West Windsor-Plainsboro Regional School District
Algebra 1 H&A
August 2020

Unit 1: Equations and Inequalities	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
The study of equations helps students' link concrete arithmetic skills to broad conceptual situations. Students will work closely with equations that define linear and nonlinear functions and their graphs. Work with these functions is grounded in logical reasoning. Skills with manipulations of expressions will be accomplished with intent and based on properties of arithmetic and the laws of equality. Students will expand their abilities to use algebraic equations to model situations.	
Recommended Pacing	
22 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: A-CED.A Create equations that describe numbers or relationships	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*
4	Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law V = IR to highlight resistance R.*
Standard: A-REI.A Understand solving equations as a process of reasoning and explain the reasoning	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.
Standard: A-REI.B Solve equations and inequalities in one variable	
CPI #	**Cumulative Progress Indicator (CPI)**
3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**

RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Interdisciplinary Standards Science	
HS.PS2 Motion and Instability: Forces and Interactions	Creating Equations (A-CED). Science examples: (1) Rearrange a formula (such as F = ma or p = mv) in order to highlight a quantity of interest. (2) Write and solve a linear equation to solve a problem involving motion at a constant speed. Appendix L, page
Instructional Focus	
Unit Enduring Understandings	
● Rules of arithmetic and algebra can be used together with the concept of equivalence to transform equations and inequalities so solutions can be found to solve problems. ● Algebraic and numerical procedures are interconnected and build on one another to produce a coherent number system.	
Unit Essential Questions	
● How can arithmetic operations be extended to solve algebraic equations and inequalities? ● How do equations and inequalities model real world phenomena? ● How are arithmetic and algebra related?	
Content Understandings	
● Equations and inequalities model real-life situations and help us solve problems. ● Equations do not always have one solution. ● Interval notation is an additional form to express the solution to an inequality. ● Solution(s) can be verified by substituting them into the equation to see if they remain true. ● When there are infinitely many solutions, the solution set is all real numbers.	
Content Questions	
● What is the goal of solving equations and inequalities? ● What do solutions to equations and inequalities tell us? ● How do you determine the number of solutions to an equation or inequality? ● How can you use a formula for one measurement to write a formula for a different measurement? ● What is a compound inequality? What is the difference between “and” and “or” statements? ● How does solving an absolute value inequality differ from solving other inequalities? ● What is an empty set and an identity?	
Objectives	
Students will know:	

- Procedures for simplifying, solving, and graphing one, two, and multi-step single variable equations and inequalities
- Procedures for simplifying, solving, and graphing single variable compound inequalities
- Procedures for simplifying and solving single variable absolute value equations and inequalities
- Single variable equations and inequalities can have infinitely many, no real number solutions, or one solution

Students will be able to:

- Classify numbers in the real number system
- Apply properties of real numbers in order to solve linear equations
- Solve multi-step linear equations resulting in one solution, no solution, and all real numbers
- Solve absolute value equations, including ones with extraneous solutions
- Solve literal equations
- Solve and graph compound inequalities and identify the differences between a conjunction and disjunction
- Explain the differences between infinitely many solutions and all real numbers
- Solve absolute value inequalities
- Distinguish between the concepts of and graphical representations of “and” / “or”

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner

Resources

Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017

Unit 2: Writing and Graphing Linear Functions	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
Functions are used in every branch of mathematics- as algebraic operations on numbers, transformations on points in the plane or in space, intersection and union of pairs of sets, and so forth. Functions are a unifying concept in all mathematics and display relationships among phenomena in everyday life. Students will build on their understanding of domain and range, will explore new forms of linear functions, and will solidify their ability to interpret linear relationships in data. By reasoning abstractly and quantitatively, students will extend their thinking to understand absolute value functions as being piecewise.	
Recommended Pacing	
23 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: F-IF.A Understand the concept of a function and use function notation	
CPI #	**Cumulative Progress Indicator (CPI)**
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*).
2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
Standard: F-IF.B **Interpret functions that arise in applications in terms of the context**	
CPI #	**Cumulative Progress Indicator (CPI)**
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. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
Standard: F-IF.C Analyze functions using different representations	
CPI #	**Cumulative Progress Indicator (CPI)**
7a	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

