation of a linear model to solve problems by interpreting slope and intercept. • I can determine the line of best fit. 8.SP.4 • I can use tables and determine the relationships they show.	association categorical data two-way table relative frequency
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8TH GRADE MATH RESOURCES

<u>Name / Standard</u>	<u>Resource</u>
NCDPI - wiki lessons (all standards)	http://maccss.ncdpi.wikispaces.net/file/view/CCSSMathTasks-Grade8.pdf/382798194/CCSSMathTasks-Grade8.pdf
Unpacked Content (all standards)	http://maccss.ncdpi.wikispaces.net/file/view/8th%20Grade%20Unpacked%20101112.pdf/379337342/8th%20Grade%20Unpacked%20101112.pdf
Math Stars (all standards) NCDPI resources	http://mathlearnnc.sharpschool.com/UserFiles/Servers/Server_4507209/File/Math%20Stars%20Newsletter/Grade%208%20Math%20Stars.pdf
Superstars (all standards) NCDPI resources	http://mathlearnnc.sharpschool.com/UserFiles/Servers/Server_4507209/File/Superstars%20III/Superstars-III-6-8pt1.pdf
Problem Deck (all standards) NCDPI resources	http://maccss.ncdpi.wikispaces.net/Middle+School
Ten Marks (all standards)	http://www.tenmarks.com/
Manga High - games for students (all standards)	http://www.mangahigh.com/en_us/
Vocabulary Study Guide (all standards)	http://dynamo.dictionary.com/subject/math
Rational/Irrational Math Game	http://www.math-play.com/rational-and-irrational-numbers-game/rational-and-irrational-numbers-game.html
Square root game	http://www.math-play.com/square-roots-game.html
Exponent/Scientific Notation Activities	http://www.softschools.com/math/exponents/
Scatter Plot Multiple Choice problems	http://www.regentsprep.org/regents/math/algebra/AD4/PracPlot.htm
Slope Game (basketball)	http://www.math-play.com/slope-intercept-game.html
Linear word problems	http://www.ixl.com/math/algebra-1/linear-function-word-problems

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Volume Practice Problems	http://www.ixl.com/math/grade-8/volume-of-prisms-and-cylinders
Dilation Notes	http://www.helpingwithmath.com/by_subject/geometry/geo_dilations.htm
Geometry Games	http://www.internet4classrooms.com/grade_level_help/geometry_3-dimensional_figure_math_eighth_8th_grade.htm
Math Chimp - games are grouped by math domains	http://www.mathchimp.com/8thGrade.php
National Library of Manipulatives	http://nlvm.usu.edu/en/nav/vlibrary.html
Solving equations (Game: Rags to Riches)	http://www.quia.com/rr/4096.html
Slope (power points and activities)	http://www.internet4classrooms.com/grade_level_help/algebra_linear_equation_slope_math_eighth_8th_grade.htm
Slope Intercept Form	http://www.mathwarehouse.com/algebra/linear_equation/slope-intercept-form.php
Algebra and Geometry (practice sheets and games)	http://www.mathwarehouse.com/
Math notes, videos, and practice	http://www.algebra-class.com/
Internet 4 classrooms (all standards: practice, PowerPoint, games)	http://www.internet4classrooms.com/skills_8th_math_new.htm
Common Core Free Tests	http://www.free-test-online.com/ccss/grade8/grade8_ccss.html