



Curriculum

Math
Algebra 1

Estell Manor School District

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Assessments

Benchmark:

Formative:

Summative:

Alternative Assessments:

Interdisciplinary Connections:

21st Century Life & Career Skills Standards (Career Education)

Integration of Technology Standards

Accommodations and Modifications for students who are classified as Gifted and Talented Students:

Accommodations and Modifications for students who are classified as E.L.L Students:

Accommodations and Modifications for students who are classified with 504's:

Accommodations and Modifications for students who are classified with IEP's:

Accommodations and Modifications for students at risk of failing:

Estell Manor School

This document reflects the collaboration of teachers, staff, students, parents, and the Board of Education to define our mission to guide our work.

Our Mission:

Supported by home and community, Estell Manor School is to be a model of excellence in developing all students academically, emotionally, physically, and socially; thus empowering students to become lifelong learners who compete in and contribute to a global society.

This curricula and accompanying instructional materials have been developed to align with the NJSLS and in accordance with the NJ Department of Education's guidelines to include: Curriculum designed to meet grade level expectations, integrated accommodations and modifications for students with IEPs, 504s, ELLs, and gifted and talented students, assessments including benchmarks, formative, summative, and alternative assessments, a list of core instructional and supplemental materials, pacing guide, interdisciplinary connections, integration of 21st century skills, integration of technology, and integration of 21st Century Life and Career standards.

About the Standards

In 1996, the New Jersey State Board of Education adopted the state's first set of academic standards called the Core Curriculum Content Standards. The standards described what students should know and be able to do upon completion of a thirteen-year public school education. Over the last twenty years, New Jersey's academic standards have laid the foundation for local district curricula that are used by teachers in their daily lesson plans.

Revised every five years, the standards provide local school districts with clear and specific benchmarks for student achievement in nine content areas. Developed and reviewed by panels of teachers, administrators, parents, students, and representatives from higher education, business, and the community, the standards are influenced by national standards, research-based practice, and student needs. The standards define a "Thorough and Efficient Education" as guaranteed in 1875 by the New Jersey Constitution. Currently the standards are designed to prepare our students for college and careers by emphasizing high-level skills needed for tomorrow's world.

The New Jersey Student Learning Standards include Preschool Teaching and Learning Standards, as well as nine K-12 standards for the following content areas: **21st Century Life and Careers, Comprehensive Health and Physical Education, English Language Arts, Mathematics, Science, Social Studies, Technology, Visual and Performing Arts, World Languages.** The most recent review and revision of the standards occurred in 2014. However, the standards in language arts and math underwent an additional review in 2015 with adoption by the New Jersey State Board of Education in May 2016.

**Estell Manor School
Math: Algebra 1**

Pacing Guide

Course Title: Math		Grade level: Algebra 1	
Topic	Unit of Study	Topic	Unit of Study
1	Solving Equations and Inequalities / 17 days	7	Polynomials and Factoring / 17 days
2	Linear Equations / 11 days	8	Quadratic Functions / 14 days
3	Linear Functions / 14 days	9	Solving Quadratic Equations / 17 days
4	Systems of Linear Equations and Inequalities / 13 days	10	Working with Functions / 17 days
5	Piecewise Functions / 11 days	11	Analyzing Data Displays / 13 days
6	Exponents and Exponential Functions / 13 days		
Instruction Materials/Additional Resources: Math K-4/EnVision 2.0 Math/Scott Foresman/2016, www.pearsonsuccessnet.com Classroom Manipulatives, EDC Calendar Math activities, GregTangMath.com, http://www.mathgoodies.com , http://www.funbrain.com , http://www.mathplayground.com , http://www.mathsisfun.com , http://www.gamequarium.com , http://www.vestorkids.com , http://www.mathwire.com			

Estell Manor School
Algebra 1 Math Curriculum
Overview

Content Area: Math Topic 1

Topic 1=17 Days

Unit Title: Solving Equations and Inequalities

Grade Level: Algebra 1

NJSLS Addressed: HSN.RN.B.3, HSA.CED.A.1, HSA.REI.A.1, HSA.REL.B.3, HSA.CED.A.4, HSA.CED.A.3

- HSN.RN.B.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.
- HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems.
- HSA.REI.A.1 Explain each step in solving a simple equation as following from 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.
- HSA.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
- HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
- HSA.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

Topic 1 Summary

Essential Questions:

- What general strategies can you use to solve simple equations?

Enduring Understandings:

- The set of real numbers includes both rational and irrational numbers. The sum or product of two rational numbers is rational. The sum of a rational number and an irrational number is irrational; and the product of a nonzero rational number and an irrational number is irrational.
- Linear equations can be used to solve mathematical and real-world problems. You can solve linear equations by using the properties of equality.
- The properties of equality are used to solve equations that have variables on each side. If an equation is true for all values of x , then it has infinitely many solutions; if it is not true for any value of x , then it has no solutions.
- Literal equations are equations with two or more variables. They are solved by rewriting the equation to highlight the variable of interest.
- The solution to an inequality in one variable is solved by using the properties of inequalities
- A compound inequality is a combination of two or more inequalities used to describe multiple constraints.
- The solution to an absolute value equation either has two solutions, one positive and one negative, or if there is no value of x that makes the absolute value equation true, it has no solution. The solution to an absolute value inequality is a compound inequality that uses or or and.

Learning Targets

Students will be able to understand:

- 1.1 Operations on Real Numbers
- 1.2 Solving Linear Equations
- 1.3 Solving Equations with a Variable on Both Sides
- 1.4 Literal Equations and Formulas
- 1.5 Solving Inequalities in One Variable
- 1.6 Compound Inequalities
- 1.7 Absolute Value Equations and Inequalities

Students will be able to demonstrate:

- Find the sum or product of two rational numbers and explain why the sum or product is rational.
- Find the sum or product of a rational number and an irrational number and explain when the sum or product is irrational.
- Create and solve linear equations with one variable using the properties of equality.
- Use the properties of equality to solve linear equations with a variable on both sides and identify if the linear equation has one solution, infinitely many solutions, or no solution.
- Rearrange formulas and equations to solve for a particular variable/quantity of interest.
- Use formulas and equations to solve problems.

	• Create and solve inequalities in one variable. • Interpret solutions to inequalities within the context. • Identify inequalities as true or false based on the number of solutions • Create and solve a system of inequalities and interpret the solution to a compound inequality within the modeling context. • Solve absolute value inequalities and equations and use them to solve problems.
Content Area: Math Topics 2	Topic 2: 11 days
Unit Title: Linear Equations	
Grade Level: Algebra 1	
NJSLs Addressed: HSA.CED.A.1, HSA.CED.A.2, HSS.ID.C.7, HSF.LE.A.2, HSA.REI.A.1, HSA.CED.A.4, HSA.CED.A.3, HSF.IF.C.7.A	
• HSA.CED.A.1 Create equations and inequalities in one variable and use them to solve problems. • HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. • HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. • HSF.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). • HSA.REI.A.1 Explain each step in solving a simple equation as following from 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. • HSA.CED.A.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. • HSA.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. • HSF.IF.C.7.A Graph linear and quadratic functions and show intercepts, maxima, and minima	

Topic 2 Summary

Essential Questions:

- Why is it useful to have different forms of linear equations??

Enduring Understandings:

- When a linear equation is written in slope-intercept form, $y=mx+b$, m is the slope, and the line intersects the y -axis at $(0,b)$, so the y -intercept is b .
- The point slope form of a linear equation is used to write the equation of a line using the slope and any point on the line.
- The standard form of a linear equation is helpful for identifying the x - and y -intercepts. These are used to graph the line and to aid in understanding the constraints within a real-world context.
- Many real-world problem solutions can be represented with a mathematical model, but that model might not represent the real-world situation exactly.
- The equations of lines can be used to help identify whether the lines are parallel or perpendicular. Parallel lines have the same slope but different x - or y - intercepts; perpendicular lines have slopes that are opposite reciprocals.

Learning Targets

Students will be able to understand:

- 2.1 Slope-intercept Form
- 2.2 Point-Slope Form
- 2.3 Standard Form
- 2.4 Parallel and Perpendicular Lines

Students will be able to demonstrate:

- Write linear equations in two variables using slope-intercept form to represent the relationship between two quantities.
- Interpret the slope and the intercept of a linear model.
- Write and graph linear equations in point-slope form and in standard form.
- Analyze different forms of a line to interpret the slope and y -intercept of a linear model in the context of the data.
- Create equations to represent lines that are parallel or perpendicular to a given line.
- Graph lines to show an understanding of the relationship between the slopes of parallel and perpendicular lines.
- Solve real world problems with parallel or perpendicular lines.

Content Area: Math Topic 3	Topic 3 = 14 days
Unit Title: Linear Functions	
Grade Level: Algebra 1	
NJSLs Addressed: HSF.IF.A.1, HSF.IF.A.2, HSF.IF.B.5, HSF.BF.B.3, HSF.IF.A.3, HSF.BF.A.2, HSS.ID.B.6.A, HSS.ID.B.6.C, HSS.ID.C.7	
• HSF.IF.A.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y=f(x)$. • HSF.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of context. • HSF.IF.B.5 Relate the domain of a function to its graph and where applicable, to the quantitative relationship it describes. • HSF.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, and $f(kx)$ 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. Including recognizing even and odd functions from their graphs and algebraic expressions for them. • HSF.IF.A.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. • HSF.BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula. Use them to model situations, and translate between the two forms. • HSS.ID.B.6.A Fit a function to the data; use functions fitted to data to solve problems in the context of the data • HSS.ID.B.6.C Fit a linear function for a scatter plot that suggests a linear association. • HSS.ID.C.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.	

Topic 3 Summary

Essential Questions:

- How can linear functions be used to model situations and solve problems?