	a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
8	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Instructional Focus	
Unit Enduring Understandings	
● Graphs and equations are alternative (and often equivalent) ways for depicting and analyzing patterns. ● Functional relationships can be expressed in real contexts, graphs, algebraic equations, tables, and words; each representation of a given function is simply a different way of expressing the same idea. The value of a particular representation depends on its purpose. ● Linear and absolute value graphs and equations can be used to model and describe physical relationships. ● Functions are a special type of relationship or rule that uniquely associates members of one set with members of another set.	
Unit Essential Questions	
● How can patterns and equations be used as tools to best describe and help explain real-life situations? ● How are relationships represented mathematically? ● How can data be organized and represented to provide insight into the relationship between quantities? ● How can we use mathematical models to describe linear change? ● How are patterns of change related to the behavior of functions?	
Content Understandings	
● A graph represents a function when no vertical line passes through more than one point on the graph. ● Domain of a function is a set of input values, and the range is the set of output values. ● A discrete domain is a set of input values that consists of only certain numbers in an interval, while a continuous domain is a set of input values that consists of all numbers in an interval. ● A translation is a transformation that shifts a graph horizontally or vertically but does not change the size, shape, or orientation of the graph. ● A piecewise function is a function defined by two or more equations, where each “piece” of the function applies to a different part of its domain. ● There are different forms of linear equations and there is a purpose to each form.	

Content Questions

- What is the difference between a function and a relation?
- What is a reasonable domain for a given function?
- What is function notation and why is it used?
- How can you determine a linear function by looking at a graph, a table of values or an algebraic equation?
- How do you choose which method to use given an algebraic system or word problem?
- What is the meaning of slope?
- How do linear functions model real-life situations?
- How can you describe a function that is represented by more than one equation?

Objectives

Students will know:

- The difference between a relation and function
- That a function is a rule that assigns each input exactly one output
- Parallel lines have the same slope but different y-intercepts
- Perpendicular lines have opposite reciprocal slopes
- Terminology and notation for functions
- Slope as a rate of change
- The procedures for writing the equation of line in slope-intercept, standard and point slope form
- The differences and similarities between f(x) and y; f(x) and y both represent the output, however, there are advantages of using f(x)
- The differences between rigid and nonrigid transformations

Students will be able to:

- Identify the domain and range of a given function
- Sketch a function to model a relationship between two variables in a real world scenario
- Determine the rate of change
- Define and find the slope of a given line, including situations of positive, negative, zero, and no slopes
- Represent a function in multiple ways (equation, table, verbally, graph, mapping diagram, ordered pairs)
- Distinguish between discrete and continuous data
- Evaluate and interpret functions through function notation
- Write a linear function in standard form
- Identify the x- and y- intercepts from standard form
- Write linear functions in slope-intercept form to recognize situations of one, no, and infinite solutions.
- Identify the rate of change/slope
- Use point-slope form to determine the equation of a line
- Use parallel and perpendicular relationships to find the equation of a line related to given information
- Manipulate a parent function both graphically and algebraically via translation, reflection, and vertical stretching and shrinking
- Translate graphs of absolute value functions
- Identify features of a graph by analyzing the parameters of a given absolute value function
- Analyze an absolute value function as a piecewise function

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher

	Innovative & Practical Problem Solver		Self-Directed Learner
Resources			
Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017			

Unit 3: Solving Systems of Linear Equations and Inequalities	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
This unit involves the study of systems of linear equations and inequalities. A key idea when studying systems is the linking of the graphical interpretation of the system and the solution of the system. Connecting numerical solutions and graphical interpretation is an underpinning of their future study of calculus. Transfer of knowledge is another important goal. By learning to solve the systems both algebraically and graphically and to appropriately interpret their solutions students will be able to apply systems to model real world situations.	
Recommended Pacing	
21 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
1	Make sense of problems and persevere in solving them
Standard: A-REI.C Solve systems of equations	
CPI #	**Cumulative Progress Indicator (CPI)**
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.
6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
Standard: A-REI.D Represent and solve equations and inequalities graphically	
CPI #	**Cumulative Progress Indicator (CPI)**
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.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).

