Summit Public Schools

Summit, New Jersey

Grade Level 9th and 10th / Content Area: Mathematics

Length of Course: Full Academic Year

Algebra I – Modeling with Functions

Submitted by:

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Revised for CCS: August 2014

Revised by Christina Allian: August 2017

Revised by Angelique Bender and Adam Leaman 2021

Overview:

This course offers a deep exploration of the advanced topics of Algebra 1. It has been designed to offer a rigorous and comprehensive foundation that addresses the newly expanded core content standards for Algebra 1. It will also provide students the opportunity to truly master algebraic and mathematics skills that will lead to greater achievement in subsequent courses. Throughout this course students will represent linear functions numerically, algebraically, graphically and verbally and work with and interpret these representations. Students will deepen their understanding of relations and functions and expand their repertoire in working with them. Students will develop insight and understanding of the algebraic properties that govern the manipulation of symbols in expressions, equations, and inequalities. Linear, quadratic, exponential and radical functions will be used as mathematical modeling tools providing students with a versatile and powerful means for analyzing and solving complex, multi-step, real world problems. Students will also learn the appropriate use of technology, such as graphing calculators and spreadsheet utilities to model and analyze a wide range of mathematical relationships. In addition, students will explore radical expressions and statistics. Among the goals of this course is to explore real-world problems to improve their critical thinking and algebra skills while emphasizing the meaningfulness of algebra in their lives.

Chapters 3 - Graphing Linear Functions

Section #	Section Title	Days
3.1 and Course Introduction	Functions (domain and range; independent and dependent variables)	2
3.2	Linear Functions (how to show from tables, discrete and continuous)	1
3.3	Functional Notation	2
3.4 - 3.5	Graphing Linear Equations in Slope Intercept Form / Standard Form	1
3.6	** GRAPHING FROM POINT SLOPE FORM**	1
3.7	Graphing Absolute Value Equations - By transformations (a, h, k)	1
	Reviews / Extensions / Quizzes as needed	2
	Chapter 3 Test	1

Total Number of Days: 11

Chapter 4 - Writing Linear Functions

4.1	Writing Equations in Slope-Intercept Form -given slope and y-intercept -given standard form	1
4.2	Writing Equations in Point-Slope Form -given two points -applications	1
4.3	Writing Equations of Parallel and Perpendicular Lines	1
4.4	Scatter Plots and Lines of Fit	1
4.5	Analyzing Lines of Fit	1
4.6	Arithmetic Sequences - discrete domain and range - No Recursive	2
4.7	Piecewise Linear Functions	2
	Reviews / Quizzes / Extensions as needed	2
	Test	1

Total Number of Days: 12

Chapter 5-Systems of Equations

Section #	Section Title	Days
5.1	Solving Systems of Linear Equations by Graphing (Integrate 5.4 and systems involving absolute value functions. Use all forms of linear equations). Introduce 5.5 concepts through the use of the graphing calculator	2
5.2	Solving Systems of Linear Equations by Substitution (Integrate 5.4)	1
5.3	Solving Systems of Linear Equations by Elimination (Integrate 5.4)	1
5.1-5.4	Systems word problems and best method	2
5.6 - 5.7	Linear Inequalities and system of linear inequalities. Include word problems involving systems of inequalities	2
	Review / Quizzes / Extensions as needed	2
	Chapter 5 Test	1

Total Number of Days: 11

Chapter 6-Exponential Functions

Section #	Section Title	Days
6.1	Properties of Exponents	2
6.2	Radicals and Rational Exponents	2
6.3	Exponential Functions - Day 1 - Introduce exponential functions; contrast linear and exponential by tables - Day 2 - Graph with transformations	2
6.4	Growth and Decay -identify growth/decay, write equations -word problems including compound interest	2
6.5	Solving Exponential Equations	2
6.6	Geometric Sequences	2
	Review/ Quizzes/ Extensions as needed	3
	Chapter 6 Test	1

Total Number of Days: 16

Chapter 7-Polynomial Equations and Factoring

Section #	Section Title	Days
7.1	Adding and Subtracting Polynomials	1
7.2	Multiplying Polynomials	1
7.3	Special Products of Polynomials	1
7.4	Solving Polynomial Equations in Factored Form	1
7.5	Factoring Trinomials (a=1)	2
7.6	Factoring Trinomials (a>1)	3
7.7	Factoring Special Products - just difference of squares	1
7.8	Factoring Completely -gcf, grouping -Picking the appropriate method	2
	Review / Quizzes / Extensions as needed	3
	Chapter 7 Test	1

