<u>Unit Title</u>: Linear Equations and Graphs

Stage 1: Desired Results

Standards & Indicators:

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

NJSLS-A-SSE.A.1b –Interpret complicated expressions by viewing one or more of their parts as a single entity

NJSLS-A-CED.A.4 –Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations

NJSLS-A-REI.B.3 –Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

NJSLS-A-CED.A.1 –Create equations and inequalities in one variable and use them to solve problems

NJSLS-A-CED.A.2 –Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales

NJSLS-A-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.

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

NJSLS-F-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

NJSLS-F-BF.A.1a –Determine an explicit expression, a recursive process, or steps for calculation from a context

NJSLS-F-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 (including reading these from a table)

Career Readiness, Life Literacies and Key Skills				
Standard	Performance Expectations	Core Ideas		
9.4.12.TL.2	Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.	Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.		

9.4.12.TL.3	Analyze the effective	veness of the	Collaborative digital tools can be used to	
	process and quality of collaborative		access, record and share different viewpoints	
	environments.		and to collect and tabulate the views of	
			groups of people.	
Central Idea/Enduring	understanding:	Essential/Guiding	Question:	
Central Idea/Enduring Understanding: Students will be able to: Isolate a variable in an equation Translate word problems into equations Calculate the slope of a line given two points Write the equation of a line in slope-intercept form Describe the slope of a line as positive, negative, zero, or undefined Describe the slopes of parallel and perpendicular lines		 How can you isolate a variable? How can you translate word problems into equations? How can you calculate the slope of a line given two points? How can you write the equation of a line in slope-Intercept form? How can you discern whether the slope of a line is positive, negative, zero, or undefined based on its graph? 		
Content:		Skills(Objectives):		
<u></u> .		1. Isolate a variable		
Expressions and equat	ions	2. Translate word problems into		
Slope of line		equations 3. Calculate the slope of a line given two points 4. Write the equation of a line in slope-intercept form 5. Describe the slope of a line as positive, negative, zero, or undefined 6. Describe the slopes of parallel and perpendicular lines		

Interdisciplinary Connections: Interdisciplinary connections are integrated with connections to the mathematical practices.

Stage 2: Assessment Evidence			
Performance Task(s):	Other Evidence:		
Onit exam	Sudents are giving a daily grade based on participation Supplemental material through Khan academy and Collegeboard		
Stage 3: Learning Plan			
Learning Opportunities/Strategies:	Resources:		
Group discussion	Khan Academy:		
 1-1 teacher interactions 	https://www.khanacademy.org/test-prep/sat/new-sat-tips-planning#		
 Video walkthroughs 	about-the-sat-math-test		
 Practice exams 			

		College Board: https://collegereadiness.collegeboard.org/sat/practice			
		 LGBT and Disabilities Resources: <u>LGBTQ-Inclusive Lesson & Resources by Garden State</u> <u>Equality and Make it Better for Youth</u> <u>LGBTQ+ Books</u> 			
		 DEI Resources: <u>Learning for Justice</u> <u>GLSEN Educator Resources</u> <u>Supporting LGBTQIA Youth Resource List</u> <u>Respect Ability: Fighting Stigmas, Advancing Opportunities</u> <u>NJDOE Diversity, Equity & Inclusion Educational Resources</u> <u>Diversity Calendar</u> 			
Differentiation *Please note: Teachers Struggling and/or Spec	who have students ial Needs Section fo	with 504 plans that re r differentiation	equire curricular accommodations are to refer to		
High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL		
High-Achieving students will be given supplemental material to challenge them and help hone their test taking skills.	On-Grade level students will be encouraged to try the supplemental material to push themselves after completion of	Struggling students will have the use of videos and other supplemental material designed to help guide	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model),		

performance tasks.	them step by step	and/or small group instruction for reading/writing
	through any problem they might have with plenty of examples that are directly taken from the main material.	ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

<u>Unit Title</u>: Inequalities

Stage 1: Desired Results

Standards & Indicators:

NJSLS-A-REI.B.3 –Solve linear equations and inequalities in one variable, including equations with coefficients represented by variables

NJSLS-A-CED.A.1 –Create equations and inequalities in one variable and use them to solve problems

NJSLS-A-CED.A.2 –Create equations in two or more variables to represent relationships between quantities; graph equations son coordinate axes with labels and scales NJSLS-A-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