New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.

Instructional Focus

Unit Enduring Understandings

- A system of equations or inequalities can be used to model and solve world situations
- The value of the graphical representation of the solution to a system of linear equations or inequalities depends on the real world situation the system models
- The intersection(s) of graphs of functions connects to the algebraic solution(s) to a system

Unit Essential Questions

- What is the most efficient method for solving a system of equations?
- When would a system of equations and inequalities be used to solve real life situations?
- What can we do with a system of equations/inequalities that we cannot do with a single equation/inequality?

Content Understandings

- The solution to a system of equations is the point of intersection of the 2 functions.
- There are different methods to solve systems.
- Graphing systems is not always the most efficient method for determining the solution.
- Linear inequalities and systems of linear inequalities can model real-life situations to help find solutions.
- A solution of a system of linear equations in two variables is an ordered pair that is a solution of each equation in the system.
- The graph of a system of linear inequalities is the graph of all the solutions of the system.

Content Questions

- How can you solve a system of equations?
- How do you determine the most efficient way to solve a system of equations?
- How do you use systems of equations to represent real-life problems?
- What are reasonable solutions to linear inequalities and systems of linear inequalities?
- How do you interpret a real-life system of equations that has no solution or infinitely many solutions?

Objectives

Students will know:

- Procedures for solving systems of linear equations and inequalities
- Procedures for writing systems of linear equations and inequalities for real life situations

Students will be able to:

- Solve a system of linear equations by graphing, substitution, elimination methods
- Interpret the solution set to a system of linear equations and inequalities both algebraically and graphically
- Write a system of equations or inequalities to model a real world situation
- Analyze a system of linear equations or inequalities and determine the most appropriate method of solution
- Solve and interpret the system in terms of the context of a real world problem

Evidence of Learning

Assessment			
Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.			
Competencies for 21st Century Learners			
	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner
Resources			
Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017			

Unit 4: Exponents, Polynomials & Factoring	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
This unit provides the language and techniques for representing, analyzing, and interpreting expressions involving exponents. It also involves knowledge and skills relative to polynomials, the basic building blocks of algebraic expressions. Using previous knowledge of the properties of numbers students will be able to transform polynomial expressions into equivalent forms. The ability to write a function defined by an expression in different but equivalent forms reveals and explains different properties of the function. The concepts covered in this unit are foundational in finding solutions to quadratic equations and functions.	
Recommended Pacing	
23 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: A-SSE.A Interpret the structure of expressions	
CPI #	**Cumulative Progress Indicator (CPI)**
1a	Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients.
Standard: A-APR.A Perform arithmetic operations on polynomials	
CPI #	**Cumulative Progress Indicator (CPI)**
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.
Standard: A-SSE.C Use polynomial identities to solve problems	
CPI #	**Cumulative Progress Indicator (CPI)**
4	Prove polynomial identities and use them to describe numerical relationships. *For example, the difference of two squares; the sum and difference of two cubes; the polynomial identity* $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**

RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Instructional Focus	

Unit Enduring Understandings

- Properties of exponents make it easier to simplify products or quotients of powers with the same base
- Rules of algebra can be used together with equivalence to transform expressions
- Algebraic and numeric procedures are interconnected and build on one another to produce a coherent whole as it applies to real life situations
- Various forms of an expression have different benefits based on its extending concept

Unit Essential Questions

- How can you write general rules involving properties of exponents?
- How can we model situations using exponents?
- Are the operations of addition, subtraction and multiplication universal?
- Which is the best form for a polynomial?

Content Understandings

- Exponents provide a special way of writing repeated multiplication.
- A number written in exponential notation has a base and an exponent, and each of these parts provides information for finding the value of the expression.
- Multiplying and factoring polynomials are inverse operations.
- You can multiply polynomials using different methods.

Content Questions

- What is the best way to simplify exponential expressions?
- How do you know when an exponential expression is simplified completely?
- What are the patterns in special products?
- How can you recognize and factor special products?
- How can you factor a polynomial completely?
- How can polynomials be simplified and applied to solve problems?