Total Number of Days: 16

-- MIDTERM --

Chapter 8- Graphing Quadratic Equations

Section #	Section Title (old textbook section #)	Days
8.1	Graphing $f(x)=ax^2$	1
8.2	Graphing $f(x)=ax^2+c$ -with graphing calculator and by hand	1
8.4	Vertex Form **Use transformations** -with graphing calculator and by hand	1
8.3	Graphing $f(x)=ax^2+bx+c$ plus review of 8.1-8.4	2
8.5	Intercept Form	1
8.6	Comparing Functions (Linear, Exponential, Quadratic) - Tables - Graphs - Function form	1

	Quizzes / Review / Extensions	2
	Chapter 8 Test	1

Total Number of Days: 10

Chapter 9-Solving Quadratic Equations

Section #	Section Title	Days
9.1	Simplifying Square Roots only as a prequel to the Quadratic formula (leave operations and rationalizing until chapter 10)	1
9.2	Solving Quadratic Equations by Graphing	1
9.3	Solving Quadratic Equations by Using Square Roots	1
7.4/7.8	Review of solving by factoring	1
9.4	Solving Quadratic Equations by Completing the Square - Leading coefficient of 1 and b always even	1
9.5	Solving Quadratic Equation by the Quadratic Formula - Discriminant and nature of solutions	1
9.1-9.5 + 7.4/ 7.8 Recap	Choosing the Best Method, review all methods	1
9.6	Solving Nonlinear systems manually and using graphing calculator; word problems (projectile motion, number and area problems)	3
	Quizzes, reviews and extensions as needed	3
	Test 9	1

Total Number of Days: 14

Chapter 10 - Radical Functions

Section #	Section Title	Days
9.1	Properties of Radicals	3
10.1	Graphing Square Roots ** Use transformations **	1
10.2	Graphing Cube Roots *Using transformations*	1
10.3	Solving Radical Equations	1
10.4	Inverse Functions	1

	Review / Quizzes / Extensions as needed	3
	Unit Test	1

Total Number of Days: 11

Chapter 11-Data Analysis and Displays

Section #	Section Title (old textbook section #)	Days
11.1	Measures of Center of Variation - Only do standard deviation by calculator	1
11.2	Box and Whisker Plots (include outliers)	1
11.3	Shapes of Distributions - If there is time, focus on normal distribution	1
11.4	Two-Way Tables **For conditional relative frequency, DO NOT follow the book, use joint frequency divided by relative frequency**	2
11.5	Choosing a Data Display	1
	Review / Quizzes / Extensions as needed	2
	Test	1

Total Number of Days: 9

SUPPLEMENTAL UNIT
(if time permits)

Probability

	Counting Principles	2
	Permutations and Combinations	2
	Basic Probability	1
	Complex Probability	2
	Review / Quizzes / Extensions as needed	1
	Probability Test	1

Total Number of Days: 9

Unit 1: Graphing Linear Functions

Big Ideas: *Course Objectives/Content Statement(s)*

- Function notation, representation of functions, discrete and continuous functions, evaluation of functions
- Graphing from slope-intercept and standard form
- Graphing linear and absolute value functions using transformations

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• What is a function? • What is a graph appropriate form for a given function? • How are functions graphed based on the form? • How can you determine whether a function is linear or nonlinear? • How can you use function notation to represent a function? • How can you describe the graph of the various types of linear functions • How do the values of a, h and k affect the graph of the absolute value equation?	**Students will understand that:** • Relations are sometimes functions • Each relation has a corresponding domain and range (input vs. output...discrete and continuous) • Linear functions can be presented in various forms • Linear functions can be used to model real-life situations and data • Function notation can be used to evaluate, interpret, solve and graph problems • Graphs can be translated, stretched, shrunk, or reflected based on transformations
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**