NJSLS-A-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

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

Career Readiness, Life Literacies and Key Skills			
Standard	Performance Expectations		Core Ideas
9.4.12.TL.2	Generate data using for	ormula-based	Digital tools differ in features,
	calculations in a sprea	adsheet and draw	capacities, and styles.
	conclusions about the	data.	Knowledge of different digital
			tools is helpful in selecting the
			best tool for a given task.
9.4.12.TL.3	Analyze the effective	ness of the process	Collaborative digital tools can
	and quality of collabo	rative environments.	be used to access, record and
			share different viewpoints and
			to collect and tabulate the views
			of groups of people.
Central Idea/Enduring U	Inderstanding:	Essential/Guiding Question:	
 Students will be able to: Solve an inequality for a range of values Identify the graph of an inequality or a system of inequalities Solve for the point of intersection of the boundary lines of a system of inequalities Solve algebraically a system of one inequality with two variables and another inequality with one variable Identify one or more inequalities that match a real-life situation 		 How can you solve at How can you identify system of inequalities? How can you solve for boundary lines of a syst How can you solve at inequality with two varia with one variable? How can you identify match a real-life situation 	n inequality for a range of values? the graph of an inequality or a or the point of intersection of the eem of inequalities? Igebraically a system of one ibles and another inequality one or more inequalities that on?

Content:	Skills(Objectives):
Graphing Inequalities Systems of inequalities	 Solve an inequality Identify the graph of an inequality or system of inequalities Solve for the point of intersection of the boundary lines of a system of inequalities Solve algebraically a system of one inequality with two variables and another inequality with one variable Identify one or more inequalities that match a real-life situation
Interdisciplinary Connections: Interdisciplinary connections are integrated in practices.	each unit with connections to the mathematical
Stage 2: As	sessment Evidence
Performance Task(s): Unit exam	Other Evidence: Students are giving a daily grade based on participation Supplemental material through Khan academy and Collegeboard
Stage 3	: Learning Plan
 Learning Opportunities/Strategies: Group discussion 1-1 teacher interactions Video walkthroughs Practice exams 	Resources: Khan Academy: https://www.khanacademy.org/test-prep/sat/new-sat-tips-pla nning#about-the-sat-math-test College Board: https://collegereadiness.collegeboard.org/sat/practice LGBT and Disabilities Resources: LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth LGBTQ+ Books
Differentiation	 DEI Resources: Learning for Justice GLSEN Educator Resources Supporting LGBTQIA Youth Resource List Respect Ability: Fighting Stigmas, Advancing Opportunities NJDOE Diversity, Equity & Inclusion Educational Resources Diversity Calendar

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
High-Achieving students will be given supplemental material to challenge them and help hone their test taking skills.	On-Grade level students will be encouraged to try the supplemental material to push themselves after completion of performance tasks.	Struggling students will have the use of videos and other supplemental material designed to help guide them step by step through any problem they might have with plenty of examples that are directly taken from the main material.	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Unit Title: Exponents, Radicals, Polynomials, and Rational Expressions

Stage 1: Desired Results

Standards & Indicators:

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

exponents.

NJSLS-A-REI.A.2 - Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

NJSLS-A-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.

NJSLS-A-SSE.B.3 - Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

NJSLS-F-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.

NJSLS-A-SSE.B.3 - Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

NJSLS-A-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.

NJSLA-F-LE.A.1 - Distinguish between situations that can be modeled with linear functions and with exponential functions.

a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

NJSLS-A-APR.D.7 - Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.

NJSLS-A-APR.D.6 - Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more complicated examples, a computer algebra system.

Career Readiness, Life Literacies and Key Skills				
Standard	Performance	Expectations	Core Ideas	
9.4.12.TL.2	Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data.		Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task.	
9.4.12.TL.3	Analyze the effectiveness of the process and quality of collaborative environments.		Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people.	
Central Idea/Enduring Understanding:		Essential/Guiding Que	estion:	
Students will be able to:1. How do you apply exponent rules?• Apply exponent rules2. How do you apply radical rules?		ponent rules? dical rules?		

