Georgia Department of Education

GSE Fulton Eighth Grade Advanced Curriculum Map

1st Semester				2nd Semester			
Unit 1 *(3 – 4 weeks)*	**Unit 2** *(5 – 6 weeks)*	**Unit 3** *(4 – 5 weeks)*	**Unit 4** *(2 – 3 weeks)*	**Unit 5** *(3 – 4 weeks)*	**Unit 6** *(6 – 7 weeks)*	**Unit 7** *(3 – 4 weeks)*	**Unit 8** *(3 – 4 weeks)*
Transformations, Congruence and Similarity	**Exponents**	**Geometric Applications of Exponents**	**Functions**	**Linear Functions**	**Linear Models and Tables**	**Solving Systems of Equations**	**Show What We Know**
MGSE8.G.1 MGSE8.G.2 MGSE8.G.3 MGSE8.G.4 MGSE8.G.5	MGSE8.EE1 MGSE8.EE.2 (evaluating) MGSE8.EE.3 MGSE8.EE.4 MGSE8.EE.7 MGSE8.EE.7a MGSE8.EE.7b MGSE8.NS.1 MGSE8.NS.2 *MGSE9-12.A.CED.4 MGSE9-12.N.RN.3	MGSE8.G.6 MGSE8.G.7 MGSE8.G.8 MGSE8.G.9 MGSE8.EE.2 (equations)	MGSE8.F.1 MGSE8.F.2 MGSE9-12.F.IF.1 MGSE9-12.F.IF.2 MGSE9-12.F.IF.3	MGSE8.EE.5 MGSE8.EE.6 MGSE8.F.3 MGSE9-12.A.REI.10 MGSE9-12.A.REI.11	MGSE8.F.4 MGSE8.F.5 MGSE8.SP.1 MGSE8.SP.2 MGSE8.SP.3 MGSE8.SP.4	MGSE8.EE.8 MGSE8.EE.8a MGSE8.EE.8b MGSE8.EE.8c	ALL Plus High School Prep Review

These units were written to build upon concepts from prior units, so later units contain tasks that depend upon the concepts addressed in earlier units.
All units will include the Mathematical Practices and indicate skills to maintain.
Prioritized Standards are noted in RED
***Additional standards for the Advanced Curriculum in green font.**
Green font standards with a * are prioritized standards at the next grade level.

NOTE: Mathematical standards are interwoven and should be addressed throughout the year in as many different units and tasks as possible in order to stress the natural connections that exist among mathematical topics.

Grades 6-8 Key:
NS = The Number System
RP = Ratios and Proportional Relationships
EE = Expressions and Equations
G = Geometry
SP = Statistics and Probability.

Richard Woods, State School Superintendent
July 2015

GSE Fulton Eighth Grade Advanced Expanded Curriculum Map – 1st Semester

Standards for Mathematical Practice

1 Make sense of problems and persevere in solving them. **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.

Unit 1	Unit 2	Unit 3	Unit 4
Transformations, Congruence and Similarity	**Exponents**	**Geometric Applications of Exponents**	**Functions**
Understand congruence and similarity using physical models, transparencies, or geometry software. **MGSE8.G.1** Verify experimentally the congruence properties of rotations, reflections, and translations: 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. **MGSE8.G.2** 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. **MGSE8.G.3** Describe the effect of dilations, translations, rotations and reflections on two-dimensional figures using coordinates. **MGSE8.G.4** 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. **MGSE8.G.5** 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.	**Work with radicals and integer exponents.** **MGSE8.EE.1** Know and apply the properties of integer exponents to generate equivalent numerical expressions. **MGSE8.EE.2** Use square root and cube root symbols to represent solutions to equations. Recognize that $x^2 = p$ (where p is a positive rational number and $\|x\| < 25$) has 2 solutions and $x^3 = p$ (where p is a negative or positive rational number and $\|x\| < 10$) has one solution. Evaluate square roots of perfect squares < 625 and cube roots of perfect cubes > -1000 and < 1000. **MGSE8.EE.3** Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other. For example, estimate the population of the United States as 3×108 and the population of the world as 7×109, and determine that the world population is more than 20 times larger. **MGSE8.EE.4** Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Understand 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 (e.g. calculators).	**Understand and apply the Pythagorean Theorem.** **MGSE8.G.6** Explain a proof of the Pythagorean Theorem and its converse. **MGSE8.G.7** Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. **MGSE8.G.8** Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. **Solve real-world and mathematical problems involving volume of cylinders, cones, and spheres.** **MGSE8.G.9** Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. **Work with radicals and integer exponents.** **MGSE8.EE.2** Use square root and cube root symbols to represent solutions to equations. Recognize that $x^2 = p$ (where p is a positive rational number and $\|x\| < 25$) has 2 solutions and $x^3 = p$ (where p is a negative or positive rational number and $\|x\| < 10$) has one solution. Evaluate square roots of perfect squares < 625 and cube roots of perfect cubes > -1000 and < 1000.	**Define, evaluate, and compare functions.** **MGSE8.F.1** 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. **MGSE8.F.2** Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). **Understand the concept of a function and use function notation.** **MGSE9-12.F.IF.1 Understand that a function from one set (the input, called the domain) to another set (the output, called the range) assigns to each element of the domain exactly one element of the range, i.e. each input value maps to exactly one output value. If f is a function, x is the input (an element of the domain), and f(x) is the output (an element of the range). Graphically, the graph is y = f(x).** **MGSE9-12.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.** **Build a function that models a relationship between two quantities.** **MGSE9-12.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. (Generally, the scope of high school math**