Standards Summary

Section	Common Core State Standards	
3.1	Learning	HSF-IF.A.1
3.2	Learning	HSA-CED.A.2, HSA-REI.D.10, HSF-IF.B.5, HSF-IF.C.7a, HSF-LE.A.1b
3.3	Learning	HSA-CED.A.2, HSF-IF.A.1, HSF-IF.A.2, HSF-IF.C.7a, HSF-IF.C.9
3.4	Learning	HSA-CED.A.2, HSF-IF.C.7a
3.5	Learning	HSA-CED.A.2, HSF-IF.B.4, HSF-IF.C.7a, HSF-LE.B.5
3.6	Learning	HSF-IF.C.7a, HSF-BF.B.3
3.7	Learning	HSA-CED.A.2, HSA-REI.D.10, HSF-IF.C.7b, HSF-BF.B.3

- 3.1 Functions
- 3.2 Linear Functions
- 3.3 Function Notation
- 3.4 Graphing Linear Equations in Standard Form
- 3.5 Graphing Linear Equations in Slope-Intercept Form
- 3.6 Transformations of Graphs of Linear Functions
- 3.7 Graphing Absolute Value Functions

****Note, these common core state standards for each section are the same NJSLS standards, except with "HS" at the beginning. For example, Algebra Section 3.1 aligns with NJSLS standard F-IF.A.1.** **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	
Differentiation	**Assessments**
Interdisciplinary Connections/Media Literacy Integration/Global Perspectives ● Chapter STEM Performance Tasks (found on Big Ideas Course Resources). These tasks connect the current math topic with disciplines such as: business and consumer math, biology, chemistry and physics, as well as writing tasks encouraging writing across the curriculum and mathematical reasoning. ● Connections to Media Literacy and Global Perspectives are presented throughout the chapters and engrained within the real-life problems **Technology Integration** ● Incorporate the daily use of the TI-84 online	**Formative Assessments:** ● Quiz ● Do nows ● Exit/Entrance Tickets ● Quizizz ● Go Formative ● Delta Math **Summative Assessments, Projects, and Celebrations:** ● Unit Test (paper or online version - Big Ideas has both) ● Chapter 3 STEM Performance Tasks (found on Big Ideas Course Resources)

graphing calculator, Desmos, GoFormative, Delta Math, and online resources through Big Ideas

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic	Individualized assessment tools based on student need

	responding	
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 2: Writing Linear Functions	
Big Ideas: *Course Objectives/Content Statement(s)* ● Identify, use and write linear equations in slope-intercept, standard and point-slope form ● Interpret and model data from scatter plots ● Apply the concepts of linear functions to arithmetic sequences	
Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
● Given the graph of a linear equation, how do you write the equation of a line? ● How can you write the equation of a line given only certain characteristics? ● How can you recognize lines that are parallel and perpendicular, and what characteristics do they have? ● How can you use a scatter plot and line of fit to make conclusions about real-world data? ● How are arithmetic sequences used to describe patterns? ● How can you describe functions represented by more than one equation?	**Students will understand that:** ● Linear equations come in different forms ● You can use linear equations to model and solve real-life problems ● Parallel and perpendicular lines have unique characteristics ● Interpreting scatter plots allows for analyzing data beyond what is presented ● To find a particular term of an arithmetic sequences, you can first write the general rule ● Piecewise linear functions can take on different characteristics depending on the domain
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**
	● 4.1 Writing Equations in Slope-Intercept Form ● 4.2 Writing Equations in Point-Slope Form ● 4.3 Writing Equations of Parallel and Perpendicular Lines ● 4.4 Scatter Plots and Lines of Fit ● 4.5 Analyzing Lines of Fit ● 4.6 Arithmetic Sequences ● 4.7 Piecewise Functions

Standards Summary		
Section	**Common Core State Standards**	
4.1	Learning	HSA-CED.A.2, HSF-BF.A.1a, HSF-LE.A.1b, HSF-LE.A.2
4.2	Learning	HSA-CED.A.2, HSF-BF.A.1a, HSF-LE.A.1b, HSF-LE.A.2
4.3	Learning	HSA-CED.A.2, HSF-LE.A.2
4.4	Learning	HSF-LE.B.5, HSS-ID.B.6a, HSS-ID.B.6c, HSS-ID.C.7
4.5	Learning	HSF-LE.B.5, HSS-ID.B.6a, HSS-ID.B.6b, HSS-ID.B.6c, HSS-ID.C.7, HSS-ID.C.8, HSS-ID.C.9
4.6	Learning	HSF-IF.A.3, HSF-BF.A.1a, HSF-BF.A.2, HSF-LE.A.2
4.7	Learning	HSA-CED.A.2, HSA-REI.D.10, HSF-IF.C.7b

Career-Ready Practices

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

Differentiation	Assessments
Interdisciplinary Connections/Media Literacy Integration/Global Perspectives	**Formative Assessments:** • Quiz • Do nows

- Chapter STEM Performance Tasks (found on Big Ideas Course Resources). These tasks connect the current math topic with disciplines such as: business and consumer math, biology, chemistry and physics, as well as writing tasks encouraging writing across the curriculum and mathematical reasoning.

