Hillside Township School District

Mathematics Department
Algebra 1 CP

Grades 8 and 9

Dr. Antoine L. Gayles
Superintendent of Hillside Public Schools

Dr. Christy Oliver-Hawley
Director of Curriculum and Instruction

Curriculum Contributors:
Mr. Emenaka, Ms. Fayed, Ms. Dunlap,
Mr. Wilberforce, Ms. Shaw, Mr. Cisko
Ms. Cerqueira, Mr. Powers,
Mr. Brooks, Mr. D'Amato

Supervisor
Obinna Emenaka
Nagwa Fayed

Board of Education Approved:
January 19, 2017

Revised 12/2016

Table of Contents

Section	Page
Mission Statement	3
Academic Overview	3
Affirmative Action Compliance Statement	3
Math Department Lesson Plan Template	4
Content Overview	6
Units and Pacing Charts	8

District Mission Statement

The mission of the Hillside Public Schools is to ensure that all students at all grade levels achieve the New Jersey Core Curriculum Content Standards and make connections to real-world success. We are committed to strong parent-community school partnerships, providing a safe, engaging, and effective learning environment, and supporting a comprehensive system of academic and developmental support that meets the unique needs of each individual.

Academic Area Overview

The Hillside Township School District is committed to excellence. We believe that all children are entitled to an education that will equip them to become productive citizens of the twenty-first century. We believe that a strong foundation in mathematics provides our students with the necessary skills to become competent problem solvers and pursue math intensive careers in the sciences and engineering.

A strong foundation in mathematics is grounded in exploration and rigor. Children are actively engaged in learning as they model real-world situations to construct their own knowledge of how math principles can be applied to solve every day problems. They have ample opportunities to manipulate materials in ways that are developmentally appropriate to their age. They work in an environment that encourages them to take risks, think critically, and make models, note patterns and anomalies in those patterns. Children are encouraged to ask questions and engage in dialogue that will lead to uncovering the math that is being learned. Facts and procedures are important to the study of mathematics. In addition to learning the common facts and procedures that lead efficient solutions of math problems, children will also have the opportunity to explore the "why" so that they can begin to understand that math is relevant to the world.

Our program provides teachers with resources both online and in print that incorporates the use of technology to help students reach the level of rigor that is outlined in the Common Core State Standards for Mathematics. Textbooks and materials have been aligned to the standards and teachers are trained on an ongoing basis to utilize the resources effectively and to implement research-based strategies in the classroom.

Affirmative Action Statement

Equality and Equity in Curriculum

The Hillside Township School District ensures that the district's curriculum and instruction are aligned to the State's Core Curriculum Content Standards and addresses the elimination of discrimination and the achievement gap, as identified by underperforming school-level AYP reports for State assessment, by providing equity in educational programs and by providing opportunities for students to interact positively with others regardless of race, creed, color, national origin, ancestry, age, marital status, affectional or sexual orientation, gender, religion, disability or socioeconomic status.

N.J.A.C. 6A:7-1.7(b): Section 504, Rehabilitation Act of 1973; N.J.S.A. 10:5; Title IX, Education Amendments of 1972

Math Department Lesson Plan Template

Lesson Information

Lesson Name: _____

Unit: _____

Date: _____

Lesson Data

1. Essential Questions & Enduring Understanding:

2. CCSS:

3. Knowledge:

   Students will know……

4. Skills:

   Students will be able to…..

