Washington Township School District

The mission of the Washington Township Public Schools *is to provide a safe, positive, and progressive educational environment that provides opportunity for all students to attain the knowledge and skills specified in the NJ Learning Standards at all grade levels, so as to ensure their full participation in an ever-changing world as responsible, self-directed and civic-minded citizens.*

Course Title:	**Algebra 1**
Grade Level(s):	**9-12**

Duration:	*Full Year:*	**X**	*Semester:*		*Marking Period:*	
Course Description:	The fundamental purpose of this course is to formalize and extend the mathematics that students learned in the middle grades. The critical areas deepen and extend understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend. Students will engage in methods for analyzing, solving, and using quadratic functions. The Mathematical Practice Standards apply throughout the course and together with the content standards, prescribe that students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations. Each lesson begins with an Essential Question, followed by an Exploration. Once the inquiry section is completed, students begin the direct instruction lesson, helping them to reason and make sense of their answers based on the knowledge they gained during discovery.					
Grading Procedures:	Each semester will be a composite of quiz scores, test scores, and supportive assignments such as homework and classwork reflecting a student's mastery of the areas outlined above. The student can pass the course with an overall average of 60%. The individual teacher will explain the grading system to the student.					
Primary Resources:	**Algebra 1 with Big Ideas Learning Textbook** **NJ Common Core State Standards** **NJ Student Learning Standards**					

Washington Township Principles for Effective Teaching and Learning

- Implementing a standards-based curriculum
- Facilitating a learner-centered environment
- Using academic target language and providing comprehensible instruction
- Adapting and using age-appropriate authentic materials
- Providing performance-based assessment experiences
- Infusing 21st century skills for College and Career Readiness in a global society

Designed by:	Alicia Corbley & Patricia Pinder
Under the Direction of:	Allison Krzyminski

Written: July 2022

Revised: July 2024

BOE Approval: _____

Unit 1: Solving Linear Equations and Inequalities

Unit Description: This unit gives the foundations of solving linear equations by connecting it to students' prior skills with properties of equality. The unit starts with a review of pre-algebra solving equations skills, specifically solving multi-step equations and equations with variables on both sides. This review leads the way to solving literal equations including rearranging volume, area, and perimeter formulas. This unit then moves into solving and graphing inequalities in one variable using the skills from solving equations in one variable. Inequalities in one variable will be created to model real life scenarios.

Unit Duration: 14 Days

Desired Results

Standard(s):

A-CED: A- Create equations that describe numbers or relationships.
A-REI: A- Understand solving equations as a process of reasoning and explain the reasoning.
A-REI: B- Solve equations and inequalities in one variable.
A-SSE: A- Interpret the structure of expressions

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP4: Model with Mathematics.
MP5: Use Appropriate Tools Strategically
MP6: Attend to precision.
MP7: Look for and make use of structure.

Indicators:

HSA-CED.A.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. Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.
HSA-CED.A.4 : Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations Climate Change Example: Students may rearrange formulas related to the economic impact of climate change to highlight a quantity of interest, using the same reasoning as in solving equations.
HSA-REI.A.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
HSA-REI.B.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
HSA-SSE.A.1a: Interpret parts of an expression, such as terms, factors, and coefficients.

Understandings:

Students will understand that…

- Creating equations and inequalities in one variable can be used to solve real-life problems.
- Isolating the variable is key to solving linear equations and inequalities.

Essential Questions:

- How can you use multi-step equations to solve real-life problems?
- How can you solve an equation that has variables on both sides?
- How can you solve a multi-step inequality?

• Properties of equality can be used to solve equations and inequalities.. • Applying equation solving strategies to formulas is essential to solving problems. • Solutions to equations and inequalities differ in that inequalities contain a solution set.	• How can we apply inverse operations to isolate key variables in formulas? • How can you use inequalities to describe intervals on the real number line? • How can we use inequalities to model real world scenarios?

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Quizzes • Test	• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

1.2: Solving Multi-Step Equations (1 day)
- Solving a Two-Step Equation
- Combining like Terms to Solve an Equation
- Using Distributive Property to Solve an Equation
- Modeling Real Life with Equations in One-Variable

1.5: Solving Equations with Variables on Both Sides (1 day)
- Solving an Equation With Variables on Both Sides
- Solving an Equation With Grouping Symbols
- Solving an Equation with Variables on Both Sides (Special Solutions)
- Modeling Real Life with Equations in One-Variable

1.7: Rewriting Equations and Formulas (2 days)
- Rewriting a Literal Equation (Standard Form to Slope-Intercept Form)
- Rewriting Formulas for Area, Perimeter, Volume, Temperature, and Surface Area
- Modeling Real Life (Word Problems)

2.2: Solving Inequalities Using Addition or Subtraction (1/2 day)
- Solving an Inequality Using Addition
- Solving Inequalities Using Subtraction
- Graphing Inequalities and their solutions on Number Line

2.3: Solving Inequalities using Multiplication or Division (1/2 day)
- Multiplying or Dividing by Positive Numbers
- Multiplying or Dividing by Negative Numbers
- Graphing Inequalities and their solutions on Number Line

2.4: Solving Multi-Step Inequalities (2 days)
- Solving Multi-Step Inequalities
- Solving Inequalities with Variables on Both Sides

- Inequalities with Special Solutions
- Modeling Real Life Scenarios with Inequalities

Test Review (1 day)
Test (1 Day)
*Additional 5 days used for extra practice and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding • Use enrichment and extension activities • Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	• Read Problems aloud frequently • Rephrase questions for student clarification • Preferential Seating – close proximity to teacher • Redirect student attention to the step-by-step explanation of each concept. • Use of Dynamic Monitoring Tool to practice basic skills • Have student view re-teaching videos
English Language Learners	• Have student view re-teaching videos • Rephrase questions for student clarification • Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties • Allow use of translator device • Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
RST.9-10.4. 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 9-10 texts and topics.