Objectives

Students will know:

- The language and properties of exponents
- The correct terminology for identifying polynomial expressions by degree and number of terms
- How to write a polynomial expression in standard form
- Procedures for adding, subtracting, multiplying and factoring polynomial expressions
- Procedures for the application of polynomial expressions in real life situations

Students will be able to:

- Use the properties of exponents
- Categorize polynomials by their degree and number of terms
- Write and simplify exponential expressions
- Perform operations with polynomials
- Recognize special products
- Solve a polynomial equation by applying the zero product property
- Apply different methods of factoring in order to factor a polynomial completely
- Identify when a polynomial is factored completely

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner

Resources

Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017

Unit 5: Radicals & Quadratic Functions	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
This unit of study provides the language and techniques for representing, analyzing, and interpreting expressions and equations involving radicals. Studying the mechanics of radical expressions expands students' knowledge of numbers and the real number system. Students will explore different forms in which quadratic functions can be written and how each form gives information about the graph and behavior of the function. Understanding the relationships between the characteristics of a quadratic and its equation will forge the connections between the method of graphing a quadratic function based on its algebraic form. This will be extended through applications to real world scenarios.	
Recommended Pacing	
29 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: N-RN.A Extend the properties of exponents to rational exponents.	
CPI #	**Cumulative Progress Indicator (CPI)**
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. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)^3}$ to hold, so $(5^{1/3})^3$ must equal 5.*
2	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
Standard: A-REI.B Solve equations and inequalities in one variable	
CPI #	**Cumulative Progress Indicator (CPI)**
4	Solve quadratic equations in one variable.
Standard: F-IF.C Analyze functions using different representations	
CPI #	**Cumulative Progress Indicator (CPI)**
7a	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
8a	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

	a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Interdisciplinary Standards Science	
HS.PS2 Motion and Instability: Forces and Interactions	Interpreting Functions (F-IF) and Interpreting Categorical and Quantitative Data (S-ID). Science examples: (1) Informally fit a quadratic function to the position-time data for a cart that rolls up an incline (slowing as it climbs, then reversing direction and speeding up as it descends). Use the algebraic expression for the fitted function to determine the magnitude of the cart's acceleration and initial speed. Over several trials, graph various quantities (such as acceleration vs. angle, or peak displacement vs. initial speed squared), and interpret the results. (2) Calculate and interpret the average speed of a moving object by using data from a distance-time graph. Appendix L, page
Instructional Focus	
Unit Enduring Understandings	
● Equivalent expressions can be represented in a variety of forms. ● We interpret irrational answers when solving problems. ● The concept of zeros, intercepts, and solutions to equations all reflect the same mathematical idea ● The parameters of each form of a quadratic equation tells something different about the graph of the function. ● Quadratic equations and functions can be solved using a variety of methods, each having advantages and disadvantages. ● Real world situations involving quadratic relationships can be modeled and solved using multiple representations.	
Unit Essential Questions	
● What is a radical expression and what does it mean for a radical to be in simplest form? ● What does it mean to be "like" radicals? ● How can we use mathematical language to describe non-linear change? ● Which is the most efficient method for solving a quadratic equation?	

- How can we use mathematical models to describe physical and scientific relationships?

Content Understandings

- Radical expressions represent an irrational number.
- Rational exponents can be written in different ways using exponent rules in order to simplify.
- There are three different forms of quadratic equations: standard, vertex, and intercept.
- A parabola is the graph of a quadratic function.
- The “zero of a function” is an x-intercept, or solution.
- The constant term in linear and quadratic functions is the y-intercept.
- The y-coordinate of the vertex of a parabola is the maximum or minimum value.
- Completing the square is a technique that can be used to rewrite a quadratic from standard form to vertex form.
- The discriminant determines the number of real zeros of an equation or the number of x-intercepts of a graph.
- If the graph of a parabola does not intercept the x-axis, the solution(s) to the quadratic equation are non-real.