	Analyze and solve linear equations and pairs of simultaneous linear equations. **MGSE8.EE.7** Solve linear equations in one variable. **MGSE8.EE.7a** 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). **MGSE8.EE.7b** Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. ***MGSE9-12.A.CED.4** **Rearrange formulas to highlight a quantity of interest using the same reasoning as in solving equations.** ***Examples: Rearrange Ohm's law V = IR to highlight resistance R*** **Know that there are numbers that are not rational, and approximate them by rational numbers.** **MGSE8.NS.1** 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. **MGSE8.NS.2** Use rational approximation of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions (e.g., estimate π2to the nearest tenth*). For example, by truncating the decimal expansion of √2 (square root of 2), show that √2 is between 1 and 2, then between 1.4 and 1.5, and explain how to continue on to get better approximations.*		**defines this subset as the set of natural numbers 1,2,3,4...) By graphing or calculating terms, students should be able to show how the recursive sequence $a_1=7$, $a_n=a_{n-1}+2$; the sequence $s_n = 2(n-1) + 7$; and the function $f(x) = 2x + 5$ (when x is a natural number) all define the same sequence.**

	MGSE9-12.N.RN.3 Explain why the sum or product of rational numbers is rational; why the sum of a rational number and an irrational number is irrational; and why the product of a nonzero rational number and an irrational number is irrational.		

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GSE Fulton Eighth Grade Advanced Curriculum Map – 2nd Semester

Standards for Mathematical Practice

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Unit 5	Unit 6	Unit 7	Unit 8
Linear Functions	**Linear Models and Tables**	**Solving Systems of Equations**	**Show What We Know**
Understand the connections between proportional relationships, lines, and linear equations. **MGSE8.EE.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. **MGSE8.EE.6** 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 equation y = mx + b for a line intercepting the vertical axis at b. **Define, evaluate, and compare functions.** **MGSE8.F.3** 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. For example, the function A = s2 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. **Represent and solve equations and inequalities graphically.** **MGSE9-12.A.REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane.**	**Use functions to model relationships between quantities.** **MGSE8.F.4** 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 from 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. **MGSE8.F.5** 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. **Investigate patterns of association in bivariate data.** **MGSE8.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. **MGSE8.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.	**Analyze and solve linear equations and pairs of simultaneous linear equations.** **MGSE8.EE.8** Analyze and solve pairs of simultaneous linear equations (systems of linear equations). **MGSE8.EE.8a** 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. **MGSE8.EE.8b** Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. Solve simple cases by inspection. **MGSE8.EE.8c** Solve real-world and mathematical problems leading to two linear equations in two variables.	**ALL** **Plus High School Prep Review**

MGSE9-12.A.REI.11 Using graphs, tables, or successive approximations, show that the solution to the equation f(x) = g(x) is the x-value where the y-values of f(x) and g(x) are the same.	**MGSE8.SP.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. **MGSE8.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. a. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. b. 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 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?*		