New Jersey Student Learning Standards for Technology Education
9.4.12.O.11: Apply active listening skills to obtain and clarify information.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking

Unit 2: Functions

Unit Description: This unit expands on the idea of functions from previous courses where the idea of a "function machine" shows one input gives exactly one output. This unit begins by identifying functions and then further classifying functions as linear on nonlinear. Students will then explore characteristics of functions such as domain, range, and end behavior. The unit then puts its focus on function notation. Function notation will be explored through evaluating functions, graphing linear functions, and interpreting function notation through real world examples. Transformation of functions are introduced and explored. These transformations of functions will be revisited in other units.

Unit Duration: 14 days

Desired Results

Standard(s):

A-CED:A- Create equations that describe numbers or relationships.
A-REI: D- Represent and solve equations and inequalities graphically.
F-IF-A: Understand the concept of a function and use function notation
F-IF-B: Interpret functions that arise in applications in terms of the context
F-IF-C: Analyze functions using different representations
F-BF: B- Build new functions from existing functions
F-LE: A- Construct and compare linear and exponential models and solve problems.
F-LE: B- Interpret expressions for functions in terms of the situation they model.

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP3: Construct viable arguments and critique the reasoning of others..
MP4: Model with Mathematics
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP8: Look for and Express Regularity in Repeated Reasoning

Indicators:

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.

HSA-REI.D.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

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 a context. Climate Change Example: Students may use function notation to determine the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), m, where c(m) is the number of molecules of carbon dioxide.

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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*

HSF-IF.B.5: Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*
Climate Change Example: Students may relate the domain of a function c(m) representing the amount of carbon dioxide produced by burning m molecules of ethane (gasoline), to its graph in order to determine the appropriate domain for c(m).

HSF-IF.C.7a: Graph linear and quadratic functions and show intercepts, maxima, and minima.

HSF-IF.C.9: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

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. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

HSF-LE.A.1b: Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

Understandings:
Students will understand that…

- Functions can be represented with different notations.
- Functions that require elements in the domain are mapped to exactly one element in the range.
- Many real-life problems can be represented by linear functions.
- Students can use transformations of graphs to represent other related linear functions.

Essential Questions:

- What is a function?
- How can you determine whether a function is linear or nonlinear?
- How can you use a function notation to represent a function?
- How does the graph of the linear function $f(x) = x$ compare to the graphs of $g(x) = f(x) + c$ and $h(x) = f(cx)$?

Assessment Evidence

Performance Tasks:

• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation
• Quizzes
• Test

Other Evidence:

• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)

• Conferences

• Student Performance during group activities

• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

3.1 Functions (1 day)
- Determine if a relation is a function from a set of points, graph and table
- Identify domain and range of a function from a set of points, graph and table
- Identify independent and dependent variables from a real-life example

3.2 Characteristics of Functions (2 day)
- Find x- and y-intercepts of a function.
- Describe positive, negative, increasing, decreasing, and end behaviors of functions
- Describe domain and range of continuous graphs of functions using set notation

3.3 Linear Functions (1 day)
- Determine if a function is linear or nonlinear from a graph, table and rule.
- Identify the constant rate of change from a table.

3.4 Function Notation (2 days)
- Evaluate a function in function notation
- Interpreting function notation
- Graph using function notation
- Model real life with function notation

3.7 Transformations of Linear Functions & Parent Functions (3 days)
- Describe translations, reflections, stretches and shrinks on linear functions
- Describe combinations of transformations
- Identify family and parent functions
- Describe transformations given graphs of absolute value functions .

Test Review (1 day)
Test (1 Day)

*Additional 3 days used for practice and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	● Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding ● Use enrichment and extension activities ● Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	● Read Problems aloud frequently ● Rephrase questions for student clarification ● Preferential Seating – close proximity to teacher ● Redirect student attention to the step-by-step explanation of each concept. ● Use of Dynamic Monitoring Tool to practice basic skills ● Have student view re-teaching videos
English Language Learners	● Have student view re-teaching videos ● Rephrase questions for student clarification ● Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties ● Allow use of translator device

	• Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4. 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 9-10 texts and topics.

RST.9-10.7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

New Jersey Student Learning Standards for Technology Education

9.3.ST-ET.5: Apply the knowledge learned in STEM to solve problems.

9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking

Unit 3: Linear Functions

Unit Description: This unit builds on unit 3, identifying and graphing linear equations. Starting with analyzing parts of the graph of linear functions, including intercepts and slope. From there students will be graphing linear equations from a verbal model, using *x*- and *y*-intercepts and rearranging slope-intercept form to graph using slope and *y*-intercept. Those skills are extended to writing linear equations in two forms, slope-intercept and point-slope form. The unit will then move onto analyzing data in scatter plots (correlation and interpreting scatter plots) and creating lines of best fit using technology. The unit will finish off with arithmetic sequences in which students will be extending patterns, creating arithmetic equations to represent sequences, and model real life scenarios with arithmetic equations.

Unit Duration: 14 days

Desired Results

Standard(s):

A-CED:A- Create equations that describe numbers or relationships.
F-BF: A- Build a function that models a relationship between two quantities.
F-IF:A- Understand the concept of a function and use function notation.
F-IF-B: Interpret functions that arise in applications in terms of the context
F-IF-C: Analyze functions using different representations
F-LE: A- Construct and compare linear, quadratic, and exponential models and
F-LE: B- Interpret expressions for functions in terms of the situation they model
A-SSE: A- Interpret the structure of expressions
SS-ID: B- Summarize, represent, and interpret data on two categorical and quantitative variables.
SS-ID: C- Interpret linear models.

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason Abstractly and Quantitatively
MP3: Construct Viable Arguments and Critique the Reasoning of Others
MP4: Model with Mathematics.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP8: Look for and express regularity in repeated reasoning.

Indicators:

HSF-IF.A.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

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. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*

HSF-IF.C.7a: Graph linear and quadratic functions and show intercepts, maxima, and minima.