5. Informal/Formal Assessment of Student Learning:

Evidence of student learning:

6. Lesson Agenda:

Include in Lesson Outline:
- *Anticipated timing*
- *DO NOW*
- *Activities and Investigations*
- *Discussion prompts*
- *Journal writing prompts*
- *Student uses of technology*
- *Safety precautions*
- *Materials*

7. Homework:

Content Overview

Unit Name		Topics in Curriculum	Time Frame (8th Grade)	Time Frame (High Shool)
Unit 1:	Expressions and Single-Variable Equations / Inequalities	• The Real Number System, Variables, Expressions & Evaluating Expressions • Solving Equations & Inequalities	Early Sept – Mid Oct	SKIP 8th Grade only
Unit 2:	Linear and Nonlinear Functions & Systems of Linear Equations & Inequalities	• Relations & Functions • Linear vs. Non-linear Functions • Slope, Linear Equations, & Graphing • Systems of Linear Equations • Systems of Linear Inequalities	Mid Oct - End of January	September to Mid February
Unit 3:	Polynomials	• Operations with Polynomials • Factoring Polynomials	February and March	Mid February to Mid March
Unit 4:	Quadratics	• Quadratic Functions: Graphing • Quadratic Functions: Equations	April and May	End of March and May
PARCC ASSESSMENT				

(8th Grade Only) **UNIT 1: <u>Expressions and Single-Variable Equations / Inequalities</u>**

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✓ A Number system provides a common symbolic representation that can be used to communicate reasoning and problem solve. ✓ Variables are used to form expressions, equations, and inequalities that aid in solving real problems in the world. ✓ Equations and inequalities can describe, explain, and predict various aspects of the real world.	✓ Why is it necessary to establish a common number system in the study of mathematics? ✓ How can you represent quantities, patterns, and relationships? ✓ Can equations or inequalities that appear to be different be equivalent? ✓ How can we use equations or inequalities to model the world around us? ✓ How do you represent relationships between quantities that are not equal?

CCSS	KNOWLEDGE	SKILLS
The Real Number System, Variables, Expressions & Evaluating Expressions N-RN.B.3	**Students will know that:** ● The real number system is organized into two broad categories of numbers: Rational and Irrational. o A <u>Real</u> number is a fraction, decimal, or whole number that can be positive or negative. o A <u>Rational</u> number is any real number that can be written in fractional form. o An <u>Irrational</u> number is any real number that cannot be written in fraction form. (i.e. the exact value of π is irrational because there is no equivalent fraction).	**Students will be able to:** ● Explain why the following statements must be true: o The sum or product of two rational numbers is rational o The sum of a rational number and an irrational number must be irrational. o The product of a nonzero rational number and an irrational number is irrational.

A-SSE.A.1	• A <u>variable</u> is a letter/symbol that represents a real number and must follow all of the properties of real numbers. o A variable in an expression or equation in context has meaning and must be understood based on the situation. • An <u>expression</u> is a number, a variable, or a combination of both that does not include an equal sign or inequality symbols.	• Use variables to represent real number quantities in problems solving. • Interpret expressions that represent a quantity in terms of its context. • Write expressions using variables to represent situations in problem solving.

	• Properties of real numbers can be applied to variables.
	  o Distributive: $a(b \pm c) = ab \pm ac$
	  o Inverse of Addition: $a + (-a) = 0$
	  o Inverse of Multiplication: $a \cdot \frac{1}{a} = 1$
		• Use the properties of real numbers to simplify expressions and solve problems.

Solving Equations & Inequalities A-CED.A.1 A-CED.A.4 A-REI.A.1 A-REI.B.3 A-REI.D.10	**Students will know that:** • A variable can be used to represent a number in context. Any expressions, equations, or inequalities created using this variable must follow the properties of real numbers. • The properties of real numbers can be extended to formulas.	**Students will be able to:** • Create equations and inequalities in one variable and use them to solve problems. • Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, Distance Formula: $D = R \cdot T$ or $T = \frac{D}{R}$ or $R = \frac{D}{T}$
	• In solving equations in one variable, the properties of real numbers can be used to simplify the original equation and ensure that the equality of an expression is maintained from the previous step to the next step in the process. • To solve any equation or inequality in one variable, one must use the properties of real numbers to move variables on one side and numbers on the other side.	• Solve equations in one variable and inequalities in one variable, including equations with coefficients represented by letters. • Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
	<u>Critical Vocabulary</u>: Variable, Expression, Real Number, Coefficient, Constant, Formula, Inequality, Equation	
Unit 1 Common Assessment		