 Apply radical rules Add, subtract, multiply, divide, and factor polynomials Define root, solution, zero, and x-intercept and identify them on the graph of a nonlinear function Determine whether growth or decay described in a question is linear or exponential Apply the linear and exponential equations to answer growth and decay questions 	 3. How do you add, subtract, multiply, divide, and factor polynomials? 4. How do you interpret the graph of a nonlinear function? 5. How do determine whether growth or decay is being described? 6. How do you apply the linear and exponential equations? 7. How do you simplify rational expression? 		
 Simplify rational expressions Isolate a variable in a rational equation 	8. How do you isolate a variable in a rational expression?		
Content:	Skills(Objectives):		
Exponent and radical rules Operations with Polynomials Non Linear functions Exponential equations Rational expressions and equations	 Apply exponent rules Apply radical rules Add, subtract, multiply, divide, and factor polynomials Define root, solution, zero, and x- intercept and identify them on the graph of a nonlinear function Determine whether growth or decay described in a question is linear or exponential Apply the linear and exponential equations to answer growth and decay questions Simplify rational expressions Isolate a variable in a rational expression 		
Interdisciplinary Connections: Interdisciplinary connections are integrated in each unit with connections to the mathematical practices			
Stage 2: Ass	sessment Evidence		
Performance Task(s): Unit exam	Other Evidence: Students are giving a daily grade based on participation Supplemental material through Khan academy and Collegeboard		

Stage 3: Learning Plan

Learning Opportunities/Strategies:	Resources:
Group discussion 1.1 teacher interactions	Khan Acadomy:
 Video walkthroughs 	https://www.khapacadomy.org/tost.prop/sat/pow.sat.tips.pla
 Practice exams 	nning#about-the-sat-math-test
	College Board:
	https://collegereadiness.collegeboard.org/sat/practice
	LGBT and Disabilities Resources:
	LGBTQ-Inclusive Lesson & Resources by Garden
	State Equality and Make it Better for Youth
	• $\underline{LGB} + \underline{B00KS}$
	DEI Resources:
	Learning for Justice

Differentiation		 <u>GLSEN Educator Resources</u> <u>Supporting LGBTQIA Youth Resource List</u> <u>Respect Ability: Fighting Stigmas, Advancing</u> <u>Opportunities</u> <u>NJDOE Diversity, Equity & Inclusion Educational</u> <u>Resources</u> <u>Diversity Calendar</u> 		
*Please note: Teachers wh Struggling and/or Special I	o have students with 504 Needs Section for differe	4 plans that require curric ntiation	ular accommodations are to refer to	
High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL	
High-Achieving students will be given supplemental material to challenge them and help hone their test taking skills.	On-Grade level students will be encouraged to try the supplemental material to push themselves after completion of performance tasks.	Struggling students will have the use of videos and other supplemental material designed to help guide them step by step through any problem they might have with plenty of examples that are directly taken from the main material.	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries	

Unit Title: Quadratics

Stage 1: Desired Results

Standards & Indicators:

NJSLS-A-SSE.B.3.a - Factor a quadratic expression to reveal the zeros of the function it defines.

NJSLS-A-REI.B.4.b - Solve quadratic equations by inspection (e.g., for x2 = 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.

NJSLS-F-IF.C.8.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

NJSLS-F-IF.C.7.A - Graph linear and quadratic functions and show intercepts, maxima, and minima.

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

Career Readiness, Life Literacies and Key Skills					
Standard	Performance Expectations		Core Ideas		
9.4.12.TL.2	Generate data using formula-based		Digital tools differ in features,		
	calculations in a spread	sheet and draw	capacities, and styles.		
	conclusions about the data.		Knowledge of different digital		
			tools is helpful in selecting the		
			best tool for a given task.		
9.4.12.TL.3	Analyze the effectiveness of the process and		Collaborative digital tools can be		
	quality of collaborative	environments.	used to access, record and share		
			different viewpoints and to		
			collect and tabulate the views of		
			groups of people.		
Central Idea/Enduring Und	derstanding:	Essential/Guiding Que	estion:		
 Students will be able to: Solve a quadratic equation by factoring Solve a quadratic equation by completing the square Solve a quadratic equation using the quadratic formula Compare the properties of a quadratic function and its graph Solve a system of one quadratic function and one linear function 		 How do you solve a quadratic equation by factoring? How do you solve a quadratic equation be completing the square? How do you solve a quadratic equation using the quadratic formula? How do you compare the properties of a quadratic function to its graph? How do you solve a system of one quadratic and one linear function? 			
<u>Content</u> : Quadratic Equations Factoring and graphing quadratic functions		Skills(Objectives): 1. Solve a quadratic equ 2. Solve a quadratic equ 3. Solve a quadratic equ 4. Compare the properti graph 5. Solve a system of on- function	uation by factoring uation by completing the square uation using the quadratic formula les of a quadratic function and its e quadratic and one linear		