HSF-LE.A.1a: Prove that linear functions grow by equal differences over equal intervals.
HSF-LE.B.5: Interpret the parameters in a linear or exponential function in terms of a context.

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-LE.A.1b: Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

HSA-SSE.A.1a: Interpret parts of an expression, such as terms, factors, and coefficients.

HSF-LE.B.5: Interpret the parameters in a linear or exponential function in terms of a content.

HSF-BF.A.1a: Determine an explicit expression, a recursive process, or steps for calculation from a context.

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)

HSF-LE.B.5: Interpret the parameters in a linear or exponential function in terms of a context.

HSS-ID.B.6a : Fit a function to the data; 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, quadratic, and exponential models. Climate Change Example: Students may use linear or exponential functions fitted to geoscience data to solve problems and analyze the results from global climate models to make an evidence-based forecast of the current rate of global climate change

HSS-ID.B.6b: Informally assess the fit of a function by plotting and analyzing residuals.

HSS-ID.B.6c: Fit a linear function for a scatter plot that suggest 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

HSS-ID.C.8: Compute (using technology) and interpret the correlation coefficient of a linear fit.

HSS-ID.C.9: Distinguish between correlation and causation.

Understandings:

Students will understand that…

- Linear equations can be graphed by finding the slope of the line.
- Given a linear model, the equation can be rewritten in another form to identify the slope and *y*-intercept.
- Linear equations can be graphed using *x*- and *y*-intercepts.
- If given a linear model, a linear equation can be written to model the data.
- Scatter plots can have positive, negative, or no correlation.
- Linear functions can be created to create lines of best fit for data.
- A function can be written to represent arithmetic sequences.

Essential Questions:

- How can you describe the graph of the equation $Ax + By = C$?
- How can you describe the graph of the equations $y = mx + b$?
- Given the graph of a linear function, how can you write an equation of the line?
- How can you write an equation of a line when you are given the slope and a point on a line?
- How can we best fit data to linear models?
- How can we use technology to find lines of best fit?
- What is the distinction between correlation and causation?
- Can an arithmetic sequence be related to a linear pattern?

Assessment Evidence

Performance Tasks:

• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation

Other Evidence:

• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)

• Conferences

• Student Performance during group activities

• Quizzes • Test	• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

3.5: Graphing Linear Equations in Standard Form (1 days)
- Graphing Horizontal and Vertical Lines
- Using Intercepts to Graph a Linear Equation
- Modeling Real Life

3.6: Graphing Linear Equations in Slope-Intercept Form (2 days)
- Finding Slopes of Lines
- Finding Slope From Tables
- Identifying Slopes and y-intercepts
- Using Slope-Intercept Form to Graph an Equation
- Graphing from a verbal description (optional)
- Modeling Real Life (optional)

4.2: Writing Equations in Slope-Intercept & Point-Slope Form (2 days)
- Using Slopes and y-intercept to Write Equations
- Using a Slope and a Point to Write an Equation
- Using Two Points to Write an Equation
- Writing a Linear Function
- Modeling Real Life

4.4 & 4.5 Scatter Plots and Analyzing Lines of Fit (2 days)
- Interpreting a Scatterplot
- Identifying Correlations
- Finding a Line of Fit
- Finding a Line of Fit using Technology
- Interpolating and Extrapolating Data

4.6 Arithmetic Sequences (1 day)
- Extending Arithmetic Sequences
- Graphing Arithmetic Sequences
- Identifying an Arithmetic Sequence from a Graph
- Finding the nth term of an Arithmetic Sequence
- Modeling Real Life

Test Review (1 day)
Test (1 Day)

*Additional 4 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students

Advanced Learners	• Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding • Use enrichment and extension activities

	• Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	• Read Problems aloud frequently • Rephrase questions for student clarification • Preferential Seating – close proximity to teacher • Redirect student attention to the step-by-step explanation of each concept. • Use of Dynamic Monitoring Tool to practice basic skills • Have student view re-teaching videos
English Language Learners	• Have student view re-teaching videos • Rephrase questions for student clarification • Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties • Allow use of translator device • Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections
Indicators: **New Jersey Student Learning Standards for English Language Arts** **RST.9-10.3**. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **RST.9-10.4**. 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 9-10 texts and topics. **RST.9-10.7**. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

New Jersey Student Learning Standards for Social Studies
Developing Claims and Using Evidence- Developing claims requires careful consideration of evidence, logical organization of information, self-awareness about biases, application of analysis skills, and a willingness to revise conclusions based on the strength of evidence. Using evidence responsibly means developing claims based on factual evidence, valid reasoning, and a respect for human rights.
Recognizing and Defining Computational Problems
The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

New Jersey Student Learning Standards for Technology Education
9.3.ST-ET.5: Apply the knowledge learned in STEM to solve problems.
9.4.12.O.11: Apply active listening skills to obtain and clarify information.

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:
Collaboration
Communication
Critical thinking
Creativity

Unit 4: Systems of Linear Equations & Inequalities

Unit Description: This unit concludes the study of linear functions by solving systems of linear equations. Students will build on the "find a solution" by graphing to include the elimination method. Special systems of equations will be examined where there is no solution or an infinite number of solutions. Students will learn to use graphing skills to solve systems with variables on both sides of the equation which will be helpful with future math classes. This unit concludes with a study of linear inequalities and systems of linear inequalities in two variables. Students will model mathematics with both systems of equations and inequalities in this unit to further make connections to real world scenarios.

Unit Duration: 15 Days

Desired Results

Standard(s):

A-CED: A- Create equations that describe numbers or relationships
A-REI: C- Solve systems of equations.
A-REI: D- Represent and solve equations and inequalities graphically

Practices:

MP1: Make sense of problems and persevere in solving them.
MP3: Construct viable arguments and critique the reasoning of others.
MP4: Model with Mathematics
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP8: Look for and express regularity in repeated reasoning.

Indicators:

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. Climate Change Example: Students may represent constraints describing the economic impact of climate change by equations, inequalities, and/or by systems of inequalities, and interpret solutions as viable or nonviable options.