Content Questions

- How can you write and evaluate the nth root of a number?
- When does the graph of a quadratic function open up/down?
- How can you find the axis of symmetry and what does it tell you about the vertex?
- How do you determine if the graph of a quadratic has a maximum or minimum value without graphing the function?
- Does the order of the transformations of a function affect the resulting graph?
- How can you determine graphically that a quadratic equation has no solution?
- What do the number of solutions of a quadratic equation tell you about its graph?
- How are solutions, roots, x-intercepts, and zeros related?
- What does the value of the discriminant determine?
- How can you use a graph to solve a quadratic equation in one variable?

Objectives

Students will know

- Language and notation of nth roots
- A parabola is the graphical representation of a quadratic function
- Procedures for solving quadratic equations and functions
- The advantages and disadvantages of each method for solving quadratic equations
- How the parameters for each form of the quadratic function affects the attributes of its corresponding graph
- How a graphical representation of quadratic data can be used to analyze and extrapolate pertinent information
- When an estimate is an appropriate solution in a real-life situation

Students will be able to:

- Connect the radical form with the rational exponent form
- Rewrite radical expressions that can be simplified and perform operations on radical expressions
- Evaluate expressions involving nth roots and rational exponents
- Simplify expressions and perform operations using the properties of radicals
- Identify characteristics of quadratic functions
- Graph quadratic functions in standard, vertex, and intercept form
- Solve quadratic equations by factoring, square roots, completing the square, and the quadratic formula
- Algebraically convert between different quadratic forms
- Use the discriminant to determine the number of roots of a quadratic equation
- Choose and use the most efficient method of solution for a quadratic equation

- Analyze rate of change to determine if data is best represented by a linear or quadratic model

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner

Resources

Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017

Unit 6: Data Analysis (One and Two variable)	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
This unit provides the language and techniques for analyzing situations involving interpreting data, chance and uncertainty. Different measures of center can be chosen to judge and make inferences of data. Students will have the opportunity to make predictions based on experimental probabilities and their analysis of data. Understanding probability gives us a numerical value to assess risk. A firm grasp of data analysis and probability is a critical component of making decisions and justifying these decisions in the real world.	
Recommended Pacing	
12 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: S-ID.A Summarize, represent, and interpret data on a single count or measurement variable	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Represent data with plots on the real number line (dot plots, histograms, and box plots).
2	Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
3	Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
Standard: S-ID.B Summarize, represent, and interpret data on two categorical and quantitative variables	
CPI #	**Cumulative Progress Indicator (CPI)**
5	Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
6	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.* b. Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology. c. Fit a linear function for a scatter plot that suggests a linear association.

New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Interdisciplinary Standards Science	
MS-PS1 Matter and Its Interactions	Statistics and Probability (6–8.SP). Science example: Compile all the boiling point measurements from the class into a line plot and discuss the distribution in terms of clustering and outliers. Why weren't all the measured values equal? How close is the average value to the nominal/textbook value? Show the average value and the nominal value on the line plot. Appendix L, page 22
MS-LS1 From Molecules to Organisms: Structures and Processes	Statistics and Probability (6–8.SP). Science examples: (1) For Grade 8: Use data in a two way table as evidence to support an explanation of how environmental and genetic factors affect the growth of organisms. (2) For Grade 8: Use data in a two-way table as evidence to support an explanation that different local environmental conditions impact growth in organisms. (3) For Grade 7 or 8: Use probability concepts and language to describe and quantify the effects that characteristic animal behaviors have on the likelihood of successful reproduction Appendix L, page 24

Instructional Focus

Unit Enduring Understandings

- Diagrams and graphs are used to show relationships between data and help to draw conclusions.
- There are several ways to represent data sets.
- Not all data is valid.
- The message conveyed by the data depends on the display.
- The results of a statistical investigation can be used to support or refute an argument.
- Shapes of the data distribution help you choose the appropriate measures.

Unit Essential Questions

- How do I know that the data I am looking at is fair and accurate?
- How can representations of data influence decisions?
- How do data displays help to influence predictions on future events?
- What factors determine the best way to display your data?