- Connections to Media Literacy and Global Perspectives are presented throughout the chapters and engrained within the real-life problems

Technology Integration

- Incorporate the daily use of the TI-84 online graphing calculator, Desmos, GoFormative, Delta Math, and online resources through Big Ideas

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies

- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 4 STEM Performance Tasks (found on Big Ideas Course Resources)

Accommodations	Interventions	Modifications
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 3: Systems of Equations

Big Ideas: *Course Objectives/Content Statement(s)*

- Solve systems using graphing, substitution, elimination and the technology
- Solve nonlinear systems involving absolute value (both with and without technology)
- Recognizing when a system has no real solutions in any method
- Graph and write systems of linear inequalities
- Use systems of equations and inequalities to solve real-life problems

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• What does it mean to be a "solution" • What are various ways to find solutions? • What does a solution look like? • Do all systems produce solutions? • How are systems of equations and inequalities graphed?	**Students will understand that:** • Systems of equations can be solved in various ways • Systems of equations can be used to model solutions to real-life problems with two unknowns • Not all systems produce real solutions • Solutions to a system of inequalities are regions (when solutions exists)
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**

Standards Summary		
Section	**Common Core State Standards**	
5.1	Learning	HSA-CED.A.3, HSA-REI.C.6
5.2	Learning	HSA-CED.A.3, HSA-REI.C.6
5.3	Learning	HSA-CED.A.3, HSA-REI.C.5, HSA-REI.C.6
5.4	Learning	HSA-CED.A.3, HSA-REI.C.6
5.5	Learning	HSA-CED.A.3, HSA-REI.D.11
5.6	Learning	HSA-CED.A.3, HSA-REI.D.12
5.7	Learning	HSA-CED.A.3, HSA-REI.D.12

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.
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CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
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CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

- 5.1 Solving Systems of Linear Equations by Graphing
- 5.2 Solving Systems of Linear Equations by Substitution
- 5.3 Solving Systems of Linear Equations by Elimination
- 5.4 Solving Special Systems of Linear Equations
- 5.5 Solving Equations by Graphing
- 5.6 Graphing Linear Inequalities in Two Variables
- 5.7 Systems of Linear Inequalities

Differentiation	**Assessments**

Interdisciplinary Connections/Media Literacy Integration/Global Perspectives

- Chapter STEM Performance Tasks (found on Big Ideas Course Resources). These tasks connect the current math topic with disciplines such as: business and consumer math, biology, chemistry and physics, as well as writing tasks encouraging writing across the curriculum and mathematical reasoning.

- Connections to Media Literacy and Global Perspectives are presented throughout the chapters and engrained within the real-life problems

Technology Integration

- Incorporate the daily use of the TI-84 online graphing calculator, Desmos, GoFormative, Delta Math, and online resources through Big Ideas

Supports for English Language Learners		
Sensory Supports	**Graphic Supports**	**Interactive Supports**
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Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 5 STEM Performance Tasks (found on Big Ideas Course Resources)
- Project idea: Show how one system solved all ways will yield the same solution

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 4: Exponential Functions

Big Ideas: *Course Objectives/Content Statement(s)*

- Evaluate and simplify expressions with exponents
- Find nth roots
- Identify, evaluate and graph exponential functions
- Solve exponential equations
- Identify, write, and graph geometric sequences

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• How can you write general rules involving properties of exponents? • How can you write and evaluate the nth root of a number? • What are some of the characteristics of the graph of an exponential function? • What are some of the characteristics of exponential growth and decay functions? • How can you solve an exponential equation? • How can you use a geometric sequence to describe a pattern?	**Students will understand that:** • A radical has an alternate notation which is a rational exponent • Exponential functions have asymptotes and restricted ranges • Exponential functions solely increase or decrease on their entire domain • Geometric sequences are discrete versions of exponential functions restricted to natural number domains

Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	Lessons
Standards Summary **Section** | **Common Core State Standards** **6.1** Learning HSN-RN.A.2 **6.2** Learning HSN-RN.A.1, HSN-RN.A.2 **6.3** Learning HSA-CED.A.2, HSF-IF.B.4, HSF-IF.C.7e, HSF-IF.C.9, HSF-BF.A.1a, HSF-BF.B.3, HSF-LE.A.1a, HSF-LE.A.2 **6.4** Learning HSA-SSE.B.3c, HSA-CED.A.2, HSF-IF.C.7e, HSF-IF.C.8b, HSF-BF.A.1a, HSF-LE.A.1c, HSF-LE.A.2 **6.5** Learning HSA-CED.A.1, HSA-REI.A.1, HSA-REI.D.11 **6.6** Learning HSF-IF.A.3, HSF-BF.A.2, HSF-LE.A.2 **6.7** Learning HSF-IF.A.3, HSF-BF.A.1a, HSF-BF.A.2, HSF-LE.A.2 **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to personal goals. **CRP11**: Use technology to enhance productivity. **CRP12**: Work productively in teams while using cultural global competence.	• 6.1 Properties of Exponents • 6.2 Radicals and Rational Exponents • 6.3 Exponential Functions • 6.4 Exponential Growth and Decay • 6.5 Solving Exponential Equations • 6.6 Geometric Sequences
Differentiation	**Assessments**

Interdisciplinary Connections/Media Literacy Integration/Global Perspectives

- Chapter STEM Performance Tasks (found on Big Ideas Course Resources). These tasks connect the current math topic with disciplines such as: business and consumer math, biology, chemistry and physics, as well as writing tasks encouraging writing across the curriculum and mathematical reasoning.

- Connections to Media Literacy and Global Perspectives are presented throughout the chapters and engrained within the real-life problems

Technology Integration

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Supports for English Language Learners		
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Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 6 STEM Performance Tasks (found on Big Ideas Course Resources)

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 5. Polynomial Functions and Factoring

Big Ideas: *Course Objectives/Content Statement(s)*

- To classify, add, subtract and multiply polynomials
- Factor polynomials using various factoring techniques
- To apply the zero product-property on factored polynomials

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• How can you add and subtract polynomials? • How can you multiply two polynomials • What are the patterns in the special products? • How can you solve a polynomial equation? • How do you factor a quadratic polynomial completely?	**Students will understand that:** • Polynomials have degrees, can be classified, added, subtracted and multiplied, and can be used to solve real-life problems • Polynomials can be factored under certain circumstances • The zero product property can be applied to factored polynomials and help us solve real-life problems

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- Certain polynomials take on certain special factoring patterns

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<tr><td>Areas of Focus: Proficiencies
(New Jersey Student Learning Standards)</td><td>Lessons</td></tr>
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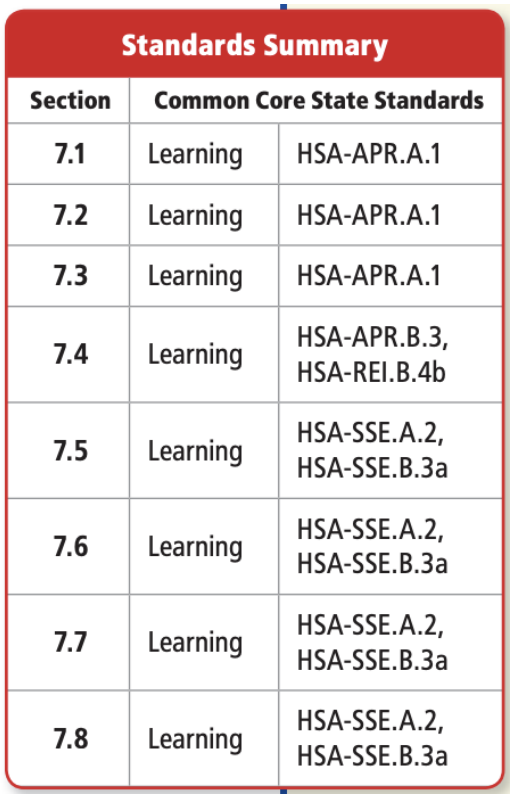