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.C.6: Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

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, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★

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.

Understandings:

Students will understand that…

- A solution to a linear system is an ordered pair that satisfies both equations.
- Properties of equality must be applied to every term of the equations to maintain the equality of the system.
- Systems of equations that have no solutions are parallel lines, and ones with infinitely many solutions coincide.
- Methods for solving systems of equations can be applied to solve nonlinear equations with variables on both sides.
- The solution to a system of linear inequalities is the set of ordered pairs that satisfy the system.

Essential Questions:

- How can you solve a system of linear equations by graphing?
- How can you use elimination to solve a system of linear equations?
- Can a system of linear equations have no solution or infinitely many solutions?
- How can you use a system of linear equations to solve an equation with variables on both sides?
- How can you graph a linear inequality in two variables?
- How can you graph a system of linear inequalities?

Assessment Evidence

Performance Tasks:

• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation
• Quizzes
• Test

Other Evidence:

• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)

• Conferences

• Student Performance during group activities

• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

5.1: Solving Systems of Linear Equations by Graphing (1 day)
- Checking Solutions
- Solving a System of Linear Equations by Graphing

5.5: Solving Equations by Graphing (1 day)
- Solving a Linear Equation by Graphing
- Solving an Absolute Value Equation by Graphing

5.3: Solving Systems of Linear Equations by Elimination (2 days)
- Solving a System of Linear Equations by Elimination
- Modeling Real Life

5.4: Solving Special Systems of Linear Equations (1 day)
- Solving a System: No solution
- Solving a System: Infinitely Many Solutions

5.6: Solving Linear Inequalities in Two Variables (2 days)
- Checking Solutions
- Graphing a Linear Inequality in Two Variables
- Modeling Real Life

5.7: Systems of Linear Inequalities (1 day)

- Checking Solutions
- Graphing a System of Linear Inequalities
- Graphing a System of Linear Inequalities: No Solution
- Writing Systems of Linear Inequalities
- Modeling Real Life (optional)

Test Review (1 day)
Test (1 Day)

*Additional 5 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	● Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding ● Use enrichment and extension activities ● Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	● Read Problems aloud frequently ● Rephrase questions for student clarification ● Preferential Seating – close proximity to teacher ● Redirect student attention to the step-by-step explanation of each concept. ● Use of Dynamic Monitoring Tool to practice basic skills ● Have student view re-teaching videos
English Language Learners	● Have student view re-teaching videos ● Rephrase questions for student clarification ● Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties ● Allow use of translator device ● Provide vocabulary flash cards ● For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to

	ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4. 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 9-10 texts and topics.

RST.9-10.5. Analyze the relationships among concepts in a text, including relationships among key terms (e.g., force, friction, reaction force, energy).

New Jersey Student Learning Standards for Social Studies

Presenting Arguments and Explanations- Using a variety of formats designed for a purpose and an authentic audience forms the basis for clear communication. Strong arguments contain claims with organized evidence and valid reasoning that respects the diversity of the world and the dignity of each person. Writing findings and engaging in civil discussion with an audience provides a key step in the process of thinking critically about conclusions and continued inquiry.

New Jersey Student Learning Standards for Technology Education

9.4.12.O.12: Develop and interpret tables, charts, and figures to support written and oral communications.

9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

New Jersey Student Learning Standards for Science

Engaging in Argument from Evidence: Argumentation is the process by which explanations and solutions are reached. In science and engineering, reasoning and argument based on evidence are essential to identifying the best explanation for a natural phenomenon or the best solution to a design problem. Scientists and engineers use argumentation to listen to, compare, and evaluate competing ideas and methods based on merits.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking
Creativity

Unit 5: Operations on Polynomials

Unit Description: This chapter formally introduces students to polynomial equations and factoring. This is necessary for understanding and solving quadratic equations and functions which are introduced in later units. The unit begins with terminology and forms of polynomials. Basic operations of adding, subtracting, and multiplying are explored. This is followed by factoring techniques, especially for quadratic equations.

Unit Duration: 22 Days

Desired Results

Standard(s):

A-APR: A- Perform arithmetic operations on polynomials.
A-APR: B- Understand the relationship between zeros and factors of polynomials.
A-SSE: A- Interpret the structure of expressions
A-SSE: B- Write expressions in equivalent forms to solve problems.

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason Abstractly and Quantitatively
MP3: Construct viable arguments and critique the reasoning of others.
MP6: Attend to precision.
MP7: Look for and make use of structure.
MP8: Look for and express regularity in repeated reasoning.

Indicators:

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-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.

HSA-SSE.A.1a: Interpret parts of an expression, such as terms, factors, and coefficients.

HSA-SSE.A.2: Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$, *thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.
HSA-SSE.B.3a: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. a.) Factor a quadratic expression to reveal the zeros of the function it defines.

Understandings:

Students will understand that…

- Adding and subtracting polynomials is the same as combining like terms.
- Multiplying polynomials is similar to finding area and volume of figures.
- Recognizing a special product simplifies the multiplication process.
- Using sums and products are the key to factoring quadratic expressions.

Essential Questions:

- How can you add and subtract polynomials?
- How can you multiply two polynomials?
- What are the patterns in the special products $(a + b)(a - b)$, $(a + b)^2$ and $(a - b)^2$
- How can you use algebra tiles to factor the trinomial $x^2 + bx + c$ into the product of two binomials?
- How can you recognize and factor special products?