Content Understandings

- Determination of interval size can change the interpretation of the data a histogram represents.
- Box and whisker plots are used to represent data sets
- Compare measures of central tendencies
- Compare the range and standard deviation of a data set
- Identify the effects of transformations on data
- Make a two way table and be able to find an interpret marginal frequencies
- Interpret Data displays
- Describe shapes of data distributions
- Represent and analyze data in different ways
- Describe shapes of data distribution
- Use the shapes of data distribution to use and compare appropriate measures
- Two-way table recognize associations in data

Content Questions

- How can you describe the variation of a data set?
- Describe the shape of the data distribution and what does it tell you?
- When is the best situation to use a two way table?
- How can you describe the variation of a data set?
- How can you use a box-and-whisker plot to describe a data set?
- How can you use a histogram to characterize the basic shape of a distribution?
- How can you read and make a two-way table?

Objectives

Students will know:

- How to compare the mean, median and mode of a data set.
- How to find the range and standard deviation of a data set.
- How box-and-whisker plots represent data sets.
- Find and interpret marginal frequencies.
- How to use two-way tables to recognize associations in data.
- Whether data is quantitative or qualitative.
- How to choose and create appropriate data displays.
- Mean and median can both serve as effective measures of center.
- Quartiles represent equal amounts of data.

Students will be able to:

- Find and interpret the range and standard deviation of a data set using a graphing calculator
- Identify the effects on data when additional data is added or taken away
- Interpret and use box and whisker plots to compare data sets
- Use the shapes of data distribution to use and compare appropriate measures
- Compare data distributions
- Find and interpret marginal frequencies
- Make two-way tables
- Analyze misleading graphs
- Describe the shapes of data distributions
- Construct, Interpret, and compare data sets of a box and whiskers while discussing the inter quartile range and outliers
- To use a histogram to characterize the basic shape of a distribution
- Make a two way table and be able to find an interpret marginal frequencies
- Organize and interpret data in displays
- Find and interpret measure of center to best represent a data set

Evidence of Learning			
Assessment			
Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.			
Competencies for 21st Century Learners			
	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner
Resources			
Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017			

Unit 7: Exponential Functions	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
This unit of study provides the language and techniques for representing, analyzing, and interpreting expressions and equations involving exponents. Exploring examples of functions and their graphs will illuminate the contrast between linear and exponential functions. Expressing non-linear quantities gives us the power to recognize and describe patterns, generalize, draw and justify conclusions. Non-linear representations enable us to model many real-life situations and represent them abstractly.	
Recommended Pacing	
7 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: F-IF.C Analyze functions using different representations	
CPI #	**Cumulative Progress Indicator (CPI)**
7e	Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.
8b	Use the properties of exponents to interpret expressions for exponential functions. *For example, identify percent rate of change in functions such as* $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{t/10}$, *and classify them as representing exponential growth or decay.*
Standard: F-LE.A Construct and compare linear and exponential models and solve problems	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Distinguish between situations that can be modeled with linear functions and with exponential functions. a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

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).
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.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.
Interdisciplinary Standards Science	
HS.LS1 From Molecules to Organisms: Structures and Processes	Interpreting Functions (F-IF) and Building Functions (F-BF). Science example: Use a spreadsheet or other technology to simulate the doubling in a process of cell division; graph the results; write an expression to represent the number of cells after a division in terms of the number of cells beforehand; express this in closed form as a population size in terms of time. Discuss real-world factors in the situation that lead to deviation from the exponential model over time. Appendix L, page 30
Instructional Focus	
Unit Enduring Understandings	
● Mathematical models can be used to describe non-linear physical relationships ● Patterns in data help us make predictions ● Compound interest is interest earned on the principal and the previously earned interest	
Unit Essential Questions	
● How do exponential functions model real-world problems? ● How do the characteristics of exponential functions affect the graph?	
Content Understandings	
● Finding the rate of growth/decay and the growth/decay factor in order to use and identify exponential growth functions ● The graph of an exponential function shows how a quantity increases or decreases over time	

- Compound interest is a real-life example involving exponential growth

Content Questions

- What are some of the characteristics of the graph of an exponential function?
- What are the similarities and differences between simple and compound interest?
- How do you graph an exponential function?
- How can you determine the growth or decay factor from an equation?
- What is the difference between the growth factor and the rate of growth?