Standards Summary

Section	Common Core State Standards	
7.1	Learning	HSA-APR.A.1
7.2	Learning	HSA-APR.A.1
7.3	Learning	HSA-APR.A.1
7.4	Learning	HSA-APR.B.3, HSA-REI.B.4b
7.5	Learning	HSA-SSE.A.2, HSA-SSE.B.3a
7.6	Learning	HSA-SSE.A.2, HSA-SSE.B.3a
7.7	Learning	HSA-SSE.A.2, HSA-SSE.B.3a
7.8	Learning	HSA-SSE.A.2, HSA-SSE.B.3a

Career-Ready Practices

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

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- 7.1 Adding and Subtracting Polynomials
- 7.2 Multiplying Polynomials
- 7.3 Special Products of Polynomials
- 7.4 Solving Polynomial Equations in Factored Form
- 7.5 Factoring x^2+bx+c
- 7.6 Factoring ax^2+bx+c
- 7.7 Factoring Special Products
- 7.8 Factoring Polynomials Completely

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</table>

CRP12: Work productively in teams while using cultural global competence.

Differentiation

Interdisciplinary Connections/Media Literacy Integration/Global Perspectives

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Technology Integration

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Supports for English Language Learners

Sensory Supports	Graphic Supports	Interactive Supports
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support

Assessments

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 7 STEM Performance Tasks (found on Big Ideas Course Resources)

Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 6. Graphing Quadratic Functions

Big Ideas: *Course Objectives/Content Statement(s)*

- To graph quadratic functions in different forms
- To identify the characteristics of the graph - intervals of increase / decrease, domain and range, maximum / minimum value
- To apply the characteristics of the graph to solve real-life word problems

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• What are the characteristics of the graph of a quadratic function? • What are the different forms of a quadratic function?	**Students will understand that:** • In a quadratic function $f(x) = ax^2 + c$, the "c" value affects the vertical translation of the graph of the function, and the a value affects vertical stretch/shrink and x-axis reflection.

• How does the form in which the quadratic function is given affect the method of graphing? • How are the characteristics of quadratic functions applied to real-life problems (max/min, increasing/decreasing, y- and x- intercepts)?	• The vertex and max/min value of a quadratic in standard form can be found by (-b/2a,f(-b/2a) • A quadratic in the form y=a(x-h)^2+k reveals the vertex at the point (h,k), and a vertical stretch/shrink or x-axis reflection at "a" • A quadratic function in the form y=a(x-p)(x-q) has x-intercepts at p and q • You can switch back and forth between the forms of a quadratic function • Linear, exponential and quadratic functions have different characteristics
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**
Standards Summary **Section** / **Common Core State Standards** **8.1** Learning: HSA-CED.A.2, HSF-IF.C.7a, HSF-BF.B.3 **8.2** Learning: HSA-CED.A.2, HSF-IF.C.7a, HSF-BF.B.3 **8.3** Learning: HSA-CED.A.2, HSF-IF.C.7a, HSF-IF.C.9 **8.4** Learning: HSA-CED.A.2, HSF-IF.B.4, HSF-BF.A.1a, HSF-BF.B.3 **8.5** Learning: HSA-SSE.B.3a, HSA-APR.B.3, HSA-CED.A.2, HSF-IF.B.4, HSF-IF.C.8a, HSF-BF.A.1a **8.6** Learning: HSF-IF.B.6, HSF-BF.A.1a, HSF-LE.A.3 **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation. **CRP7**: Employ valid and reliable research strategies. **CRP8**: Utilize critical thinking to make sense of problems and persevere in solving them. **CRP9**: Model integrity, ethical leadership and effective management. **CRP10**: Plan education and career paths aligned to	• 8.1 Graphing f(x)=ax^2 • 8.2 Graphing f(x)=ax^2+c • 8.3 Graphing f(x) = ax^2 + bx + c • 8.4 Graphing f(x)=a(x-h)^2+k • 8.5 Using Intercept Form • 8.6 Comparing Linear, Exponential, and Quadratic Functions

personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

Differentiation

Interdisciplinary Connections/Media Literacy Integration/Global Perspectives

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Technology Integration

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Supports for English Language Learners

Sensory Supports	Graphic Supports	Interactive Supports
Real-life objects	Charts	In pairs or partners
Manipulatives	Graphic Organizers	In triands or small groups
Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software

Assessments

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 8 STEM Performance Tasks (found on Big Ideas Course Resources)
- Project Idea: Show how one quadratic function written in three different ways will yield the same graph

		support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
Permit response provided via computer or electronic device	Increase opportunities to engage in active academic responding	Individualized assessment tools based on student need
Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 7: Solving Quadratic Equations

Big Ideas: *Course Objectives/Content Statement(s)*

- Solve quadratic equations by graphing, factoring, square roots, completing the square, quadratic formula and technology.
- To determine the best method of solving given a quadratic equation.
- To apply the methods of solving quadratic functions in real-life word problems and solving nonlinear systems involving a quadratic function.