Pacing Chart
UNIT 1: Expressions and Single-Variable Equations / Inequalities

TOPIC	SUGGESTED PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
Variables and Expressions Evaluating Expressions	Help the Postman using expressions Http://www.BBC.co.uk/education/mathsfile/shockwave/games/postie.html Online practice – One variable http://www.321know.com/equ723x2.htm Online practice – Two variables http://www.321know.com/equ723x3.htm Evaluating expressions card game http://www.kaganonline.com/catalog/look_whats_inside/blacklines/BKHSMAlgebra1.pdf	Text Sections: 1-3, 1-1; 1-2 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Solving Equations & Inequalities	Teacher Resources: Chapter 2 Project, Chapter 3 Project Deflategate Project (New England Patriots 2015 Playoffs) http://www.yummymath.com/2015/deflategate/ Geology Rocks (Group Activity) http://illuminations.nctm.org/LessonDetail.aspx?id=L786 Graphing calculator utility http://my.hrw.com/math06_07/nsmedia/tools/Graph_Calculator/graphCalc.html Solving Equation - Games www.shodor.org/interactivate/activities/AlgebraFour National Library of Virtual Manipulatives http://nlvm.usu.edu/en/nav/topic_t_2.html Algebraic Balance Scales http://nlvm.usu.edu/en/nav/frames_asid_201_g_3_t_2.html?open=instructions&from=category_g_3_t_2.html Solving linear equations & inequalities: Games, lessons, reference sheet, dictionary and more. *www.coolmath.com/algebra/algebra-practice-solving.html*	Text Sections: 1-8; 2-1 to 2-4; 3-1 to 3-4; 3-6 to 3-7; 2-5 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes

UNIT 2: <u>Linear and Nonlinear Functions & Systems of Linear Equations/Inequalities</u>

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✓ A function is a relationship between variables in which each value of the input variable is associated with a unique value of the output variable. ✓ A function that models a real world situation can be used to make estimates or predictions about future occurrences. ✓ Functions can be represented in a variety of ways such as graphs, tables, equations, or words. ✓ A line on a graph can be represented by a linear equation. ✓ Change in Algebra can be represented using slope as a ratio of vertical change to horizontal change. ✓ Linear inequalities can be used to represent situations where there are infinitely many possibilities for the solution. ✓ Some sequences have function rules that can be used to find any term of the sequence. ✓ Systems of equations can be solved algebraically as well as graphically. ✓ Systems of linear equations can be used to model real world problems. ✓ Systems of linear inequalities can be used to provide constraints in problems that have multiple acceptable solutions.	✓ How can we determine if a relationship is a function? Is every relationship a function? ✓ How can the input/output relationship in functions help us to predict future outcomes? ✓ How can you represent and describe functions? ✓ Why is it necessary to have multiple ways of writing linear equations ✓ What does the slope of a line indicate about a line ✓ Why is it necessary to use shading when representing the solutions to a linear inequality? ✓ How do patterns help us represent, analyze, predict, and justify conclusions? ✓ When is it more beneficial to use one method of solving a system of equations over another? ✓ When is it possible to set up a system of equations to model a real problem? ✓ How do you find the values that meet the conditions of a system of inequalities? ✓ What is the meaning of the solutions to a system of linear equations/inequalities in the context of the real world?