Objectives

Students will know:

- The value of the correlation coefficient indicates the strength of the linear relationship between the elements of a set of data
- How to find the rate of increase or decrease
- When a linear vs an exponential model is appropriate
- The difference in the rate of change between exponential growth and linear growth
- The difference between simple interest and compound interest

Students will be able to:

- Approximate the line of best fit (trend line) and describe the correlation as either positive, negative, or no correlation
- Graph, model, and make predictions using exponential functions
- Analyze exponential models via technology
- Interpret and rewrite exponential growth and decay functions
- Calculate and analyze accumulated growth through compound interest
- Interpret bivariate data to determine if there's a correlation and express the strength of the correlation via the correlation coefficient
- Determine and support the most appropriate model for a data set
- Analyze rate of change to determine if data is best represented by a linear, exponential, or quadratic model

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner

Resources

Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017

(Optional) Unit 8: Rational Expressions	
Content Area: Mathematics	
Course & Grade Level: Algebra 1 H&A, Grade 7	
Summary and Rationale	
In this unit, students will bridge their prior knowledge of simplifying and operating with fractions to rational expressions, thus establishing the interconnectedness of arithmetic and algebraic skills. Simplifying and solving simple rational equations demonstrate how extraneous solutions may arise and introduce the need for restrictions made on domains.	
Recommended Pacing	
8 days	
New Jersey Student Learning Standards for Mathematics	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
1	Make sense of problems and persevere in solving them
2	Reason abstractly and quantitatively
3	Construct viable arguments and critique the reasoning of others
4	Model with Mathematics
5	Use appropriate tools strategically
6	Attend to precision
7	Look for and make use of structure
8	Look for and express regularity in repeated reasoning
Standard: A-APR.D Rewrite rational expressions	
CPI #	**Cumulative Progress Indicator (CPI)**
6	Rewrite simple rational expressions in different forms; write $a(x)/b(x)$ in the form $q(x) + r(x)/b(x)$, where $a(x)$, $b(x)$, $q(x)$, and $r(x)$ are polynomials with the degree of $r(x)$ less than the degree of $b(x)$, using inspection, long division, or, for the more complicated examples, a computer algebra system.
7	Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
Standard: F-IF.C Analyze functions using different representations	
CPI #	**Cumulative Progress Indicator (CPI)**
7d	Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	

Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**
8.1	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.

Instructional Focus

Unit Enduring Understandings

- Equivalent expressions can be represented in a variety of forms.
- Mathematical expressions are easiest to understand and operate when they are in their simplest form.
- Domains of functions can vary.
- Dividing by zero results in an undefined solution.

Unit Essential Questions

- When is a rational expression simplified?
- What real life phenomena can be represented with rational expressions?
- Why would the domain of a function be restricted?

Content Understandings

- A rational expression is simplified by reducing through factoring.
- Extraneous solutions and restricted values are numbers that cannot be solutions to a rational expression.
- Clearing fractions is essential when solving rational equations.

Content Questions

- When is a rational expression in simplest form?
- Why is it important to simplify rational expressions?
- How do you simplify complex fractions?
- How do you identify extraneous solutions?
- What is an extraneous solution and what does it mean?
- How can rational equations help you when solving real life applications?

Objectives

Students will know:

- Operations with fractions extend to simplifying rational expressions
- Extraneous solutions represent values not included within the domain

Students will be able to:

- Simplify rational expressions
- Identify restricted values for a rational expression
- Add and subtract rational expressions
- Multiply and divide rational expressions
- Simplify complex fractions
- Solve rational equations
- Identify extraneous solutions when solving a rational equation
- Apply rational equations to real life situations

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.			
Competencies for 21st Century Learners			
	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner
Resources			
Core Text: Big Ideas, Algebra 1 by Larson and Boswell, 2017			