• Factoring a polynomial completely requires different techniques and perhaps more than one factoring.	• How can you factor a polynomial completely?
Assessment Evidence	
Performance Tasks: • Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Quizzes • Test	**Other Evidence:** • Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.
Benchmarks: Successful completion of quizzes and tests.	
Learning Plan	

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

7.1: Adding and Subtracting Polynomials (2 days)
- Finding Degrees of Monomials
- Writing a Polynomial in Standard Form
- Classifying Polynomials
- Adding Polynomials
- Subtracting Polynomials
- Modeling Real Life

7.2: Multiplying and Dividing Polynomials (1 day)
- Multiplying Polynomials and Monomials
- Dividing Polynomials
- Multiplying Binomials Using the Distributive Property
- Multiplying Binomials using the FOIL Method
- Multiplying Binomials and Trinomials
- Modeling Real Life

7.3: Special Products of Polynomials (1 day)
- Using the Square of a Binomial Pattern
- Using the Sum and Difference Pattern

7.4/7.5: Factoring GCF & Factoring $x^2 + bx + c$ (1 day)
- Factoring a Polynomial Using the GCF
- Factoring $x^2 + bx + c$ When b and c are Positive
- Factoring $x^2 + bx + c$ When b is Negative and c is Positive
- Factoring $x^2 + bx + c$ When c is Negative
- Modeling Real Life

7.6: Factoring $ax^2 + bx + c$ (2 days)
- Factoring out the GCF
- Factoring $ax^2 + bx + c$ When a and c are Positive
- Factoring $ax^2 + bx + c$ When a is Positive and c is Negative
- Factoring $ax^2 + bx + c$ When a is Negative
- Modeling Real Life

7.7: Factoring Special Products (1 day)
- Factoring the Difference of Two Squares
- Factoring Perfect Square Trinomials
- Modeling Real Life

7.8: Factoring Polynomials Completely (1 day)
- Factoring Polynomials by Grouping
- Factoring Polynomials Completely

Test Review (1 day)
Test (1 day)

*Additional 11 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding • Use enrichment and extension activities • Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	• Read Problems aloud frequently • Rephrase questions for student clarification • Preferential Seating – close proximity to teacher • Redirect student attention to the step-by-step explanation of each concept. • Use of Dynamic Monitoring Tool to practice basic skills • Have student view re-teaching videos
English Language Learners	• Have student view re-teaching videos • Rephrase questions for student clarification • Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties • Allow use of translator device • Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections
Indicators: **New Jersey Student Learning Standards for English Language Arts** **RST.9-10.3**. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text. **New Jersey Student Learning Standards for Computer Science and Design Thinking**

Recognizing and Defining Computational Problems
The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

New Jersey Student Learning Standards for Technology Education
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Integration of 21st Century Skills

Indicators:
The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking

Unit 6: Quadratic Functions

Unit Description: This unit uses the concepts of polynomials and factoring from unit 5 to gain an understanding of quadratic functions. Graphs of quadratic functions are examined and graphed using transformations similar to the ones used earlier examining linear functions. Quadratic functions are presented in two forms: standard and vertex form. The characteristics of each will be discussed. The unit will end with a nice comprehensive review of comparing linear, quadratic, and exponential functions.

Unit Duration: 12 Days

Desired Results

Standard(s):

A-CED: A- Create equations that describe numbers or relationships
F-IF: B- Interpret functions that arise in applications in terms of the context
F-IF: C- Analyze functions using different representations
F-BF: A- Build a function that models a relation between two quantities
F-BF:B- Build new functions from existing functions
F-LE: A- Construct and compare linear and exponential models and solve problems

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP4: Model with Mathematics.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP8: Look for and make use of structure.

Indicators:

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.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.
HSF-IF.C.7a: Graph linear and quadratic functions and show intercepts, maxima, and minima.

HSF-IF.C.9: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

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. Climate Change Example: Students may calculate the average rate of change of a function c(m) presented symbolically or as a table, where c(m) represents the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline).

HSF-BF.A.1a: Determine an explicit expression, a recursive process, or steps for calculation from a context.

HSF-BF.A.1b: Combine standard function types using arithmetic operations.

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-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.

Understandings:

Students will understand that…

- The value of *a* affects the stretch and direction of the quadratic function.
- The value of *c* is a vertical translation of the quadratic function.
- The vertex is located on the axis of symmetry.

Essential Questions:

- What are some of the characteristics of the graph of a quadratic function of the form $f(x) = ax^2$?
- How does the value of c affect the graph of $f(x) = ax^2 + bx + c$?

• The value of h is a horizontal translation of the quadratic function. • Linear, exponential, and quadratic functions grow with their own characteristic rate. • Standard form of a quadratic can be used to easily identify the y- intercept of a quadratic. • The vertex of a quadratic can be calculated using formulas.	• How can you find the vertex of the graph $f(x) = ax^2 + bx + c$? • How can you describe the graph $f(x) = ax^2 + bx + c$? • What are some of the characteristics of the graph $f(x) = a(x - h)^2 + k$? • How can you compare the growth rates of linear, exponential, and quadratic functions?

Assessment Evidence

Performance Tasks:	Other Evidence:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.) • Homework Assignments (Worksheets, online assignments, etc.) • Class Participation and Preparation • Quizzes • Test	• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.) • Conferences • Student Performance during group activities • Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

8.1: Graphing $f(x) = ax^2$ (1 day)
- Identifying Characteristics of a Quadratic Function
- Graphing $y = ax^2$ When $a > 0$
- Graphing $y = ax^2$ When $a < 0$
- Modeling Real Life

8.2: Graphing $f(x) = ax^2 + c$ (1 day)
- Graphing $y = x^2 + c$
- Graphing $y = ax^2 + c$
- Translating the Graph of $y = ax^2 + c$
- Modeling Real Life

8.4: Graphing $f(x) = a(x - h)^2 + k$ (1 day)
- Identifying Even and Odd Functions (Optional)
- Graphing $y = a(x - h)^2$
- Graphing $y = a(x - h)^2 + k$
- Modeling Real Life

8.3: Graphing $f(x) = ax^2 + bx + c$ (2 days)
- Finding the Axis of Symmetry and the Vertex
- Graphing $f(x) = ax^2 + bx + c$
- Finding a Minimum and Maximum Value
- Modeling Real Life

8.6: Comparing Linear, Exponential, and Quadratic Functions (2 days)

- Using Graphs to Identify Functions
- Using Differences or Ratios to Identify Functions
- Writing a Function to Model Data
- Writing a Recursive Rule
- Using and Interpreting Average Rates of Change
- Modeling Real Life