CCSS	KNOWLEDGE	SKILLS

Relations & Functions F-IF.A1 F-IF.A.2 F-IF.B.5 F-BF.A.1 A-CED.A.2	**Students will know that:** • A relation is a relationship between two sets of information that is represented by an ordered pair (x, y). • A function is a special relationship between two sets of information in which every element from one set (domain) is paired with exactly one element in another set (range). o The domain is the set of all allowable input values for a relation or function. o The range is the set of all possible output values for a relation or function.	**Students will be able to:** • Identify the domain and range of a given relation or function. • Recognize a function from a table of order pairs, input/output *mapping diagram*, and graph (vertical line test). • Select the appropriate domain to represent a given situation.
	• The graph of a relation or function is the set of all ordered pairs plotted on the coordinate plane.	• Graph a function within a given domain or range. • Relate the domain of a function to its graph and where applicable to the quantitative relationship it describes. For example if a function $h(n)$ gives the number of person-hours it takes to assemble an engine in a factory, then the positive integers would be an appropriate domain for the function.
	• Function notation is denoted by the symbol $f(x)$ to which f depends on the value of x. The graph of f is the graph of the equation $y = f(x)$.	• Use function notation to evaluate functions for inputs in their domains and interpret statements that use function notation in terms of a context. • Write a function based on a given context. (i.e. the distance traveled, *d(t)*, represents the distance traveled after, *t*, hours.) • Explain statements involving function notation in the context of the problems. (i.e. *d*(3)=150 means that after 3 hours, you have traveled 150 miles)
Linear vs. Non-linear Functions F-LE.A.1 F-LE.A.2 F-LE.A.3 F-LE.B.5 F-BF2 F-IF.A.3	**Students will know that:** • Linear functions have straight line, non-vertical graphs whereas all other types of functions have curves or sharp turns and thus are non-linear. o The equations for linear functions in two variables have no higher than an exponent of 1 on any of the two variables. • Visual and numerical patterns can be represented by algebraic expressions. • Functions can be used to represent patterns both explicitly and recursively.	**Students will be able to:** • Distinguish between the graphs of linear, quadratic, absolute value, and exponential functions. • Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. • Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals • Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, or quadratically.

	○ Arithmetic patterns can be represented with a linear function. ○ For recursive functions, the domain is the set of integers.	• Write the explicit formula for a function based on a given arithmetic sequence. • Write the recursive formula for a function based on a given arithmetic sequence.
Slope, Linear Equations, & Graphing A-CED2 F-IF.B.4 F-IF.B.6 F-IF.C.7 A-SSE.A.1 S.ID.C.7 S.ID.C.8 S.ID.C.9	• The <u>slope</u> is a constant rate of change that measures steepness of a line - the higher the slope, the steeper the line. ○ $\text{slope } (m) = \frac{\text{vertical change}}{\text{horizontal change}} = \frac{\text{rise}}{\text{run}} = \frac{y_2 - y_1}{x_2 - x_1}$ ○ The sign of the slope $(\pm)$ determines the direction of the slant (i.e. slant upwards or slant downwards). ○ Average rate of change can be calculated by using the slope formula over a specific interval. • The relationship between two lines can be determined by comparing their slopes and y-intercepts. • Linear equations can be written in the following forms: ○ Slope-Intercept Form: $y = mx + b$ ○ Point-Slope Form: $y - y_1 = m(x - x_1)$ ○ Standard Form: $Ax + By = C$. • A scatter plot can be used to respresent a bivariate data set. • Understand that correlation does not imply causation.	• Calculate the slope of a line using the formula or by analyzing the graph of a linear function. • Calculate and interpret the average rate of change of a function (presented symbolically, graphically or as a table) over a specified interval. Estimate the rate of change from a graph • Create equations in two variables to represent relationships between quantities; graph equations on coordinate axes (with labels & scales) • Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology. ○ Show x and y -intercepts. ○ Include piecewise and step functions. • Represent data on a scatter plot, describe how the variables are related and use technology to fit a function to data. • Interpret the slope, intercept, and correlation coefficient of a data set of a linear model; distinguish between correlation and causation.
Systems of Linear Equations	**Students will know that:**	**Students will be able to:**

A-CED.A.3
A-REI.C.5
A-REI.C.6
	• The solution of the system of equations is the intersection of the graphs of two functions.
	