Enduring Understandings:

- A relation is a function if each element of the domain is assigned to exactly one element of the range.
- Linear functions can be represented in multiple ways, using words, tables, graphs, and rules. Function notation is a way to write the rule for a function f . The output of the function $f(x)$, read “ f and x ,” means that f is a function of the input variable x .
- A transformation of a function maps each point of its graph to a new location. Adding k to the function output causes a vertical translation, and the adding k to the function input causes a horizontal translation. Multiplying the function output by $k > 1$ causes a stretch, and multiplying the function input by $k > 1$ causes a compression.
- Recursive and explicit formulas are used to describe arithmetic sequences. Arithmetic sequences, similar to linear functions, relate quantities that increase at a constant rate.
- When data presented in a scatter plot suggests a linear function, a line can be fitted to the data and a linear function can be written to represent the relationship.
- When a line is fitted to a set of data, the closer the data points are to the line, the stronger the correlation. A plot of residuals can be used to determine the line of best fit, which is the trend line that most closely models the data

Learning Targets

Students will be able to understand:

- 3.1 Relations and Functions
- 3.2 Linear Functions
- 3.3 Transforming Linear Functions
- 3.4 Arithmetic Sequences
- 3.5 Scatter Plots and Lines of Fit
- 3.6 Analyzing Lines of Fit

Students will be able to demonstrate:

- Understand that a relation is a function if each element of the domain is assigned to exactly one element of the range.
- Determine a reasonable domain and identify constraints on the domain based on the context of a real world problem.
- Write and evaluate linear functions using function notation.
- Graph a linear function and relate the domain of a function to its graph.
- Interpret functions represented by graphs, tables, verbal descriptions, and function notation in terms of a context.
- Graph transformations of linear functions by identifying the effects of multiplying or adding specific values of k to the input or output of a function.
- Interpret the key features of the graph of a linear function and use them to write the

	function that the graph represents. • Write arithmetic and geometric sequences recursively and with an explicit formula. • Fit a function to linear data shown in a scatter plot and use fitted functions to solve problems in the context of the data. • Interpret the slope of the trend line within the context of the data. • Compute and interpret the correlation coefficient in the linear data. • Plot and analyze residuals to assess the fit of the function. • Distinguish between correlation and causation.
Content Area: Math Topic 4	Topic 4 = 13 days
Unit Title: Systems of Linear Equations and Inequalities	
Grade Level: Algebra 1	
NJSLs Addressed: HSA.REI.C.6, HSA.CED.A.3, HSA.REI.C.5, HSA.REI.D.12	
• HSA.REI.C.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. • HSA.CED.A.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. • HSA.REI.C.5 Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions. • HSA.REI.D.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.	

Topic 4 Summary

Essential Questions:

- How do you use systems of linear equations and inequalities to model situations and solve problems?

Enduring Understandings:

- The intersection of the graphs of a pair of linear equations is used to estimate the solution to the system. If two lines intersect at a point, there is exactly one solution. If two lines are the same, there are infinitely many solutions. If two lines are parallel, there is no solution.
- Substitution is one method for solving systems of equations. The process involves solving one equation for a variable and substituting the solution into the system's other equation. This results in an equation in one variable. Solve for the variable and substitute its value into one of the original equations in the system to find the value of the second variable.
- Elimination is an alternate method for solving systems of equations when it is not easy to use substitution. Multiply one or both equations by a constant to get like coefficients that are opposite to use elimination.
- **The graph of a linear inequality in two variables shows the solutions of the inequality as a half-plane above or below the boundary line. The boundary line is included in the solution when the inequality symbol is $\leq$ or $\geq$ and excluded when the inequality symbol is $<$ or $>$.**
- Many real-world problem situations can be represented with a mathematical model, but that model might not represent the real-world situation exactly.
- Systems of linear inequalities can be solved by graphing. The solution of a system of inequalities is the intersection of the corresponding half-planes, excluding the boundary lines in the case of a strict inequality.

Learning Targets

Students will be able to understand:

- 4.1 Solving Systems of Equations by Graphing
- 4.2 Solving Systems of Equations by Substitution
- 4.3 Solving Systems of Equations by Elimination
- 4.4 Linear inequalities in Two Variables

Students will be able to demonstrate:

- Graph systems of linear equations in two variables to find an approximate solution
- Write a system of linear equations in two variables to represent real world problems.
- Use the substitution method to solve systems of equations.
- Represent situations as a system of equations and interpret solutions as

4.5 Systems of Linear Inequalities	- viable/nonviable options for the situation. - Solve systems of linear equation and prove that the sum of one equation and a multiple of the other produces a system with the same solutions as the original system. - Represent constraints with a system of equations in a modeling context. - Graph solutions to linear inequalities in two variables - Represent constraints with inequalities and interpret solutions as viable or nonviable options in a modeling context. - Graph the solution set of a system of linear inequalities in two variables - Interpret solutions of linear inequalities in a modeling context.
Content Area: Math Topic 5	Topic 5 = 11 days
Unit Title: Piecewise Functions	
Grade Level: Algebra 1	
NJSLs Addressed: HSF.IF.B.4, HSF.IF.B.6, HSF.IF.C.7.B, HSF.BF.B.3	
- HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. - HSF.IF.B.6 Calculate and interpret the average rate change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate change from a graph. - HSF.IF.C.7.B Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. - HSF.BF.B.3 Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, 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.	

Topic 5 Summary

Essential Questions:

- How do you use piecewise-defined functions to model situations and solve problems?

Enduring Understandings:

- The graph of an absolute value function has a vertex at the turning point, which represents either the minimum or maximum value of the function. The axis of symmetry is the vertical line that passes through the vertex.
- Piecewise-defined functions are functions whose domains are divided into intervals where each interval has a different function rule.
- A step function is a piecewise-defined function that pairs every number in an interval with a single value. Ceiling functions and floor functions are step functions that round numbers up or down to the nearest integer.
- For the absolute value function, $g(x)=a(x-h)+k$, the values of the constants, h and k , translate the graph horizontally and vertically, and the value of the leading coefficient a affects the vertical stretch or compression.

Learning Targets

Students will be able to understand:

- 5.1 The Absolute Value Function
- 5.2 Piecewise-Defined Functions
- 5.3 Step Functions
- 5.4 Transformations of Piecewise-Defined Functions

Students will be able to demonstrate:

- Graph an absolute value function and identify the key features of the graph.
- Calculate and interpret the rate of change of an absolute value function over a specified interval.
- Use mathematical modeling to represent a problem situation and to propose a solution.
- Test and verify the appropriateness of their math models.
- Explain why the results from their mathematical models might not align exactly with the problem situation.
- Understand and graph piecewise-defined functions.
- Analyze the key features of the graph of a piecewise defined function.
- Write and interpret a piecewise-defined function to solve application problems.
- Graph step functions including ceiling functions and floor functions
- Calculate and interpret the average rate of change of step functions
- Graph transformations and piecewise-defined functions
- Identify the effect of changing constants and coefficients of absolute value functions on their graphs.

Content Area: Math Topic 6	Topic 6 = 13 days
Unit Title: Exponents and Exponential Functions	
Grade Level: Algebra 1	
NJSLs Addressed: HSN.RN.A.1, HSN.RN.A.2, HSF.IF.B.4, HSF.LE.A.1, HSF.LE.A.2, HSF.LE.B.5, HSF.BF.A.2, HSF.BF.B.3	
• HSN.RN.A.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. • HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. • HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. • HSF.LE.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. • HSF.LE.A.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs. • HSF.LE.B.5 Interpret the parameters in a linear or exponential function in terms of a context. • HSF.BF.A.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. • HSF.BF.B.3 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.	

Topic 6 Summary

Essential Questions:

- How do you use exponential functions to model situations and solve problems?

Enduring Understandings:

- Radicals can be rewritten using rational exponents. The properties of exponents can be used to solve equations with rational exponents.
- An exponential function models the relationship between two quantities that differ by a constant ratio. Exponential functions are modeled using $f(x)=abx^x$ where a is the initial amount and b is the constant ratio.
- An exponential growth function increases by a fixed percent over each interval. An exponential decay function decreases by a fixed percent over each interval. Exponential growth and decay functions can be used to model many real-world situations.
- Geometric sequences are number sequences in which each term is related to the next by a common ratio. They can be represented by recursive and explicit formulas. Exponential functions can represent geometric sequences.
- The values of the constants h and k affect the graphs of exponential functions. Changing the value of k results in a vertical shift in the function's graph. Changing the value of h results in a horizontal shift in the function's graph.

Learning Targets

Students will be able to understand:

- 6.1 Rational Exponents and Properties of Exponents
- 6.2 Exponential Functions
- 6.3 Exponential Growth and Decay
- 6.4 Geometric Sequences
- 6.5 Transformations of Exponential Functions

Students will be able to demonstrate:

- Extend the properties of integer exponents to rational exponents to rewrite radical expressions using rational exponents
- Solve equations with rational exponents using the properties of exponents.
- Sketch graphs showing key features of exponential functions
- Write exponential functions using tables and graphs
- Compare linear and exponential functions.
- Construct exponential growth and decay functions given a description of a relationship.
- Recognize if a situation can be modeled with exponential growth or exponential decay, and interpret the parameters of the model in context.
- Find explicit and recursive formulas for geometric sequences.
- Translate between recursive and explicit formulas for geometric sequences.
- Translate the graph of an exponential function vertically and horizontally, identifying the effect different values of h and k have on the graph of the function.
- Compare characteristics of two exponential functions represented in different

	ways, such as tables and graphs. • Use mathematical modeling to represent a problem situation and to propose a solution. • Test and verify the appropriateness of their math models. • Explain why the results from their mathematical models might not align exactly with the problem situation.
Content Area: Math Topic 7	Topic 7 = 17 days
Unit Title: Polynomials and Factoring	
Grade Level: Algebra 1	
NJSLs Addressed: HSA.APR.A.1, HSA.SSE.A.2, HSA.SSE.A.1.A, HSA.SSE.A.1	
• HSA.APR.A.1 Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. • HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. • HSA.SSE.A.1.A Interpret parts of an expression, such as terms, factors, and coefficients. • HSA.SSE.A.1 Interpret expressions that represent a quantity in terms of its context.	