Unit 8: Financial Literacy	
Content Area: Mathematics	
Course & Grade Level: Math 7/Math 7 Honors, 7	
Summary and Rationale	
Financial literacy for students is an important tool to improve the financial capability of our youth and communities. Students should be taught how to handle money—both at home and in school. This will help reduce the economic impact of the long-term recession that now grips many communities across the country. Teaching students about money has a great impact on their future. Grasping even the most basic lessons gets students considering available options before making important monetary decisions; in turn, this careful consideration may help them avoid personal debt and improve their chances of achieving financial security.	
Recommended Pacing	
8 days	
New Jersey Student Learning Standards for Financial Literacy	
Standard: Standards for Mathematical Practice	
CPI #	**Cumulative Progress Indicator (CPI)**
9.1.8.A.1	Explain the meaning and purposes of taxes and tax deductions and why fees for various benefits (e.g., medical benefits) are taken out of pay
9.1.8.A.2	Relate how career choices, education choices, skills, entrepreneurship, and economic conditions affect income.
9.1.8.A.3	Differentiate among ways that workers can improve earning power through the acquisition of new knowledge and skills.
9.1.8.A.5	Relate how the demand for certain skills determines an individual's earning power.
9.1.8.A.6	Explain how income affects spending decisions.
9.1.8.A.7	Explain the purpose of the payroll deduction process, taxable income, and employee benefits.
New Jersey Student Learning Standards for English Language Arts Companion Standards	
Standard: Science Key Ideas and Details	
CPI #	**Cumulative Progress Indicator (CPI)**
RST.6-8.4	Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to grades 6-8 texts and topics
RST.6-8.7	Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).
New Jersey Student Learning Standards for Career Readiness, Life Literacies and Key Skills	
Standard: Critical Thinking and Problem Solving	
CPI #	**Cumulative Progress Indicator (CPI)**
9.4.8.CT.1	Evaluate diverse solutions proposed by a variety of individuals, organizations, and/or agencies to a local or global problem, such as climate change, and use critical thinking skills to predict which one(s) are likely to be effective (e.g., MS-ETS1-2).
Standard: Technology Literacy	
9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
New Jersey Student Learning Standards for Technology	
CPI #	**Cumulative Progress Indicator (CPI)**

8.1	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.

Instructional Focus

Unit Enduring Understandings

- We must understand the difference between our wants and needs and use that information to make informed decisions for our business.
- We need to understand the type of education that we need in order to meet our career goals.
- We must understand our personal and financial goals and how to reach them.
- Taxes will be deducted from your pay

Unit Essential Questions

- How do we prioritize wants and needs when making purchases?
- How does education impact employment?
- Will your choice in career support your lifestyle choices?
- How do taxes contribute to a better society?

Objectives

Students will be able to:

- Summarize the advantages and disadvantages of becoming an entrepreneur.
- Describe how entrepreneurship differs from working for a paycheck from an employer.
- Determine their personal aptitude for entrepreneurship using one or more online assessment tools.
- Describe how entrepreneurs must manage their finances in a different way than employees do
- Describe different types of taxes in the U.S. and what the money collected from taxes is used for.
- Demonstrate understanding of federal income tax brackets and marginal tax rates.
- Apply understanding of the difference between tax credits and tax deductions to case study scenarios.
- Explain common health insurance terms such as deductible, coinsurance, and copayment.
- Complete math problems that apply health insurance terminology.
- Compare the costs and features of various health insurance plans.
- Explain what can happen when people lack health insurance.
- Define the terms “needs” and “wants” and distinguish between them with real world examples.
- Determine criteria to make budgeting decisions and prioritize household expenses.
- Define the term “opportunity cost” and provide real world examples of spending plan trade-offs.
- Track personal expenses and develop a personal spending plan/budget using an online calculator.
- Define the goals they need to achieve to start in their chosen careers.
- Explore career clusters and the specific pathway associated with their goal occupation.
- Explore other career options that all relate to their interests

Evidence of Learning

Assessment

Assessment plan may include teacher designed formative and summative assessments, a district common assessment, analysis of standardized test and NJSLA data.

Competencies for 21st Century Learners

	Collaborative Team Member		Effective Communicator
	Globally Aware, Active, & Responsible Student/Citizen		Information Literate Researcher
	Innovative & Practical Problem Solver		Self-Directed Learner

Resources
Core Text: None **Suggested Resources:** NJ Model Curriculum Lessons 1,6,8,10 https://www.careeronestop.org/ExploreCareers/explore-careers.aspx?&frd=true https://www.usa.gov/government-jobs-lesson-plan?source=kids