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• How do you simplify square roots?	**Students will understand that:**

- How do you use a graph to solve a quadratic equation in one variable?
- How do you determine the number of solutions of a quadratic equation in standard form?
- How do you use completing the square to solve a quadratic equation?
- How do you apply the quadratic formula and what does it reveal about the quadratic?
- How do you determine the best method for solving any quadratic equation or nonlinear system involving quadratics?

- Square roots are not simplified if there is a perfect square factor other than 1 in the radicand
- A graph can determine the solutions of a quadratic, and those solutions can be used to reason about real-life problems
- The form of a quadratic equation contribute to determining the best method for solving
- A quadratic function can have one real solutions, two real solutions, or no real solutions
- There are multiple methods for solving a quadratic

Areas of Focus: Proficiencies (New Jersey Student Learning Standards)

Lessons

Standards Summary

Section	Common Core State Standards	
9.1	Learning	HSN-RN.A.2, HSN-RN.B.3
9.2	Learning	HSA-REI.D.11, HSF-IF.C.7a
9.3	Learning	HSA-CED.A.1, HSA-CED.A.4, HSA-REI.B.4b
9.4	Learning	HSA-SSE.B.3b, HSA-CED.A.1, HSA-REI.B.4a, HSA-REI.B.4b, HSF-IF.C.8a
9.5	Learning	HSA-CED.A.1, HSA-REI.B.4a, HSA-REI.B.4b
9.6	Learning	HSA-REI.C.7, HSA-REI.D.11

- 9.1 Properties of Radicals
- 9.2 Solving Quadratic Equations by Graphing
- 9.3 Solving Quadratic Equations Using Square Roots
- 9.4 Solving Quadratic Equations by Completing the Square
- 9.5 Solving Quadratic Equations Using the Quadratic Formula
- 9.6 Solving Nonlinear Systems of Equations

Career-Ready Practices

CRP1: Act as a responsible and contributing citizen and employee.
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CRP3: Attend to personal health and financial well-being.
CRP4: Communicate clearly and effectively and with reason.
CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.

CRP9: Model integrity, ethical leadership and effective management.
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Differentiation

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Assessments

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 9 STEM Performance Tasks (found on Big Ideas Course Resources)
- Project Idea: Students can write one quadratic equation in different forms and solve the equation using the method that best suits the form.

Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
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Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 8: Radical Functions and Equations

Big Ideas: *Course Objectives/Content Statement(s)*

- To simplify and apply operations on radicals
- Graph and name the characteristics of a square root and a cube root function.
- To solve radical equations and identify extraneous solutions.
- To find inverses of relations and linear functions

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*

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- How can you simplify, multiply, divide, add, and rationalize denominators of radicals?
- What are some of the characteristics of the graph of a square root and cube root function?
- How can you solve an equation that contains square roots and cube roots?
- What is an extraneous solution?
- How are a function and its inverse related?

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Students will understand that:

- The concepts of transformations apply to graphing square and cube root functions
- Radicals may be to be simplified before applying operations on them
- Extraneous solution can occur when solving a square root function
- Inverses can be found algebraically and graphically by switching input and output values

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<td>Areas of Focus: Proficiencies
(New Jersey Student Learning Standards)</td>
<td>Lessons</td>
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Standards Summary

Section	Common Core State Standards	
10.1	Learning	HSA-CED.A.2, HSF-IF.B.4, HSF-IF.B.6, HSF-IF.C.7b, HSF-IF.C.9
10.2	Learning	HSA-CED.A.2, HSF-IF.B.4, HSF-IF.B.6, HSF-IF.C.7b, HSF-IF.C.9
10.3	Learning	HSA-CED.A.1
10.4	Learning	HSF-BF.B.4a

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CRP1: Act as a responsible and contributing citizen and employee.
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CRP5: Consider the environmental, social and economic impacts of decisions.
CRP6: Demonstrate creativity and innovation.
CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems

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- 10.1 Graphing Square Root Functions
- 10.2 Graphing Cube Root Functions
- 10.3 Solving Radical Equations
- 10.4 Inverse of a Function

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and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
CRP11: Use technology to enhance productivity.
CRP12: Work productively in teams while using cultural global competence.