Topic 7 Summary

Essential Questions:

- How do you work with polynomials to rewrite expressions and solve problems?

Enduring Understandings:

- A polynomial is a monomial or the sum or differences of two or more monomials (terms). Polynomials can be added or subtracted by combining like terms. Polynomials are closed under addition or subtraction, similar to integers.
- Polynomials can be multiplied by applying the Distributive Property or by using a table. They form a system similar to integers. Therefore, polynomials are closed under multiplication.
- The product of the square of a binomial in the form $(a+b)^2$ is always the square of the first term, plus twice the product of the first and last terms, plus the square of the last term. The product of a sum and a difference of two binomials in the form $(a+b)(a-b)$ is always the difference of the two squares.
- The greatest common factor of the terms of a polynomial is the greatest common factor of the coefficients and the variable or variables, using the number of instances of the variable that are common to each term.
- When a trinomial is in the form $x^2 + bx + c$, the factors are found by identifying a pair of integer factors of c that have a sum of b and then using the factors to write binomials that have a product equal to the trinomial.
- **A quadratic trinomial in the form ax^2+bx+c when $a \neq 1$ can either be factored by grouping or factored by substitution.**
- When a trinomial has the pattern $a^2+2ab+b^2$ or $a^2-2ab+b^2$, then it can be factored as $(a+b)^2$ or $(a-b)^2$ respectively. If a binomial has the pattern a^2-b^2 , then it can be factored as $(a+b)(a-b)$.

Learning Targets

Students will be able to understand:

- 7.1 Adding and Subtracting Polynomials
- 7.2 Multiplying Polynomials

Students will be able to demonstrate:

- Identify the parts of a polynomial
- Classify polynomials by number of terms and by degree

• 7.3 Multiplying Special Cases • 7.4 Factoring Polynomials • 7.5 Factoring • 7.6 Factoring ax^2+bx+c • 7.7 Factoring Special Cases	• Write a polynomial in standard form • Add or subtract two polynomials • Use the Distributive Property with polynomials, recognizing that polynomials are closed under multiplications • Multiply polynomials using a table and an area model. • Determine the square of a binomial • Find the product of a sum and difference of two squares. • Solve real-world problems involving the square of a binomial • Find the greatest common factor of the terms of a polynomial • Use the structure of a polynomial to rewrite it in factored form. • Factor polynomials that represent real-world problems. • Factor a trinomial in the $x^2 + bx + c$ by finding two binomial factors whose product is equal to the trinomial. • Identify and use patterns in the signs of the coefficients of the terms of a trinomial expression. • Use mathematical modeling to represent a problem situation and to propose a solution. • Test and verify the appropriateness of their math models. • Explain why the results from their mathematical models might not align exactly with the problem situation. • Identify the common factor of the coefficients in the terms of a trinomial expression where a does not equal 1. • Write a quadratic trinomial as a product of two binomial factors. • Identify and factor a trinomial that is a perfect square or a binomial that is a difference of two squares • Factor special cases of polynomials within the context of real-world problems.
Content Area: Math Topic 8	Topic 8= 11 days
Unit Title: Quadratic Functions	
Grade Level: Algebra 1	
NJSLs Addressed: HSA.CED.A.2, HSF.IF.B.6, HSF.IF.C.7, HSF.BF.B.3, HSF.IF.B.4, HSF.IF.A.2, HSS.ID.B.6.A, HSF.LE.A.3	

- HSA.CED.A.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
- HSF.IF.B.6 Calculate and interpret average rates of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.
- HSF.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
- HSF.BF.B.3 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.
- HSF.IF.B.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship.
- HSF.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- HSS.ID.B.6.A Fit a function to the data; use functions fitted to data to solve problems in the context of the data.
- HSF.LE.A.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Topic 8 Summary

Essential Questions:

- How can you use sketches and equations of quadratic functions to model situations and make predictions?

Enduring Understandings:

- A quadratic function is a polynomial function in one or more variables in which the highest degree term is of the second degree. The graph of quadratic function $f(x)=ax^2$ is a parabola. The value of the leading coefficients determines both the width of the parabola and the direction the parabola opens (upward or downward)
- The structure of a quadratic function in vertex form reveals the vertex and axis of symmetry of the graph it represents.
- The standard form of a quadratic function is $f(x)=ax^2+bx+c$, where c is the y -coordinate of the y -intercept and the axis of symmetry is the line $x=-b/2a$
- A quadratic function can be used to model area and vertical motion problems. These models can be written in the same form as the quadratic function $f(x)=ax^2+bx+c$ using key features to interpret and understand the situation
- Linear, quadratic, and exponential functions are differentiated by their average rates of change over different intervals. A linear function models a relationship between x and y in which the differences between successive y -values are constant. A quadratic function models a relationship in which the second differences, or the difference between the first differences, are constant. An exponential function models a relationship where the ratios of consecutive y -values are constant.

Learning Targets

Students will be able to understand:

- 8.1 Key Features of a Quadratic Function
- 8.2 Quadratic Functions in Vertex Form
- 8.3 Quadratic Functions in Standard Form
- 8.4 Modeling with Quadratic Functions
- 8.5 Linear, Exponential, and Quadratic Models

Students will be able to demonstrate:

- Identify key features of the graph of a quadratic function using graphs, tables and equations.
- Explain the effect of the value of a on the quadratic parent function
- Identify key features of the graph of quadratic functions written in vertex form.
- Graph quadratic functions in vertex form.
- Graph quadratic functions in standard form and show intercepts, maxima, and minima.
- Determine how the values of a , b , and c affect the graph of $f(x) = ax^2 + bx + c$
- Identify the key features of parabolas.
- Compare properties of quadratic functions presented in different

	forms(algebraically, in a table, graphically). • Use quadratic functions fitted to data to model real-world situations. • Use the vertical motion model to write an equation. • Compare a model to a data set by analyzing and evaluating residuals. • Use mathematical modeling to represent a problem situation and to propose a solution. • Test and verify the appropriateness of their math models. • Explain why the results from their mathematical models might not align exactly with the problem situation. • Determine which model- linear, exponential, or quadratic - best fits a set of data. • Use fitted functions to solve problems in the context of data.
Content Area: Math Topic 9	Topic 9= 17 days
Unit Title: Solving Quadratic Equations	
Grade Level: Algebra 1	
NJSLs Addressed: HSA.REI.D.11, HSA.SSE.B.3.A, HSA.APR.B.3, HSN.RN.A.2, HSA.SSE.A.2, HSA.REI.B.4.B, HSA.REI.B.4.A, HSA.SSE.B.3.B, HSA.REI.C.7	
• HSA.REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y=f(x)$ and $y=g(x)$ intersect are the solutions of the equation $f(x)=g(x)$; find the solutions approximately-eg., using technology to graph the functions, make tables of values, or find successive approximations. • HSA.SSE.B.3.A Factor a quadratic expression to reveal the zeros of the function it defines. • HSA.APR.B.3 Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial. • HSN.RN.A.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. • HSA.SSE.A.2 Use the structure of an expression to identify ways to rewrite it. • HSA.REI.B.4.B Solve quadratic equations by inspection (e.g., for $x^2=49$), taking square roots, completing the square, using the quadratic formula, and factoring, as appropriate to the initial form of equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real number a and b. • HAS.REI.B.4.A Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x-p)^2=q$ that has the same solutions. Derive the quadratic formula from this form. • HSA.SSE.B.3.B Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.	

- HSA.REI.C.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.

Topic 9 Summary

Essential Questions:

- How do you use quadratic equations to model situations and solve problems?

Enduring Understandings:

- A quadratic equation is an equation of the second degree. It can have 0, 1, or 2 solutions. The x-intercepts of a graph and the zeros in a table can be used to identify the real solutions.
- In the standard form of a quadratic equation $ax^2 + bx + c = 0$, where $a \neq 0$, the factors of the equation determine the solutions. The Zero-Product Property states that for all real numbers a and b , if $ab = 0$, then either $a = 0$ or $b = 0$.
- Properties of exponents are used to rewrite radical expressions in different forms. A radical expression is written in the simplest form when there are no perfect square factors other than 1 in the radicand.
- When a quadratic equation is in the form $ax^2 + b = c$, it can be solved by isolating the ax^2 term, simplifying to remove the coefficients, and then taking the square root of each side of the equation.
- To complete the square, add the square of half of the coefficient of x to each side of the equation. Completing the square is useful when solving quadratic equations that are not factorable.
- The quadratic formula can be used to solve every quadratic equation and is particularly useful for those that cannot be easily factored. The discriminant of the quadratic formula indicates the number of solutions of the equation.
- For any system of two equations in two variables, the solution consists of the ordered pairs that satisfy both equations.