	• Systems of equations can be solved by:
	  ○ Graphing – The solution is the point of intersection of the lines.
	  ○ Substitution – Replace one variable with the expression from the other equation.
	  ○ Eliminating – Set up the coefficient of one of the variables to cancel by addition or subtraction of the equations.
		• Graph two functions and find the solution which is the point(s) of intersection.
		• Find the solutions approximately, e.g. using technology to graph a function, make table of values, or find successive approximations
		
		• Represent constraints by equations and by systems of equations and interpret solutions as viable or nonviable options in a modeling context. *For example, finding the value when expenses equal income.*
		• Prove that manipulating two equations in a system using different operations or methods will produce equivalent equations and same solutions.

Systems of Linear Inequalities A-REI,D10 A-REI.D.12 A-CED3	**Students will know that:** • The graph of a system of linear inequalities in two variables is the intersection of the corresponding half planes.	**Students will be able to:** • Graph the solutions to a linear inequality in two variables as a half plane and graph solution sets to a system of linear inequalities in two variables. • Represent constraints by inequalities, and by systems of inequalities, and interpret solutions as viable or nonviable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
	Critical Vocabulary: Relation, Function, Domain, Range, Element, Function Notation, Arithmetic Sequence, Explicit, Recursive, Coordinate Plane, Axis, Rate of Change, Slope, Intercept, Inequality, half plane, , Linear, Quadratic, Absolute Value, Exponential,	

Pacing Chart
UNIT 2: Linear and Nonlinear Functions & Systems of Linear Equations/Inequalities

TOPIC	SUGGESTED PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
Relations & Functions	Relations & Functions Activities http://www.mathwarehouse.com/algebra/relation/ Function machine http://nlvm.usu.edu/en/nav/frames_asid_191_g_3_t_1.html Domain and Range Activity	Text Sections: 4.1, 4.2 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Linear vs. Non-linear Functions Recursive and Explicit Function Tables	Linear & quadratic graphs with sliders http://www.cosmeo.com/braingames/LinearandQuadraticFunctions/Parabola.swf Exponential function graph with sliders http://hotmath.com/learning_activities/interactivities/exp_2.swf Interactive linear vs nonlinear activity http://www.asset.asu.edu/new/mathactive/lessons/4/see.swf Compare linear and quadratic http://educator.schools.officelive.com/Documents/Pass%20The%20Ball%20Activity-%20linear%20and%20quadratic.pdf	Text Sections: 4.2, 4.3 to 4-7, 5.8, 7.6, 7.7, 7.8, 9.1, 9.7 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Slope, Linear Equations, & Graphing	Chapter 5 Project Slope Millionaire game http://www.quia.com/rr/79713.html Slope Jeopardy http://www.quia.com/cb/24707.html Virtual Slope (slope slider) http://www.shodor.org/interactivate/activities/SlopeSlider/ Linear equation Activities/Games/Projects http://www.ilovemath.org/index.php?option=com_docman&task=cat_view&gid=55&dir=DESC&order=date&limit=10&limitstart=20 Slope Intercept Rap	Text Sections: 5.1, 5.3 to 5.6 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes

	http://www1.teachertube.com/viewVideo.php?video_id=101097	
Systems of Linear Equations	System of Equations Activities http://www.ilovemath.org/index.php?option=com_docman&task=cat_view&gid=53 More Systems Activities http://player.discoveryeducation.com/index.cfm?guidAssetId=41BD9CF7-7138-46E9-A81B-BB0E01B7526A&blnFromSearch=1&productcode=US Systems Jeopardy http://www.quia.com/cb/79607.html Solving systems of equations basketball game http://www.crctlessons.com/systems-of-equations-game.html	Text Sections: 6.1 to 6.4 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Linear Inequalities and Systems	Chapter 6 Project – "Let's Dance" Linear inequalities millionaire http://www.quia.com/rr/79715.html System of Equations Activities http://www.ilovemath.org/index.php?option=com_docman&task=cat_view&gid=53 Linear inequality millionaire http://www.quia.com/rr/79715.html	Text Sections: 6.5, 6.6 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Unit 2 Common Assessment / Common Mid Term Exam		