Test Review (1 day)
Test (1 day)

*Additional 3 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	● Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding ● Use enrichment and extension activities ● Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	● Read Problems aloud frequently ● Rephrase questions for student clarification ● Preferential Seating – close proximity to teacher ● Redirect student attention to the step-by-step explanation of each concept. ● Use of Dynamic Monitoring Tool to practice basic skills ● Have student view re-teaching videos
English Language Learners	● Have student view re-teaching videos ● Rephrase questions for student clarification ● Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties ● Allow use of translator device ● Provide vocabulary flash cards ● For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to

	ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts
RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

New Jersey Student Learning Standards for Computer Science and Design Thinking
8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

New Jersey Student Learning Standards for Technology Education
9.4.12.O.12: Develop and interpret tables, charts, and figures to support written and oral communications.
9.4.12.O.17: Employ critical thinking skills (e.g., analyze, synthesize, and evaluate) independently and in teams to solve problems and make decisions.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking
Creativity

Unit 7: Solving Quadratic Equations

Unit Description: This unit takes the concepts that were learned in the two previous units and uses them to focus specifically on solving quadratic equations. Different techniques such as factoring to solve, completing the square, the quadratic formula, and graphing are examined to take into account the form of the quadratic equation. An introduction to simplifying square roots is presented which will be used to solve a certain form of a quadratic equation. The unit will finalize with students deciding which method is best to solve a quadratic dependent upon the format in which the quadratic is written.

Unit Duration: 18 Days

Desired Results

Standard(s):

N-RN: A- Extend the properties of exponents to rational exponents.
N-RN: B- Use properties of rational and irrational numbers
A-CED: A- Create equations that describe numbers or relationships.
A-SSE: B- Write expressions in equivalent forms to solve problems.
A-REI: B- Solve equations and inequalities in one variable.
F-IF: B- Interpret functions that arise in application in terms of context
F-IF: C- Analyze functions using different representations

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP3: Construct viable arguments and critique the reasoning of others.
MP4: Model with Mathematics
MP7: Look for and make use of structure.
MP8: Look for and Express Regularity in Repeated Reasoning

Indicators:

HSN-RN.A.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.

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.

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

HSA-CED.A.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.Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.

HSA-SSE.B.3b: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. b.) Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
HSA-REI.B.4a: Solve quadratic equations in one variable. 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-REI.B.4b: Solve quadratic equations in one variable. b.) Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

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, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.★

HSF-IF.C.7a: Graph linear and quadratic functions and show intercepts, maxima, and minima.
HSF-IF.C.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.

Understandings:
Students will understand that…

- By using properties of multiplication and division, one can simplify radicals to make them more useful.
- By examining the graph of a quadratic function, one can determine the number of real solutions.
- Quadratic equations of the form $ax^2 + bx + c = 0$ can be solved using factoring, quadratic formula, or graphing.
- By mastering completing the square one learns the process of solving complex equations and the derivation of the quadratic formula.
- The quadratic formula can be used to solve any quadratic equations and determine the number of real solutions.

Essential Questions:

- How can you multiply and divide square roots?
- How can you use a graph to solve a quadratic equation in one variable?
- How can you determine the number of solutions of a quadratic equation of the form $ax^2 + c = 0$?
- How can you use "completing the square" to solve a quadratic equation?
- How can you derive a formula that can be used to write the solutions of any quadratic equation in standard form?
- How can you solve quadratics that are in the form $ax^2 + bx + c = 0$?

Assessment Evidence

Performance Tasks:
• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation
• Quizzes
• Test

Other Evidence:
• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)
• Conferences
• Student Performance during group activities
• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

9.2: Solving Quadratic Equations by Graphing (1 day)
- Solving a Quadratic Equation: Two Real Solutions
- Solving a Quadratic Equation: One Real Solution
- Solving a Quadratic Equation: No Real Solutions
- Finding Zeros of a Function
- Modeling Real Life

7.4 -7.8 Solving Quadratic Equations by Factoring (2 days)
- Zero Product Property
- Solving a Quadratic Equation by Factoring

9.1: Properties of Radicals (2 days)
- Using the Product Property of Square Roots
- Using the Quotient Property of Square Roots
- Rationalizing the Denominator
- Adding and Subtracting Radicals
- Multiplying Radicals

9.3: Solving Quadratic Equations Using Square Roots (1 day)
- Solving Quadratic Equations Using Square Roots
- Approximating Solutions of a Quadratic Equation
- Modeling Real Life
- Rewriting and Evaluating a Formula

9.4: Solving Quadratic Equations by Completing the Square (1 day)
- Completing the Square
- Solving a Quadratic Equation: $x^2 + bx = d$
- Solving Quadratic Equation: $ax^2 + bx + c = 0$
- Modeling Real Life

9.5: Solving Quadratic Equations Using the Quadratic Formula (2 days)
- Using the Quadratic Formula
- Modeling Real Life
- Determining the Number of Real Solutions
- Finding the Number of x-Intercepts of a Parabola
- Choosing a Method

Test Review (1 day)
Test (1 day)

*Additional 7 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding • Use enrichment and extension activities • Have them complete additional critical thinking exercise to develop a deeper understanding

Struggling Learners	• Read Problems aloud frequently • Rephrase questions for student clarification • Preferential Seating – close proximity to teacher • Redirect student attention to the step-by-step explanation of each concept. • Use of Dynamic Monitoring Tool to practice basic skills • Have student view re-teaching videos
English Language Learners	• Have student view re-teaching videos • Rephrase questions for student clarification • Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties • Allow use of translator device • Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts

RST.9-10.7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.

RST.11-12.7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.

New Jersey Student Learning Standards for Computer Science and Design Thinking

Collaborating Around Computing and Design

Collaborative computing is the process of performing a computational task by working on pairs in teams. Because it involves asking for the contributions and feedback of others, effective collaboration can lead to better outcomes than working independently. Collaboration requires individuals to navigate and incorporate

diverse perspectives, conflicting ideas, disparate skills, and distinct personalities. Students should use collaborative tools to effectively work together and to create complex artifacts.