Learning Targets

Students will be able to understand:

- 9.1 Solving Quadratic Equations using Graphs and Tables
- 9.2 Solving Quadratic Equations by Factoring
- 9.3 Rewriting Radical Expressions
- 9.4 Solving Quadratic Equations using Square Roots
- 9.5 Completing the Square

Students will be able to demonstrate:

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9.6 The Quadratic Formula and the Discriminant 9.7 Solving Systems of linear and Quadratic Equations	
Content Area: Math Topic 10	Topic 10= 17 days
Unit Title: Working with Functions	
Grade Level: Algebra 1	
NJSLs Addressed: HSF.IF.B.6, HSF.IF.C.7.B, HSF.IF.B.5, HSF.BF.B.3, HSF.BF.A.1.B, HSF.BF.B.4A	
- HSF.IF.B.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. - HSF.IF.C.7.B Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions. - HSF.IF.B.5 Relate the domain of a function to its graph and. Where applicable, to the quantitative relationship it describes. - HSF.BF.B.3 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. - HSF.BF.A.1.B Combine standard function types-linear, quadratic, exponential, and square root functions-using addition, subtraction, and multiplication. - HSF.BF.B.4A Solve an equation of the form $f(x)=c$ for a simple function f that has an inverse and write an expression for the inverse.	

Topic 10 Summary

Essential Questions:

- What are some operations on functions that you can use to create models and solve problems?

Enduring Understandings:

- A square root function contains a square root symbol with the independent variable in the radicand.
- **The general form of a cube root function is $f(x) = \sqrt[3]{x}$. It intersects both axes at the origin, and the domain and range are all real numbers.**
- The key features of the graphs of functions-including the domain, range, maximum and minimum values, axis of symmetry, and end behavior-are used to identify and compare functions.
- Changes to the input and output of a function in the form $f(x-h)+k$ result in a translation of the graph of the function. Adding a constant k to the output of the function shifts the graph vertically. Subtracting a constant h from the input of the function shifts the graph horizontally.
- The graphs of functions are transformed when the input and output are multiplied by varying factors of k . Multiplying the output by a factor of k stretches or compresses the graph vertically. Multiplying the input by a factor of k stretches or compresses the graph horizontally.
- Functions can be combined in the same way as numbers, expressions, and polynomials. Addition, subtraction, and multiplication can be used to find $(f+g)(x)$, $(f-g)(x)$, and $(f \cdot g)(x)$.
- A one to one function is a function for which each range value corresponds to exactly one domain value. For these functions, it is possible to describe an inverse function, which reverses the order of the outputs and inputs of the function.

Learning Targets

Students will be able to understand:

- 10.1 The Square Root Function
- 10.2 The Cube Root Function
- 10.3 Analyzing Functions Graphically
- 10.4 Translations of Functions
- 10.5 Compressions and Stretches of Functions
- 10.6 Operations with Functions
- 10.7 Inverse Functions

Students will be able to demonstrate:

- Graph the translations of the square root function.
- Calculate and interpret the average rate of change for a square root function over a specified interval.
- Identify key features of the graph of cube root functions and graph translations of them.
- Model real-world situations using the cube root functions.
- Calculate and interpret the average rate of change of a cube root function over a specified interval.

	• Relate the domain and range of a function to its graph. • Analyze the key features of the graph of a function to identify the type of function it represents. • Graph translations of absolute value, exponential, quadratic, and radical functions. • Determine how combining translations affects the key features of the graph of a function. • Identify the effect on the graph of a function of multiplying the output by (-1). • Identify the effect on the graph of a function of replacing $f(x)$ by $kf(x)$ or $f(kx)$ for specific values of k. • Use mathematical modeling to represent a problem situation and to propose a solution. • Test and verify the appropriateness of their math models. • Explain why the results from their mathematical models might not align exactly with the problem situation. • Combine functions using arithmetic operations, including addition, subtraction and multiplication. • Combine functions to solve real-world problems. • Write an equation of the inverse of a linear function. • Write the inverse of a quadratic function after restricting the domain so the original function is one-to one.
Content Area: Math Topic 11	Topic 11= 13 days
Unit Title: Analyzing Data Displays	
Grade Level: Algebra 1	
NJSLs Addressed: HSS.ID.A.1, HSS.ID.A.2, HSS.ID.A.3, HSS.ID.B.5	

- HSS.ID.A.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).
- HSS.ID.A.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) spread (interquartile range, standard deviation) of two or more different data sets.
- HSS.ID.A.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points.
- HSS.ID.B.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trend in data.

Topic 11 Summary

Essential Questions:

- How do you use statistics to model situations and solve problems?

Enduring Understandings:

- Dot plots, histograms, and box plots provide different information about the data sets they represent. Dot plots show the frequency of data and clearly show clusters, gaps, and outliers. Histograms show the distribution of values within a data set and shape of the data. Box plots show the center and spread of a distribution.
- Measures of center and variability are used to compare data sets displayed in dot plots, box plots, and histograms. Dot plots show how much the data vary. Box plots show the minimum, maximum, and center of the data. Histograms show ranges of data.
- When the shape of the data display is symmetric, the mean is equal (or approximately equal) to the median. When the shape of the data display is skewed right or skewed left, the mean and median are not equal.
- Standard deviation is a measure of spread, or variability. It indicates by how much the values in a data set deviate from the mean.
- Two-way frequency tables show relationships between two sets of categorical data. Entries in the table can be frequency counts or relative frequency. Two-way frequency tables are used to analyze data and make inferences about a population.

Learning Targets

Students will be able to understand:

- 11.1 Analyzing Data Displays
- 11.2 Comparing Data Sets
- 11.3 Interpreting the Shapes and Displays
- 11.4 Standard Deviation
- 11.5 Two-Way Frequency Tables

Students will be able to demonstrate:

- Represent data using dot plots, box plots, and histograms.
- Interpret the data displayed in dot plots, box plots, and histograms within the context of the data that it represents.
- Use measures of center to interpret and compare data sets displayed in dot plots, box plots, and histograms.

	• Explain and account for the effect of outliers on measures of center and variability. • Use measures of variability, such as the MAD and IQR, to interpret and compare data sets. • Interpret and compare differences in the shape, center and spread of data of different data sets. • Determine the relationship between the mean and median of a data set when the shape of the data is evenly spread, skewed right or skewed left. • Interpret differences in the variability or spread in the context of a data set. • Calculate the standard deviation of a data set and use it to compare and interpret data sets. • Organize and summarize categorical data by creating two-way frequency tables. • Calculate and interpret joint and marginal frequencies, joint and marginal relative frequencies, and conditional relative frequencies, and use them to make inferences about a population. • Use mathematical modeling to represent a problem situation and to propose a solution. • Test and verify the appropriateness of the math model. • Explain why the results from the mathematical model might not align exactly with the problem situation.

Assessments

Benchmark:

- EnVision End of Unit Assessments

Formative:

Formative Assessment's goal is to monitor student learning to provide ongoing feedback that can be used by instructors to improve their teaching and by students to improve their learning.

- Drawing a concept map to represent understanding of a topic
- Classroom polls
- Exit tickets
- Turning in assignment for early feedback
- One minute papers

Summative:

Summative Assessments' goal is to evaluate students' learning at the end of an instructional unit by comparing it against some standard or benchmark.

- End of Unit or Chapter Test
- End of Course Assessment
- A final project or paper
- Standardized Test

Alternative Assessments:

- Teacher Observations
- Patterns
- Collage
- Paint By Number
- Crossword Puzzle
- Calendar

Interdisciplinary Connections:

- Language Arts, Art & Science

21st Century Life & Career Skills Standards (Career Education)

(State 21st century themes here). Link <http://www.state.nj.us/education/cccs/2014/career/>

21st Century Life and Career Standards

21st Century Career Ready Practices

9.1.8.A.4 Relate earning power to quality of life across cultures.
 9.1.8.A.5 Relate how the demand for certain skills determines an individual's earning power.
 9.1.8.B.4 Relate the concept of deferred gratification to [investment,] meeting financial goals, and building wealth.
 9.1.8.B.5 Explain the effect of the economy on personal income, individual and family security, and consumer decisions.
 9.1.8.D.1 Determine how saving contributes to financial well-being.
 9.1.8.E.1 Explain what it means to be a responsible consumer and the factors to consider when making consumer decisions.
 9.1.8.E.2 Identify personal information that should not be disclosed to others and the possible consequences of doing or not doing so.
 9.1.8.E.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career
 9.1.8.E.4 Prioritize personal wants and needs when making purchases.
 9.2.8.B.1 Research careers within the 16 Career Clusters® and determine attributes of career success.
 9.2.8.B.2 Develop a Personalized Student Learning Plan with the assistance of an adult mentor that includes information about career areas of interest, goals and an educational plan.
 9.2.8.B.3 Evaluate communication, collaboration, and leadership skills that can be developed through school, homework, and extracurricular activities for use in a career.
 9.2.8.B.7 Evaluate the impact of online activities and social media on employer decisions.

CRP1. Act as a responsible and contributing citizen and employee.
 CRP2. Apply appropriate academic and technical skills.
 CRP3. Attend to personal health and financial well-being.
 CRP4. Communicate clearly and effectively and with reason.
 CRP5. Consider the environmental, social and economic impacts of decisions.
 CRP6. Demonstrate creativity and innovation.
 CRP7. Employ valid and reliable research strategies.
 CRP8. Utilize critical thinking to make sense of problems and persevere in solving them.
 CRP9. Model integrity, ethical leadership and effective management.
 CRP10. Plan education and career paths aligned to personal goals.
 CRP11. Use technology to enhance productivity.
 CRP12. Work productively in teams while using cultural global competence.

Integration of Technology Standards

<https://www.state.nj.us/education/cccs/2014/tech/>

Content Area	Technology	
Standard	8.1 Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.	
Strand	A. Technology Operations and Concepts: <i>Students demonstrate a sound understanding of technology concepts, systems and operations.</i>	
Grade Level bands	Content Statement Students will:	Indicator
P	Understand and use technology systems.	8.1.P.A.1 Use an input device to select an item and navigate the screen
		8.1.P.A.2 Navigate the basic functions of a browser.
	Select and use applications effectively and productively.	8.1.P.A.3 Use digital devices to create stories with pictures, numbers, letters and words.
		8.1.P.A.4 Use basic technology terms in the proper context in conversation with peers and teachers (e.g., camera, tablet, Internet, mouse, keyboard, and printer).
		8.1.P.A.5 Demonstrate the ability to access and use resources on a computing device.
K-2	Understand and use technology systems.	8.1.2.A.1 Identify the basic features of a digital device and explain its purpose.