UNIT 3: Polynomials and Quadratic Functions

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✓ Quadratic functions can be used to model certain situations where the rate of change is not constant, yet a pattern exists. ✓ Objects in the world have a parabolic shape or move in a parabolic motion. The study of quadratics helps us understand more about such objects around us. ✓ Quadratic functions can be used to model certain situations where the rate of change is not constant, yet a pattern exists. ✓ Objects in the world have a parabolic shape or move in a parabolic motion. The study of quadratics helps us understand more about such objects around us.	✓ What situations in the world can be modeled with a parabolic shaped graph? ✓ How would an understanding or quadratic functions help to shed light on the real parabolic behaviors in the world? ✓ What situations in the world can be modeled with a parabolic shaped graph? ✓ How would an understanding or quadratic functions help to shed light on the real parabolic behaviors in the world?

CCSS	KNOWLEDGE	SKILLS
Operations with Polynomials & Factoring A-SSE.A.1 A-SSE.A.2 A-APR.A.1	**Students will know that:** ● The basic properties of exponents can be used to manipulate as well as operate on algebraic expressions. ● Polynomials form a system similar to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication. o A polynomial is closed under the operation if the output is in the same set of numbers as the input. ● The basic exponent rules must be followed when adding, subtracting, and multiplying polynomials. ● Properties of real numbers can be applied to variables.	**Students will be able to:** ● Use basic properties of exponents to simplify algebraic expressions. ● Name polynomials by number of terms and degree. ● Use properties of real numbers to manipulate polynomial expressions. o Add, subtract, and multiply polynomials. o Use an area model to find the product of two binomials. ● Use the properties of exponents to transform expressions. ● Combine like terms and evaluate algebraic expressions.
	● Polynomials can be factored to yield expressions that are simpler to work with and make equation solving easier.	● Factor a polynomial by: o Identifying the greatest common factor. o Grouping o Trinomial factoring (i.e. AC Method or Box Method) o Special binomial cases (i.e. $a^2 - b^2$ and $a^3 \pm b^3$)

Quadratic Functions: Graphing and Equations A-SSE.B.3 A-APR2 A-APR.B.3 A-REI.A.1 A-REI.D.11 A-REI.B.4 A-REI7 F-BF.A.1 F-BF.B.3 F-IF.B.4 F-IF.B.5 F-IF.C.7 F-IF.C.8 F-IF.C.9	**Students will know that:** • Quadratic functions can be written in the following forms: o $y = ax^2 + bx + c$ or ▪ If a is positive, the functions has a minimum. ▪ If a is negative, the function has a maximum. ▪ The x-coordinate of the vertex can be found using $x = \frac{-b}{2a}$ ▪ The formula of the axis of symmetry for a quadratic function in standard form is $x = \frac{-b}{2a}$ o $y = a(x-h)^2 + k$; where (h,k) is the vertex of the function and the axis of symmetry is ***x = k.***	**Students will be able to:** • Graph quadratic functions expressed symbolically and show key features (intercepts,vertex, axis of symmetry, maxima, and minima) of the graph, by hand in simple cases and using technology for more complicated cases. • Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions) • Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.
	• The zeros of a function can be found graphically or algebraically by: o Finding the x-intercepts on a graph. o Setting the function to zero, factoring, and solving algebraically. • The Quadratic Formula can be used to find the zeros when graphing and factoring prove to be too difficult. o The Quadratic Formula states: $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ ▪ $b^2 - 4ac > 0$; the function has 2 real solutions ▪ $b^2 - 4ac = 0$; the function has 1 real solution ▪ $b^2 - 4ac < 0$; No real solutions • Radicals can be written in simpler forms.	• Use the graph of a quadratic function to reveal its zeros. • Identify zeros of polynomials when factorizations are available, • Use the zeros of polynomials to construct a rough graph of the function. • Solve quadratic equations by inspection, taking square roots, factoring, completing the square, or by using the quadratic formula based on the difficulty of the given problem. • Create one-variable quadratic equations in context and use them to solve real world problems.