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Illustrations,	Graphs	Using cooperative

Assessments

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 10 STEM Performance Tasks (found on Big Ideas Course Resources)

diagrams & drawings		group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

Intervention Strategies		
Accommodations	**Interventions**	**Modifications**
Allow for verbal responses	Multi-sensory techniques	Modified tasks/expectations
Repeat/confirm directions	Increase task structure (e.g. directions, checks for understanding, feedback	Differentiated materials
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Audio Books	Utilize pre-reading strategies and activities previews, anticipatory guides, and semantic mapping	Modified assessment grading

Unit 9. Data Analysis and Displays

Big Ideas: *Course Objectives/Content Statement(s)*

- Compare the measures of central tendency and determine the best measure for the data.
- Identify the range and standard deviation of the data
- Interpret and use box-and-whisker plots to represent and compare data sets.
- Make use of two-way tables to recognize associations in data by finding marginal, relative and conditional relative frequencies.
- Classify data as quantitative or qualitative and choose appropriate and accurate data displays

Essential Questions *What provocative questions will foster inquiry, understanding, and transfer of learning?*	**Enduring Understandings** *What will students understand about the big ideas?*
• How can you describe the variation of the data set? • How can you use a box-and-whisker plot to describe a data set? • How can you use a histogram to characterize the basic shape of the distribution? • How can you read and make a two-way table? • How can you display data in a way that helps you make decisions?	**Students will understand that:** • A data set can be described in various ways • The graphing calculator can be used to provide the five number summary, and the measures of center of a set of data • The box-and-whisker plots is made up of quartiles, each with 25% of the data • Data distribution takes on different shapes • Two-way tables are an efficient way to organize and associate data
Areas of Focus: Proficiencies (New Jersey Student Learning Standards)	**Lessons**
Standards Summary **Section** | **Common Core State Standards** **11.1** Learning HSS-ID.A.3 **11.2** Learning HSS-ID.A.1, HSS-ID.A.3 **11.3** Learning HSS-ID.A.1, HSS-ID.A.2, HSS-ID.A.3 **11.4** Learning HSS-ID.B.5 **11.5** Learning HSS-ID.A.1 **Career-Ready Practices** **CRP1**: Act as a responsible and contributing citizen and employee. **CRP2**: Apply appropriate academic and technical skills. **CRP3**: Attend to personal health and financial well-being. **CRP4**: Communicate clearly and effectively and with reason. **CRP5**: Consider the environmental, social and economic impacts of decisions. **CRP6**: Demonstrate creativity and innovation.	• 11.1 Measures of Center and Variation • 11.2 Box-and-Whisker Plots • 11.3 Shapes of Distributions • 11.4 Two-Way Tables • 11.5 Choosing a Data Display

CRP7: Employ valid and reliable research strategies.
CRP8: Utilize critical thinking to make sense of problems and persevere in solving them.
CRP9: Model integrity, ethical leadership and effective management.
CRP10: Plan education and career paths aligned to personal goals.
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Manipulatives	Graphic Organizers	In triands or small groups

Assessments

Formative Assessments:

- Quiz
- Do nows
- Exit/Entrance Tickets
- Quizizz
- Go Formative
- Delta Math

Summative Assessments, Projects, and Celebrations:

- Unit Test (paper or online version - Big Ideas has both)
- Chapter 11 STEM Performance Tasks (found on Big Ideas Course Resources)
- Project Idea: Students can research a topic that is meaningful to them and describe how various statistical concepts come into play in that topic. This can be presented through a Google Slide, or any appropriate medium.

Pictures	Tables	In a whole group
Illustrations, diagrams & drawings	Graphs	Using cooperative group
Magazines & Newspapers	Timelines	Structures
Physical activities	Number lines	Internet / Software support
Videos & Film		In the home language
Broadcasts		With mentors
Models & Figures		

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