	Select and use applications effectively and productively.	8.1.2.A.2 Create a document using a word processing application.
		8.1.2.A.3 Compare the common uses of at least two different digital applications and identify the advantages and disadvantages of using each.
		8.1.2.A.4 Demonstrate developmentally appropriate navigation skills in virtual environments (i.e. games, museums).
		8.1.2.A.5 Enter information into a spreadsheet and sort the information.
		8.1.2.A.6 Identify the structure and components of a database.
		8.1.2.A.7 Enter information into a database or spreadsheet and filter the information.
3-5	Understand and use technology systems.	8.1.5.A.1 Select and use the appropriate digital tools and resources to accomplish a variety of tasks including solving problems.
	Select and use applications effectively and productively.	8.1.5.A.2 Format a document using a word processing application to enhance text and include graphics, symbols and/ or pictures.
		8.1.5.A.3 Use a graphic organizer to organize information about problem or issue.
		8.1.5.A.4 Graph data using a spreadsheet, analyze and produce a report that explains the analysis of the data.
		8.1.5.A.5 Create and use a database to answer basic questions.

		8.1.5.A.6 Export data from a database into a spreadsheet; analyze and produce a report that explains the analysis of the data.
6-8	Understand and use technology systems.	8.1.8.A.1 Demonstrate knowledge of a real world problem using digital tools.
	Select and use applications effectively and productively.	8.1.8.A.2 Create a document (e.g. newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for usability.
		8.1.8.A.3 Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
		8.1.8.A.4 Graph and calculate data within a spreadsheet and present a summary of the results
		8.1.8.A.5 Create a database query, sort and create a report and describe the process, and explain the report results.
Strand	B. Creativity and Innovation: <i>Students demonstrate creative thinking, construct knowledge and develop innovative products and process using technology.</i>	
Grade Level bands	Content Statement Students will:	Indicator
P		8.1.P.B.1 Create a story about a picture taken by the student on a digital camera or mobile device.
K-2		8.1.2.B.1 Illustrate and communicate original ideas and stories using multiple digital tools and resources.
3-5		8.1.5.B.1 Collaborative to produce a digital story about a significant local event or issue based on first-

		person interviews.
6-8		8.1.8.B.1 Synthesize and publish information about a local or global issue or event (ex. telecollaborative project, blog, school web).
Strand	C. Communication and Collaboration: <i>Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.</i>	
Grade Level bands	Content Statement	Indicator
P	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.	8.1.P.C.1 Collaborate with peers by participating in interactive digital games or activities.
K-2	Communicate information and ideas to multiple audiences using a variety of media and formats.	8.1.2.C.1 Engage in a variety of developmentally appropriate learning activities with students in other classes, schools, or countries using various media formats such as online collaborative tools, and social media.
3-5	Develop cultural understanding and global awareness by engaging with learners of other cultures.	8.1.5.C.1 Engage in online discussions with learners of other cultures to investigate a worldwide issue from multiple perspectives and sources, evaluate findings and present possible solutions, using digital tools and online resources for all steps.
6-8	Contribute to project teams to produce original works or solve problems.	8.1.8.C.1 Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries.
		8.1.12.C.1 Develop an innovative solution to a real world problem or issue in collaboration with peers and experts, and present ideas for feedback through social media or in an online community.
Strand	D. Digital Citizenship: <i>Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.</i>	

Grade Level bands	Content Statement	Indicator
K-2	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.2.D.1 Develop an understanding of ownership of print and nonprint information.
3-5	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.5.D.1 Understand the need for and use of copyrights.
		8.1.5.D.2 Analyze the resource citations in online materials for proper use.
	Demonstrate personal responsibility for lifelong learning.	8.1.5.D.3 Demonstrate an understanding of the need to practice cyber safety, cyber security, and cyber ethics when using technologies and social media.
	Exhibit leadership for digital citizenship.	8.1.5.D.4 Understand digital citizenship and demonstrate an understanding of the personal consequences of inappropriate use of technology and social media.
6-8	Advocate and practice safe, legal, and responsible use of information and technology.	8.1.8.D.1 Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
	Demonstrate personal responsibility for lifelong learning.	8.1.8.D.2 Demonstrate the application of appropriate citations to digital content.
		8.1.8.D.3 Demonstrate an understanding of fair use and Creative Commons to intellectual property.
	Exhibit leadership for digital citizenship.	8.1.8.D.4 Assess the credibility and accuracy of digital content.
		8.1.8.D.5 Understand appropriate uses for social media and the negative consequences of misuse.

Strand	E: Research and Information Fluency: <i>Students apply digital tools to gather, evaluate, and use information.</i>	
Grade Level bands	Content Statement	Indicator
P	Plan strategies to guide inquiry.	8.1.P.E.1 Use the Internet to explore and investigate questions with a teacher's support.
K-2	Plan strategies to guide inquiry Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.	8.1.2.E.1 Use digital tools and online resources to explore a problem or issue.
3-5	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks.	8.1.5.E.1 Use digital tools to research and evaluate the accuracy of, relevance to, and appropriateness of using print and non-print electronic information sources to complete a variety of tasks.
6-8	Plan strategies to guide inquiry. Locate, organize, analyze, evaluate, synthesize, and ethically use information from a variety of sources and media. Evaluate and select information sources and digital tools based on the appropriateness for specific tasks. Process data and report results.	8.1.8.E.1 Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
Strand	F: Critical thinking, problem solving, and decision making: <i>Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.</i>	
Grade Level Bands	Content Statement	Indicator
K-2	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a	8.1.2.F.1 Use geographic mapping tools to plan and solve problems

	project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions.	
3-5	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative solutions	8.1.5.F.1 Apply digital tools to collect, organize, and analyze data that support a scientific finding.
6-8	Identify and define authentic problems and significant questions for investigation. Plan and manage activities to develop a solution or complete a project. Collect and analyze data to identify solutions and/or make informed decisions. Use multiple processes and diverse perspectives to explore alternative	8.1.8.F.1 Explore a local issue, by using digital tools to collect and analyze data to identify a solution and make an informed decision.

Content Area	Technology
Standard	8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
Strand	A. The Nature of Technology: Creativity and Innovation <i>Technology systems impact every aspect of the world in which we live.</i>

Grade Level bands	Content Statement	Indicator	Indicator
K-2	The characteristics and scope of technology.	8.2.2.A.1	Define products produced as a result of technology or of nature.
		8.2.2.A.2	Describe how designed products and systems are useful at school, home and work.
	The core concepts of technology.	8.2.2.A.3	Identify a system and the components that work together to accomplish its purpose.
		8.2.2.A.4	Choose a product to make and plan the tools and materials needed.
	The relationships among technologies and the connections between technology and other fields of study.	8.2.2.A.5	Collaborate to design a solution to a problem affecting the community.
3-5	The characteristics and scope of technology.	8.2.5.A.1	Compare and contrast how products made in nature differ from products that are human made in how they are produced and used.
		8.2.5.A.2	Investigate and present factors that influence the development and function of a product and a system.
	The core concepts of technology.	8.2.5.A.3	Investigate and present factors that influence the development and function of products and systems, e.g., resources, criteria and constraints.

	The relationships among technologies and the connections between technology and other fields of study.	8.2.5.A.4	Compare and contrast how technologies have changed over time due to human needs and economic, political and/or cultural influences.
		8.2.5.A.5	Identify how improvement in the understanding of materials science impacts technologies.
6-8	The characteristics and scope of technology.	8.2.8.A.1	Research a product that was designed for a specific demand and identify how the product has changed to meet new demands (i.e. telephone for communication - smart phone for mobility needs).
	The core concepts of technology.	8.2.8.A.2	Examine a system, consider how each part relates to other parts, and discuss a part to redesign to improve the system.
		8.2.8.A.3	Investigate a malfunction in any part of a system and identify its impacts.
	The relationships among technologies and the connections between technology and other fields of study.	8.2.8.A.4	Redesign an existing product that impacts the environment to lessen its impact(s) on the environment.
		8.2.8.A.5	Describe how resources such as material, energy, information, time, tools, people, and capital contribute to a technological product or system.
Content Area	Technology		

Standard		8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	
Strand		B. Technology and Society: <i>Knowledge and understanding of human, cultural and societal values are fundamental when designing technological systems and products in the global society.</i>	
Grade Level bands	Content Statement Students will be able to understand:	Indicator	Indicator
K-2	The cultural, social, economic and political effects of technology.	8.2.2.B.1	Identify how technology impacts or improves life.
	The effects of technology on the environment.	8.2.2.B.2	Demonstrate how reusing a product affects the local and global environment.
	The role of society in the development and use of technology.	8.2.2.B.3	Identify products or systems that are designed to meet human needs.
	The influence of technology on history.	8.2.2.B.4	Identify how the ways people live and work has changed because of technology.

3-5	The cultural, social, economic and political effects of technology.	8.2.5.B.1	Examine ethical considerations in the development and production of a product through its life cycle.
	The effects of technology on the environment.	8.2.5.B.2	Examine systems used for recycling and recommend simplification of the systems and share with product developers.
		8.2.5.B.3	Investigate ways that various technologies are being developed and used to reduce improper use of resources.
	The role of society in the development and use of technology.	8.2.5.B.4	Research technologies that have changed due to society's changing needs and wants.
		8.2.5.B.5	Explain the purpose of intellectual property law.
	The influence of technology on history.	8.2.5.B.6	Compare and discuss how technologies have influenced history in the past century.
6-8	The cultural, social, economic and political effects of technology.	8.2.8.B.1	Evaluate the history and impact of sustainability on the development of a designed product or system over time and present results to peers.
		8.2.8.B.2	Identify the desired and undesired consequences from the use of a product or system.