		• Present solutions to the quadratic formula in simplest radical form.
	• The solutions of a system can be found by: o Identifying the points of intersection of two functions, graphically. o Setting the expressions of both functions equal and solving algebraically.	• Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

PACING CHART
UNIT 3: Polynomials and Quadratic Functions

TOPIC	SUGGESTED PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS
Operations with Polynomials	More practice with polynomials http://www.coolmath.com/algebra/algebra-practice-polynomials.html Sorting poly by type http://www.enotes.com/documents/polynomial-sort-42283 Polynomial bingo http://makingmathfun.wikispaces.com/file/view/Polynomial+Factoring+Bingo.pdf Factoring (Various Topics) http://www.geneyang.com/factoring/main.swf	Text Sections: 7.1 to 7.4, 8.1 to 8.8 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes
Quadratic Functions, Graphing, and Equations	Quadratic equations matching game http://www.studystack.com/matching-4767 Solving Quadratic equations Webquest http://www.rblewis.net/technology/EDU506/WebQuests/quadratics/quadratics.html Polynomial Activity on making connections between polynomial functions and the graphs of these functions http://illuminations.nctm.org/LessonDetail.aspx?id=L282 Graphing Quadratic functions http://education.ti.com/calculators/downloads/US/Activities/Detail?id=6655&ref=%2fcalculators%2fdownloads%2fUS%2fActivities%2fSearch%2fSubject%3fs%3d5022%26sa%3d5022%26t%3d5035%26d%3d2 Graphing Quad Functions http://education.ti.com/calculators/downloads/US/Activities/Detail?id=9406 Quadratic Formula Song http://education.ti.com/calculators/downloads/US/Activities/Detail?id=9406	Text Sections: 9.1, 9.2, 9.3, 9.4, 9.6, 9.8 Teacher resources have puzzles, games, activities, projects, & enrichment www.poweralgebra.com Concept Bytes

Unit 4: Modeling with Statistics

ENDURING UNDERSTANDINGS	ESSENTIAL QUESTIONS
✓ Statistics can be uses to makes sense of the world we live in.	✓ How are the different data representations useful? ✓ Why is an understanding of center and spread so vital to the study of statistics?

CCSS	KNOWLEDGE	SKILLS
S.ID.A.1	**Students will know:** ● How to represent data with plots (dot plots, histograms, and box plots) on the real number line. ● The appropriate use of a statistic depends on the shape of the data distribution. ● That standard deviation tells us information about the spread of the data in a data set.	**Students will be able to:** ● Represent data with dot plots on the real number line. ● Represent data with histograms on the real number line. ● Represent data with box plots on the real number line.
S.ID.A.2 S.ID.A.3	● Statistics can be used to understand and compare data sets. ● An outlier is a value outside of (much bigger or much smaller than) the other values in a data set.	● Represent two or more data sets with plots and use appropriate statistics to compare their center and spread.

	• Measures of center and spread can be effected by outliers.	• Compare center and spread of two or more data sets, interpreting differences in shape, center, and spread in the context of the data, taking into account the effects of outliers. • Interpret differences in shape, center, and spread in context. • Explain possible effects of extreme data points (outliers) when summarizing data and interpreting shape, center and spread.

TOPIC	SUGGESTED PERFORMANCE TASKS ACTIVITIES/PROJECTS ASSESSMENTS	RESOURCES/INTERDISCIPLINARY CONNECTIONS

UNIT 5: Projects - To be completed late in the year post-PARCC

- Superbowl Activity/Project
- Select from the list of projects at the link below: https://docs.google.com/document/d/1BKrbAz-BsrR9twtCVoujHheWQybeA9Sh2p8VFvp7CwE/edit
- Desmos Art project - samples at: https://sites.google.com/site/emilou2010/poll/desmos-lessons
- Desmos Maze project at: https://www.desmos.com/calculator/havy34ev8e
- Desmos Golf project at: https://www.desmos.com/calculator/4omi4wqivm