Recognizing and Defining Computational Problems

The ability to recognize appropriate and worthwhile opportunities to apply computation is a skill that develops over time and is central to computing. Solving a problem with a computational approach requires defining the problem, breaking it down into parts, and evaluating each part to determine whether a computational solution is appropriate.

New Jersey Student Learning Standards for Technology Education

9.3.ST-SM.2: Apply science and mathematics concepts to the development of plans, processes and projects that address real world problems.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking
Creativity

Unit 8: Exponential Functions

Unit Description: This unit begins with a review of the properties of integer exponents. This is followed with a review of exponential functions. This review is then used as the building blocks to discuss growth and decay functions and how to write them. The properties of exponents are used to introduce rational exponents and radical expressions. This chapter concludes with an introduction to geometric sequences and their connections to exponential functions.

Unit Duration: 13 Days

Desired Results

Standard(s):

N-RN: A- Extend the properties of exponents to rational exponents
A-CED: A-Create equations that describe numbers or relationships
A-SSE: B- Write expressions in equivalent forms to solve problems.
F-IF: A- Understand the concept of a function and use function notation
F-IF: C- Analyze functions using different representations
F-LE: A- Construct and compare linear and exponential models and solve problems
F-BF: A- Build a function that models a relationship between two quantities

Practices:

MP1: Make sense of problems and persevere in solving them.
MP2: Reason abstractly and quantitatively.
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP7: Look for and make use of structure.

HSN-RN.A.2: Rewrite expressions involving radicals and rational exponents using the properties of exponents.

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.

HSA-SSE.B.3c: Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. c.) Use the properties of exponents to transform expressions for exponential functions.

HSF-IF.A.3: Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.

HSF-IF.C.7e: Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

HSF-IF.C.8b: Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)12^t$, $y = \frac{(1.2)^t}{10}$, and classify them as representing exponential growth or decay.

HSF-LE.A.1a: Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals

HSF-LE.A.1c: Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

HSF-LE.A.2: Construct linear and exponential functions, including arithmetic and geometric sequences, given graph, a description of a relationship, or two input-output pairs (include reading these from a table)

HSF-BF.A.1a: Determine an explicit expression, a recursive process, or steps for calculation from a context.

HSF-BF.A.1b: Combine standard function types using arithmetic operations

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.

Understandings:

Students will understand that…

- The rules of exponents can be used to simplify numerical expressions with rational exponents.
- Students can use a table of values and the general shape to graph an exponential function.
- A growth factor greater than 1 reflects growth and a decay factor less than 1 reflects decay.
- Geometric sequences describe exponential functions.

Essential Questions:

- How can you write general rules involving properties of exponents?
- What are some characteristics of the graph of an exponential function?
- What are some of the characteristics of exponential growth and exponential decay functions?
- How can you use a geometric sequence to describe a pattern?

Assessment Evidence

Performance Tasks:

• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation
• Quizzes
• Test

Other Evidence:

• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)

• Conferences

• Student Performance during group activities

• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

6.1 Properties of Exponents (2 days)

- Using Zero and Negative Exponents
- Simplifying an Expression
- Using Properties of Exponents (Product of Powers Property, Quotient of Powers Property, Power of a Power Property)
- Using Properties of Exponents (Power of a Product Property, Power of Quotient Property)

6.3: Exponential Functions (2 days)

- Identifying Functions
- Evaluating Exponential Functions
- Graphing $y = ab^x$
- Graphing $y = ab^{x-h} + k$
- Modeling Real Life

6.6: Geometric Sequences (2 days)

- Identifying Geometric Sequences
- Extending Geometric Sequences
- Graphing a Geometric Sequence
- Finding the
- n^{th} term of a Geometric Sequence
- Modeling Real Life (optional)

6.4: Exponential Growth and Decay (2 days)

- Using an Exponential Growth Function
- Identifying Exponential Growth and Decay
- Interpreting Exponential Functions
- Rewriting Exponential Functions
- Modeling Real Life
-

Test Review (1 days)
Test (1 Day)

*Additional 3 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	● Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding ● Use enrichment and extension activities ● Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	● Read Problems aloud frequently ● Rephrase questions for student clarification ● Preferential Seating – close proximity to teacher ● Redirect student attention to the step-by-step explanation of each concept. ● Use of Dynamic Monitoring Tool to practice basic skills ● Have student view re-teaching videos
English Language Learners	● Have student view re-teaching videos ● Rephrase questions for student clarification ● Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties ● Allow use of translator device ● Provide vocabulary flash cards ● For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the

	way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org
Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4. 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 9-10 texts and topics

New Jersey Student Learning Standards for Social Studies

6.1.12.EconNE.6.a: Analyze the impact of money, investment, credit, savings, debt, and financial institutions on the development of the nation and the lives of individuals.

New Jersey Student Learning Standards for Computer Science and Design Thinking

8.1.8.DA.5: Test, analyze, and refine computational models.

8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.

New Jersey Student Learning Standards for Technology Education

9.3.ST.1: Use technology to acquire, manipulate, analyze and report data.

9.4.12.O.12: Develop and interpret tables, charts, and figures to support written and oral communications.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Critical thinking

Unit 9: Radical Functions

Unit Description: This unit introduces radical functions and equations, both square root and cube root. The major work of this chapter is graphing radical functions and solving radical equations. Students will apply transformations to the square root and cube root parent functions, and interpret key features of the graphs. Radical equations are used to solve problems and inverse functions are introduced.