The effects of technology on the environment.	8.2.8.B.3	Research and analyze the ethical issues of a product or system on the environment and report findings for review by peers and /or experts.
	8.2.8.B.4	Research examples of how humans can devise technologies to reduce the negative consequences of other technologies and present your findings.
The role of society in the development and use of technology.	8.2.8.B.5	Identify new technologies resulting from the demands, values, and interests of individuals, businesses, industries and societies.
	8.2.8.B.6	Compare and contrast the different types of intellectual property including copyrights, patents and trademarks.
The influence of technology on history.	8.2.8.B.7	Analyze the historical impact of waste and demonstrate how a product is upcycled, reused or remanufactured into a new product.

Content Area	Technology
Standard	8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.
Strand	C. Design: <i>The design process is a systematic approach to solving problems.</i>

Grade Level bands	Content Statement Students will be able to understand:	Indicator	Indicator
K-2	The attributes of design.	8.2.2.C.1	Brainstorm ideas on how to solve a problem or build a product.
		8.2.2.C.2	Create a drawing of a product or device that communicates its function to peers and discuss.
		8.2.2.C.3	Explain why we need to make new products.
	The application of engineering design.	8.2.2.C.4	Identify designed products and brainstorm how to improve one used in the classroom.
		8.2.2.C.5	Describe how the parts of a common toy or tool interact and work as part of a system.
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.2.C.6	Investigate a product that has stopped working and brainstorm ideas to correct the problem.
3-5	The attributes of design.	8.2.5.C.1	Collaborate with peers to illustrate components of a designed system.
		8.2.5.C.2	Explain how specifications and limitations can be used to direct a product's development.

		8.2.5.C.3	Research how design modifications have lead to new products.
	The application of engineering design.	8.2.5.C.4	Collaborate and brainstorm with peers to solve a problem evaluating all solutions to provide the best results with supporting sketches or models.
		8.2.5.C.5	Explain the functions of a system and subsystems.
	The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.5.C.6	Examine a malfunctioning tool and identify the process to troubleshoot and present options to repair the tool.
		8.2.5.C.7	Work with peers to redesign an existing product for a different purpose.
6-8	The attributes of design.	8.2.8.C.1	Explain how different teams/groups can contribute to the overall design of a product.
		8.2.8.C.2	Explain the need for optimization in a design process.
		8.2.8.C.3	Evaluate the function, value, and aesthetics of a technological product or system, from the perspective of the user and the producer.
		8.2.8.C.4	Identify the steps in the design process that would be used to solve a designated problem.

The application of engineering design.	8.2.8.C.5	Explain the interdependence of a subsystem that operates as part of a system.
	8.2.8.C.5.a	Create a technical sketch of a product with materials and measurements labeled.
	8.2.8.C.6	Collaborate to examine a malfunctioning system and identify the step-by-step process used to troubleshoot, evaluate and test options to repair the product, presenting the better solution.
	8.2.8.C.7	Collaborate with peers and experts in the field to research and develop a product using the design process, data analysis and trends, and maintain a design log with annotated sketches to record the developmental cycle.
The role of troubleshooting, research and development, invention and innovation and experimentation in problem solving.	8.2.8.C.8	Develop a proposal for a chosen solution that includes models (physical, graphical or mathematical) to communicate the solution to peers.

Content Area		Technology	
Standard		8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	
Strand		D. Abilities for a Technological World: <i>The designed world is the product of a design process that provides the means to convert resources into products and systems.</i>	
Grade Level bands	Content Statement Students will understand how to:	Indicator	Indicator

K-2	Apply the design process.	8.2.2.D.1	Collaborate and apply a design process to solve a simple problem from everyday experiences.
	Use and maintain technological products and systems.	8.2.2.D.2	Discover how a product works by taking it apart, sketching how parts fit, and putting it back together.
		8.2.2.D.3	Identify the strengths and weaknesses in a product or system.
		8.2.2.D.4	Identify the resources needed to create technological products or systems.
	Assess the impact of products and systems.	8.2.2.D.5	Identify how using a tool (such as a bucket or wagon) aids in reducing work.
3-5	Apply the design process.	8.2.5.D.1	Identify and collect information about a problem that can be solved by technology, generate ideas to solve the problem, and identify constraints and trade-offs to be considered.
		8.2.5.D.2	Evaluate and test alternative solutions to a problem using the constraints and trade-offs identified in the design process to evaluate potential solutions.
	Use and maintain technological products and systems.	8.2.5.D.3	Follow step by step directions to assemble a product or solve a problem.
		8.2.5.D.4	Explain why human-designed systems, products, and environments need to be constantly monitored, maintained, and improved.
		8.2.5.D.5	Describe how resources such as material, energy, information, time, tools, people and capital are used in products or systems.

	Assess the impact of products and systems.	8.2.5.D.6	Explain the positive and negative effect of products and systems on humans, other species and the environment, and when the product or system should be used.
		8.2.5.D.7	Explain the impact that resources such as energy and materials used in a process to produce products or system have on the environment.
6-8	Apply the design process.	8.2.8.D.1	Design and create a product that addresses a real world problem using a design process under specific constraints.
		8.2.8.D.2	Identify the design constraints and trade-offs involved in designing a prototype (e.g., how the prototype might fail and how it might be improved) by completing a design problem and reporting results in a multimedia presentation, design portfolio or engineering notebook.
		8.2.8.D.3	Build a prototype that meets a STEM-based design challenge using science, engineering, and math principles that validate a solution.
	Use and maintain technological products and systems.	8.2.8.D.4	Research and publish the steps for using and maintaining a product or system and incorporate diagrams or images throughout to enhance user comprehension.
	Assess the impact of products and systems.	8.2.8.D.5	Explain the impact of resource selection and the production process in the development of a common or technological product or system.
		8.2.8.D.6	Identify and explain how the resources and processes used in the production of a current technological product can be modified to have a more positive impact on the environment.

Content Area		Technology	
Standard		8.2 Technology Education, Engineering, Design, and Computational Thinking - Programming: All students will develop an understanding of the nature and impact of technology, engineering, technological design, computational thinking and the designed world as they relate to the individual, global society, and the environment.	
Strand		E. Computational Thinking: Programming: <i>Computational thinking builds and enhances problem solving, allowing students to move beyond using knowledge to creating knowledge.</i>	
Grade Level bands	Content Statement Students will be able to understand:	Indicator	Indicator
K-2	Computational thinking and computer programming as tools used in design and engineering.	8.2.2.E.1	List and demonstrate the steps to an everyday task.
		8.2.2.E.2	Demonstrate an understanding of how a computer takes input through a series of written commands and then interprets and displays information as output.
		8.2.2.E.3	Create algorithms (a sets of instructions) using a predefined set of commands (e.g., to move a student or a character through a maze).
		8.2.2.E.4	Debug an algorithm (i.e., correct an error).

		8.2.2.E.5	Use appropriate terms in conversation (e.g., basic vocabulary words: input, output, the operating system, debug, and algorithm).
3-5	Computational thinking and computer programming as tools used in design and engineering.	8.2.5.E.1	Identify how computer programming impacts our everyday lives.
		8.2.5.E.2	Demonstrate an understanding of how a computer takes input of data, processes and stores the data through a series of commands, and outputs information.
		8.2.5.E.3	Using a simple, visual programming language, create a program using loops, events and procedures to generate specific output.
		8.2.5.E.4	Use appropriate terms in conversation (e.g., algorithm, program, debug, loop, events, procedures, memory, storage, processing, software, coding, procedure, and data).
6-8	Computational thinking and computer programming as tools used in design and engineering.	8.2.8.E.1	Identify ways computers are used that have had an impact across the range of human activity and within different careers where they are used.
		8.2.8.E.2	Demonstrate an understanding of the relationship between hardware and software.
		8.2.8.E.3	Develop an algorithm to solve an assigned problem using a specified set of commands and use peer review to critique the solution.
		8.2.8.E.4	Use appropriate terms in conversation (e.g., programming, language, data, RAM, ROM, Boolean logic terms).

Accommodations and Modifications for students who are classified as Gifted and Talented Students:

(This course of instruction shall be modified through varying techniques, strategies, materials, etc. to meet the needs of all students, including, but not limited to, special education, E.L.L. and basic skills. Programs shall be modified based on I.E.P.'s, 504's, etc.)

Differentiation Strategies

Differentiation strategies can require varied amounts of preparation time. High-prep strategies often require a teacher to both create multiple pathways to process information/demonstrate learning and to assign students to those pathways. Hence, more ongoing monitoring and assessment is often required. In contrast, low-prep strategies might require a teacher to strategically create process and product choices for students, but students are allowed to choose which option to pursue given their learning profile or readiness level.

Low Prep Strategies

Varied journal prompts, spelling or vocabulary lists

Students are given a choice of different journal prompts, spelling lists or vocabulary lists depending on level of proficiency/assessment results.

Anchor activities

Anchor activities provide meaningful options for students when they are not actively engaged in classroom activities (e.g., when they finish early, are waiting for further directions, are stumped, first enter class, or when the teacher is working with other students). Anchors should be directly related to the current learning goals.

Choices of books

Different textbooks or novels (often at different levels) that students are allowed to choose from for content study or for literature circles.

Choices of review activities

Different review or extension activities are made available to students during a specific section of the class (such as at the beginning or end of the period).

Flexible grouping	Students might be instructed as a whole group, in small groups of various permutations (homogeneous or heterogeneous by skill or interest), in pairs or individual. Any small groups or pairs change over time based on assessment data.
Multiple Intelligence or Learning Style options	Students select activities or are assigned an activity that is designed for learning a specific area of content through their strong intelligence (verbal-linguistic, interpersonal, musical, etc.)
Varying scaffolding of same organizer	Provide graphic organizers that require students to complete various amounts of information.
Think-Pair-Share by readiness, interest, and/or learning profile	Students are placed in predetermined pairs, asked to think about a question for a specific amount of time, then are asked to share their answers first with their partner and then with the whole group.
Mini workshops to re-teach or extend skills	A short, specific lesson with a student or group of students that focuses on one area of interest or reinforcement of a specific skill.
Games to practice mastery of information and skill	Use games as a way to review and reinforce concepts. Include questions and tasks that are on a variety of cognitive levels.
Multiple levels of questions	Teachers vary the sorts of questions posed to different students based on their ability to handle them. Varying questions is an excellent way to build the confidence (and motivation) of students who are reluctant to contribute to class discourse.
High Prep Strategies (add to list as needed)	
Cubing	Designed to help students think about a topic or idea from many different angles or perspectives. The tasks are placed on the six sides of a cube and use commands that help support thinking (justify, describe, evaluate, connect, etc.). The students complete the task on the side that ends face up, either independently or in homogenous groups.
Tiered assignment/ product	The content and objective are the same, but the process and/or the products that students must create to demonstrate mastery are varied according to the students' readiness level.
Independent studies	Students choose a topic of interest that they are curious about and wants to discover new information on. Research is done from questions developed by the student and/or teacher. The researcher produces a product to share learning with classmates.
Jigsaw	Students are grouped based on their reading proficiency and each group is given an appropriate text on a specific aspect of a topic (the economic, political and social impact of the Civil War, for example). Students later get into heterogeneous groups to share their findings with their peers, who have read about different areas of study from source texts on their own reading levels. The jigsaw technique allows you to tackle the same subject with all of your students while discreetly

	providing them the different tools they need to get there.
Multiple texts	The teacher obtains or creates a variety of texts at different reading levels to assign strategically to students.
Alternative assessments	After completing a learning experience via the same content or process, the student may have a choice of products to show what has been learned. This differentiation creates possibilities for students who excel in different modalities over others (verbal versus visual).
Modified Assessments	Assessments can be modified in a variety of ways – for example by formatting the document differently (e.g. more space between questions) or by using different types of questions (matching vs. open ended) or by asking only the truly essential questions.
Literature circles	Flexible grouping of students who engage in different studies of a piece of literature. Groups can be heterogeneous and homogeneous.
Learning Centers	A station (or simply a collection of materials) that students might use independently to explore topics or practice skills. Centers allow individuals or groups of students to work at their own pace. Students are constantly reassessed to determine which centers are appropriate for students at a particular time, and to plan activities at those centers to build the most pressing skills.
Tic-Tac-Toe Choice Board	The tic-tac-toe choice board is a strategy that enables students to choose multiple tasks to practice a skill, or demonstrate and extend understanding of a process or concept. From the board, students choose (or the teacher assigns) three adjacent or diagonal. To design a tic-tac-toe board: - Identify the outcomes and instructional focus - Design 9 different tasks - Use assessment data to determine student levels - Arrange the tasks on a tic-tac-toe board either randomly, in rows according to level of difficulty, or you may want to select one critical task to place in the center of the board for all students to complete.
Gifted and Talented: The regulations require that district boards of education provide appropriate K-12 services for gifted and talented students. This includes appropriate curricular and instructional modifications for gifted and talented students indicating content, process, products, and learning environment. District boards of education must also take into consideration the <i>PreK-Grade 12 National Gifted Program Standards</i> of the National Association for Gifted Children in developing programs for gifted and talented students. A copy of those standards is available at www.nagc.org. In addition, information can be found at www.state.nj.us/education/aps/ccs/gandt.	

Accommodations and Modifications for students who are classified as E.L.L Students:

(This course of instruction shall be modified through varying techniques, strategies, materials, etc. to meet the needs of all students, including, but not limited to, special education, E.L.L. and basic skills. Programs shall be modified based on I.E.P.'s, 504's, etc.)

Classroom Modifications for E.L.L.

PACING:

- Extend time requirements
- Omit assignments

PRESENTATION OF SUBJECT MATERIAL:

- Use individual/small group instruction
- Use specialized curriculum
- Simplify language
- Tape lectures for playback
- Demonstrate concepts
- Use manipulatives
- Emphasize critical information
- Use graphic organizers
- Pre-teach vocabulary

ENVIRONMENT:

- Assign preferential seating
- Assign peer buddy

MATERIALS:

- Provide taped textbooks
- Highlight textbooks/study guides
- Use supplementary materials
- Give assistance in note taking
- Type handwritten teacher materials
- Use bilingual dictionaries, language learner dictionaries and electronic translators
- Use adapted/modified textbooks Allow use of computer/word processor

REINFORCEMENT AND FOLLOW THROUGH:

- Use positive reinforcement
- Use concrete reinforcement
- Check often for understanding/review
- Arrange for peer tutoring

TESTING ADAPTATIONS;

- Allow students to answer orally
- Use multiple-choice format
- Read test to student
- Modify format

• Plan cooperative learning experiences • Provide language experience • Give immediate feedback • Have student repeat directions • Make/use vocabulary files • Teach study skills • Use study guides to organize materials • Repeat/review/drill	• Write a different test • Shorten test length • Require only selected test items • Create alternative assessment
ASSIGNMENTS: • Lower reading level • Give directions in small, distinct steps • Allow copying from paper/book • Use written backup for oral directions • Lower difficulty level • Shorten assignment • Read directions to students • Give oral clues or prompts • Record or type assignments • Adapt worksheets, packets Use alternate assignments	GRADING: • Modify grading system • Modify weights of course components • Modify course objectives/outcome

Classroom Accommodations for E.L.L	
Environment: • Preferential Seating • Assign peer tutor • Visual charts/cues • Provide tape recorded discourse • Highlight key words • Use real objects/manipulatives • Refer to prior knowledge (K-W-L or other) • Provide quiet study space	Assignment: • Adjust reading level materials • Single step directions • Provide extra examples/models • Shorten assignment/task • Directions read aloud • Adapt/simplify language on task • Give oral prompts/cues • Allow projects to replace written tasks
Presentation: • Individual/small group discussions • Use specialized curriculum/equipment • Simplify language/key word	Materials: • Provide tape recorded text • Provide supplementary materials • Highlighted text

• Demonstrations for key concepts • Visual or Multi-modal presentations • Frequently check for understanding • Use manipulatives • Native Language presentations	• Bilingual dictionaries/glossaries • Use of graphic organizers • Pre-teach all vocabulary • Provide varied visual/multi-sensory input • Native Language Text
Management: • Allow oral responses • Use positive reinforcement • Repeat all directions • Use cooperative learning groups • Use projects/interdisciplinary tasks • Provide language experience tasks • Have student repeat directions • Immediate praise/feedback • Plan peer tutors/models • Provide high interest topics/options • Provide extended time to complete tasks • Allow student to think/speak in native language	Class Assessment: • Allow oral responses • Read test aloud • Read portions/key words on test • Modify format/length of test • Alternate with culturally non-biased items • Provide glossaries in native language • Modify test items/weighted scores • Use multiple choice format

Accommodations for English Language Learners General Classroom and Content Areas

MATH:

- At beginning to intermediate levels of proficiency, English Language Learners should be shown examples of a completed assignment to model the correct format.
- Assignments and directions should be printed on the board along with cursive representation.
- A bilingual assistant/interpreter, when available, could be used to explain math concepts in the student's primary language.
- Students should have access to counters, number lines and other types of manipulatives, which enable them to complete assignments at their level of instruction.
- Rewrite story problems in simpler English. Use short sentences, pictures, and illustrations to encourage understanding.
- Show students how to prepare a card file of number words. Write the word on one side and the symbol on the opposite side.

SOCIAL STUDIES

- Allow beginning and advanced beginning students to use drawings to demonstrate knowledge of concepts.
- Show English Language Learners at all proficiency levels a model of a project/assignment prior to their completing the assignment.
- Teach the key concepts while limiting the vocabulary and details in the lesson.
- Test only those key concepts addressed.
- Use many visual aids during the instruction process; i.e. overhead transparencies, maps, graphic organizers, puzzles, computer, etc.

- Tape record the test or give test orally to student.
- Allow ELL student capable of tape-recording lessons to do so. (Provides immediate feedback for student to listen to the lesson at home and work on assignments on his/her own.)

READING

When making accommodations for ELL students in the area of reading, it is important to remember that there is a difference between listening and speaking and reading and writing. Some English Language Learners might be considered advanced in speaking, but functioning at a beginning instructional level when it comes to reading with fluency. Keep this in mind when assigning grades. Try to remember to place the emphasis on the student's instructional level in Reading.

- ELL students at all proficiency levels should have reading materials provided at their instructional level by the classroom teacher.
- ELL students should be taught vocabulary in context; remember to limit the number of vocabulary words taught in each unit to only the key words. As comprehension increases, increase number of words.
- Tape record information for the ELL student to learn and let him/her listen to it.
- Let students act out the story to demonstrate understanding.
- Use a variety of strategies and approaches to teach reading. The key component is to make sure that students are being taught vocabulary through meaningful context, not in isolation.
- Provide the ELL student the background knowledge necessary in order to understand.
- Teach ELL students reading strategies that enable them to predict, connect, question, and visualize a story.

SCIENCE

- Homework should include completing graphs, drawing, writing in journal, etc.
- Students should work in groups when possible to solve problems or conduct experiments.
- Provide many hands-on experiences as ELL students learn best by doing and seeing lessons.
- Show ELL students at all proficiency levels a sample of a completed project or assignment when requiring a science project for a grade.
- Have students compile notebooks of their hypotheses, materials, procedures, data, conclusions of experiments, and field experiences.
- Have students prepare collections of science objects, such as sticks and leaves.
- Use "hands-on" experiential activities that do not rely on academic language for understanding
- Prepare large charts that summarize the steps involved in experiments.