Unit Duration: 12 Days

Desired Results

Standard(s):

A-CED: A-Create equations that describe numbers or relationships
A-SSE: B- Write expressions in equivalent forms to solve problems.
F-IF: B- Interpet functions that arise in applications in terms of context
F-IF: C- Analyze functions using different representations
F-LE: A- Construct and compare linear and exponential models and solve problems
F-BF: B- Build new functions from existing function

Practices:

MP1: Make sense of problems and persevere in solving them.
MP3: Construct viable arguments and critique the reasoning of others.
MP4: Model with Mathematics
MP5: Use appropriate tools strategically.
MP6: Attend to precision.
MP7: Look for and make use of structure.

HSA-CED.A.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.Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.

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 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. Climate Change Example: Students may calculate the average rate of change of a function c(m) presented symbolically or as a table, where c(m) represents the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline).

HSF-IF.B.7b: Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

HSF-IF.C.9: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal description)

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.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.

Understandings:

Students will understand that…

- Domains and ranges of radicals functions are dependent upon transformations.
- Graphing square root and cube root functions can be done through the use of technology.
- Solving radical equations is similar to solving a linear equation.
- Inverse functions can be found and proved algebraically.

Essential Questions:

- How can you find the domain and range of a radical and cube root function given its graph?
- How can you solve a radical equation using inverse operations?
- Can a radical and cube root equation have extraneous solutions?
- What are inverse relations?
- How can we algebraically prove functions to be inverses of one another?

Assessment Evidence

Performance Tasks:

• Classwork Assignments (Practice worksheets, online assignments, activities, explorations/investigations, etc.)
• Homework Assignments (Worksheets, online assignments, etc.)
• Class Participation and Preparation
• Quizzes
• Test

Other Evidence:

• Use of digital platforms (Quizizz, Formative, Linkit!, Kahoot, Schoology, Big Ideas Platform, etc.)

• Conferences

• Student Performance during group activities

• Activities i.e. stations, group work, independent practice, card sorts, task cards, etc.

Benchmarks: Successful completion of quizzes and tests.

Learning Plan

Learning Activities: Guided Notes, Worksheets, Do Nows, Big Ideas Assignments, etc.

10.1 Graphing Square Root Functions (1 day)
- Finding the Domain of a Square Root Function
- Graphing a Square Root Function
- Comparing Graphs of Square Root Functions
- Graphing Transformations of Square Root Functions
- Comparing Square Root Functions
- Modeling Real Life

10.2: Graphing Cube Root Functions (1 day)
- Comparing Graphs of Cube Root Functions
- Graphing Transformations of Cube Root Functions
- Comparing Square Root Functions
- Modeling Real Life

10.3: Solving Radical Equations (2 days)
- Solving Radical Equations
- Solving an Equation with Radicals on Both Sides
- Solving a Radical Equation Involving a Cube Root
- Identifying Extraneous Solutions
- Modeling Real Life

10.4: Inverse of a Function (2 days)
- Finding Inverses of Relations

- Writing an Equation for the Input of a Function
- Finding the Inverse of a Linear Function
- Finding the Inverse of a Quadratic Function

Test Review (1 days)
Test (1 Day)

*Additional 4 days used for review and quiz days *

Resources: Textbook, online resources, etc.

Unit Modifications for Special Population Students	
Advanced Learners	• Ask reflective and extension questions to build on classroom knowledge to develop a deeper understanding • Use enrichment and extension activities • Have them complete additional critical thinking exercise to develop a deeper understanding
Struggling Learners	• Read Problems aloud frequently • Rephrase questions for student clarification • Preferential Seating – close proximity to teacher • Redirect student attention to the step-by-step explanation of each concept. • Use of Dynamic Monitoring Tool to practice basic skills • Have student view re-teaching videos
English Language Learners	• Have student view re-teaching videos • Rephrase questions for student clarification • Easy access to language dictionary, instructor, or any other means to help interpret any language/communication difficulties • Allow use of translator device • Provide vocabulary flash cards • For Spanish speaking students view re-teaching videos in Spanish
Special Needs Learners	Each special education student has an Individualized Educational Plan (IEP) that details the specific accommodations, modifications, services, and support needed to level the playing field. This will enable that student to access the curriculum to the greatest extent possible in the least restrictive environment. These include: • Variation of time: adapting the time allotted for learning, task completion, or testing • Variation of input: adapting the way instruction is delivered • Variation of output: adapting how a student can respond to instruction • Variation of size: adapting the number of items the student is expected to complete • Modifying the content, process or product Additional resources are outlined to facilitate appropriate behavior and increase student engagement. The most frequently used modifications and accommodations can be viewed here. Teachers are encouraged to use the Understanding by Design Learning Guidelines (UDL). These guidelines offer a set of concrete suggestions that can be applied to any discipline to ensure that all learners can access and participate in learning opportunities. The framework can be viewed here www.udlguidelines.cast.org

Learners with a 504	Refer to page four in the Parent and Educator Resource Guide to Section 504 to assist in the development of appropriate plans.

Interdisciplinary Connections

Indicators:

New Jersey Student Learning Standards for English Language Arts

RST.9-10.3. Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

RST.9-10.4. 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 9-10 texts and topics

9th and 10th Grade Writing Standards

D. Use precise language and domain-specific vocabulary to manage the complexity of the topic and convey a style appropriate to the discipline and context as well as to the expertise of likely readers.

New Jersey Student Learning Standards for Social Studies

6.1.12.EconNE.6.a: Analyze the impact of money, investment, credit, savings, debt, and financial institutions on the development of the nation and the lives of individuals.

New Jersey Student Learning Standards for Computer Science and Design Thinking

8.1.8.DA.5: Test, analyze, and refine computational models.

8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

8.2.12.EC.3: Synthesize data, analyze trends, and draw conclusions regarding the effect of a technology on the individual, culture, society, and environment and share this information with the appropriate audience.

New Jersey Student Learning Standards for Technology Education

9.3.ST.1: Use technology to acquire, manipulate, analyze and report data.

9.4.12.O.12: Develop and interpret tables, charts, and figures to support written and oral communications.

Integration of 21st Century Skills

Indicators:

The P21 organization conducted research that identified deeper learning competencies and skills they called the Four Cs of 21st century learning:

Collaboration
Communication
Critical thinking