WRITING

When making accommodations for English language learners in the area of writing, the same principle holds true. There is a large difference between listening and speaking and reading and writing. Many ELL students could be considered advanced in speaking but at a beginning instructional level in writing.

- ELL students may not know what cursive writing is; therefore, it will have to be taught.
- ELL students could be provided a list of basic sentence patterns or words (with pictures) most frequently used in their classrooms for use when writing independently.
- ELL students could use a journal as a means of practicing writing with teacher feedback.
- Classroom teacher could provide a model of what he/she expects the finishing writing assignment to look like.
- Allow ELL students to write about topics in which they have background knowledge.
- Allow ELL students to work together when possible to brainstorm and to begin the writing process.
- Use vocabulary words and sentence structures at the instructional level of the student. Use words from their own materials. The words must have meaning for the student. Provide context clues when helping the child to learn new material.
- Try to limit the number of spelling words assigned. Increase the number of words as comprehension level increases.
- Usually ELL student's oral language skills tend to be higher than their reading and writing skills. Adjust assignments based on the instructional level of the

student.

Accommodations and Modifications for students who are classified with 504's:

Examples of General Accommodations:

General program accommodations/adjustments or services are always made on a case-by-case basis and individualized. Accommodations are to be reasonable and are intended to provide persons with disabilities compensation for their functional limitation(s) due to a mental or physical impairment. Where Section 504 is concerned, accommodations are made to bring a student with a disability to the same starting point as a non-disabled student. Consequently, the accommodations defined in a Section 504 plan are those interventions that are not typically available to all students.

Environmental Strategies

- Provide a structured learning environment
- Make separate "space" for different types of tasks
- Possible adapting of non-academic times such as lunch, recess, and physical education
- Change student seating
- Utilize a study carrel
- Alter location or personal or classroom supplies for easier access or to minimize distraction
- Provide sensory breaks
- Provide a written or picture schedule

Organizational Strategies

- Model and reinforce organizational systems (i.e. color-coding)
- Write out homework assignments, check student's recording of assignments
- Tailor homework assignments toward student strengths
- Set time expectations for assignments
- Provide clues such as clock faces indicating beginning and ending times
- Teach study/organizational skills
- Schedule before or after school tutoring/homework assistance

Behavioral Strategies

- Use behavioral management techniques consistently within a classroom and across classes
- Implement behavioral/academic contracts
- Utilize positive verbal and/or nonverbal reinforcements
- Utilize logical consequences
- Confer with the student's parents (and student as appropriate)

- Establish a home/school communication system for behavior monitoring
- Post rules and consequences for classroom behavior
- Put student on daily/weekly progress report/contract
- Reinforce self-monitoring and self-recording of behaviors

Presentation Strategies

- Tape lessons so the student can listen to them again; allow students to tape lessons
- Use computer-aided instruction and other audiovisual equipment
- Select alternative textbooks, workbooks, or provide books on tape
- Highlight main ideas and supporting details in the book
- Provide copied material for extra practice (i.e. outlines, study guides)
- Prioritize drill and practice activities for relevance
- Vary the method of lesson presentation using multi-sensory techniques:
 - a) lecture plus overhead/board demonstration support
 - b) small groups required to produce a written product
 - c) large groups required to demonstrate a process
 - d) computer-assisted instruction
 - e) peer tutors or cross-age tutors
 - f) demonstrations, simulations
 - g) experiments
 - h) games
- Ask student to repeat/paraphrase context to check understanding
- Arrange for a mentor to work with student in his or her interest area or area of greatest strength
- Provide peer tutoring
- Simplify and repeat instructions about in-class and homework assignments
- Vary instructional pace
- Reinforce the use of compensatory strategies, i.e. pencil grip, mnemonic devices, “spell check”
- Vary kind of instructional materials used
- Assess whether student has the necessary prerequisite skills. Determine whether materials are appropriate to the student's current functioning levels
- Reinforce study skill strategies (survey, read, recite, review)
- Introduce definition of new terms/vocabulary and review to check for understanding
- Be aware of student's preferred learning style and provide matching instruction materials
- Pre-teach and/or re-teach important concepts • Prepare advanced organizers/study guides for new material

Assignments

- Modify the amount of homework
- Use written directions to supplement oral directions
- Reduce paper and pencil tasks
- Allow for assignments to be word processed

- Lower reading level of assignments
- Break assignments into a series of smaller assignments
- Use highlighted texts

Evaluation Methods

- Limit amount of material presented on a single page
- Provide a sample or practice test
- Provide for oral testing
- Provide tests in segments so that student hands in one segment before receiving the next part
- Provide personal copy of test tools and allow for color-coding/highlighting
- Adjust time for completion
- Modify weights of tests when grading

Accommodations and Modifications for students who are classified with IEP's:

(This course of instruction shall be modified through varying techniques, strategies, materials, etc. to meet the needs of all students, including, but not limited to, special education, E.S.L. and basic skills. Programs shall be modified based on I.E.P.'s, 504's, etc.)

A. Setting Accommodations

1. Administering the assessment:
 - a. individually in a separate room
 - b. in a small group in a separate room
 - c. in the resource room
 - d. in a special education classroom
 - e. at home or in a hospital (this will depend on the nature of the assessment task)
2. Seating the student in the front of the room near the examiner or proctor
3. Seating the student facing the examiner or proctor
4. Providing special lighting
5. Providing special furniture e.g., desks, trays, carrels

B. Scheduling Accommodations

1. Adding time as needed
2. Providing frequent breaks
3. Terminating a section of the test when a student has indicated that he/she has completed all the items he/she can. The examiner must ensure that the student has attempted all items in a section since items are not ordered by difficulty. When this accommodation is used, the test must be administered in a small group or individually to avoid distraction.

C. Test Materials Modifications

1. Administering the large-print version of the test
2. Administering the Braille version of the test

D. Test Procedure Modifications

1. Administration modifications
 - a. reading directions aloud
 - b. reading test items aloud (do not read aloud or sign the reading passages in Language Arts Literacy –the reading items may be read or signed); ONLY the teacher who must read the test items aloud or sign is permitted to have a test booklet assigned to him/her for this task
 - c. providing and ensuring that amplification (hearing aid and/or FM system) is in working order
 - d. using a sign language or cued speech interpreter to sign or cue the directions or test items but NOT the reading passages
 - e. masking a portion of the test booklet and/or answer folder to eliminate visual distractors or providing reading windows

- f. repeating, clarifying, or rewording directions ONLY
- g. providing written directions on a separate sheet or transparency
- h. using an examiner who is familiar with the student
- i. using an examiner who can communicate fluently in sign language (American Sign Language or a form of Manually Coded English)
- j. providing manipulatives for math items e.g., number line, counting chips, abacus (for NJ ASK 3-8 ONLY)
- k. using graph paper for HSPA Mathematics (all students are permitted graph paper for NJ ASK 3-8)
- l. using a Braille ruler and talking calculator or large-face calculator
- m. using tactile or visual cues for deaf or hard of hearing students to indicate time to begin, time remaining, and time to end a particular part of the test
- n. using calculators for NJ ASK 3-8 Mathematics (all students are permitted calculators for HSPA)

2. Response modifications

- a. having an examiner record the student's identification information on the test booklet and/or answer folder
- b. dictating oral responses to a scribe (examiner or proctor who writes from dictation)
- c. using a Braille writer to record responses
- d. signing responses to a sign language interpreter (student must indicate all punctuation and must spell all keywords)
- e. recording responses on a word processor (all editorial functions MUST be disabled)
- f. providing an augmentative communication device
- g. using a larger diameter or modified special grip # 2 pencil
- h. circling answers in the test booklet (the examiner subsequently transfer the answers to the answer folder); for the NJ ASK 3-4, the examiner bubbles the student's answer choice in the scannable test booklet
- i. allowing separate additional continuation pages for writing tasks

OTHER CONSIDERATIONS

Ensure that:

1. any medication has been appropriately adjusted so it will not interfere with the student's functioning.
2. eyeglasses are used, if needed.
3. hearing aids, FM systems, augmentative communication devices, word processors, or other types of equipment are functioning properly.
4. source and strength of light are appropriate.
5. all students can clearly see and hear the examiner.
6. all deaf or hard of hearing students who communicate aurally/orally are watching the examiner when instructions are given.

Gifted and Talented: The regulations require that district boards of education provide appropriate K-12 services for gifted and talented students. This includes appropriate curricular and instructional modifications for gifted and talented students indicating content, process, products, and learning environment. District boards of education must also take into consideration the *PreK-Grade 12 National Gifted Program Standards* of the National Association for Gifted Children in developing programs for gifted and talented students. A copy of those standards is available at www.nagc.org. In addition, information can be found at www.state.nj.us/education/aps/ccs/gandt.

Accommodations and Modifications for students at risk of failing:

Students thought to be at risk for failing will be given interventions in the classroom by the teacher and support staff. Data on these interventions will be tracked and if sufficient progress is not demonstrated, that student will be referred to the I&RS team. The I&RS team will compile all existing data and create targeted and individual interventions with the help of area specialists. These interventions may include some of the following:

- Provide visual and verbal directions
- Simplify directions into one-step
- Check back after two steps have been completed
- Model self-talk to complete tasks
- Discuss organizational plans for work and work completion
- Allow for multiple methods of demonstrating learning and competence
- Enforce opportunities to correct work
- Provide 1:1 instructional time
- Provide physical manipulatives whenever possible
- Assess and provide optimal seating arrangement