Interdisciplinary Connections:

Interdisciplinary connections are integrated in each unit with connections to the mathematical practices

Stage 2: Assessment Evidence			
Performance Task(s): Unit exam	Other Evidence: Students are giving a daily grade based on participation Supplemental material through Khan academy and Collegeboard		

Stage 3: Learning Plan				
 Learning Opportunities/Strategies: Group discussion 1-1 teacher interactions Video walkthroughs Practice exams 	Resources: Khan Academy: https://www.khanacademy.org/test-prep/sat/new-sat-tips-p lanning#about-the-sat-math-test College Board: https://collegereadiness.collegeboard.org/sat/practice LGBT and Disabilities Resources: LGBTQ-Inclusive Lesson & Resources by Garden State Equality and Make it Better for Youth LGBTQ+ Books DEI Resources: LEARNING for Justice GLSEN Educator Resources Supporting LGBTQIA Youth Resource List Respect Ability: Fighting Stigmas, Advancing Opportunities NJDOE Diversity, Equity & Inclusion Educational Resources NJDOE Diversity, Calendar			
Differentiation				

Differentiation *Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving	On Grade Level	Struggling Students	Special Needs/ELL
Students	Students		-
High-Achieving students will be given supplemental material to challenge them and help hone their test taking skills.	On-Grade level students will be encouraged to try the supplemental material to push themselves after completion of performance tasks.	Struggling students will have the use of videos and other supplemental material designed to help guide them step by step through any problem they might have with plenty of examples that are directly taken from the main material.	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

Pacing Guide

SAT Prep Math	Content/Resources	Standards				
UNIT 1						
Linear Equations and Graphs 22 Days	CHAPTERS Khan academy and Collegeboard units online Unit Online Assessment: https://www.khanacademy.org/test-prep/sat/n ew-sat-tips-planning#about-the-sat-math-test	NJSLS-A-SSE.A.1a, NJSLS-A-SSE.A.1b, NJSLS-A-CED.A.4, NJSLS-A-REI.B.3 NJSLS-A-CED.A.1,-3 NJSLS-F-LE.A.1b NJSLS-F-IF.B.6 NJSLS-F-BF.A.1a, NJSLS-F-LE.A.2				
UNIT 2						
Inequalities 22 Days	CHAPTERS Khan academy and Collegeboard units online Unit Online Assessment: https://www.khanacademy.org/test-prep/sat/n ew-sat-tips-planning#about-the-sat-math-test	NJSLS-A-REI.B.3, NJSLS-A-CED.A.1 NJSLS-A-CED.A.2, NJSLS-A-CED.A.3, NJSLS-A-REI.D.12 NJSLS-A-REI.C.6				
UNIT 3						
Exponents, Radicals, Polynomials, and Rational Expressions 22 Days	CHAPTERS Khan academy and Collegeboard units online Unit Online Assessment: <u>https://www.khanacademy.org/test-prep/sat/n</u> <u>ew-sat-tips-planning#about-the-sat-math-test</u>	NJSLS-N-RN.A.2 NJSLS-A-REI.A.2 NJSLS-A-APR.A.1, NJSLS-A-SSE.B.3 NJSLS-F-IF.B.4, NJSLS-A-SSE.B.3, NJSLS-A-APR.B.3 NJSLA-F-LE.A.1 NJSLS-A-APR.D.7 NJSLS-A-APR.D.6				
UNIT 4:	•	•				
Quadratics 22 Days	CHAPTERS Khan academy and Collegeboard units online Unit Online Assessment: <u>https://www.khanacademy.org/test-prep/sat/n</u> <u>ew-sat-tips-planning#about-the-sat-math-test</u>	NJSLS-A-SSE.B.3.a, NJSLS-A-REI.B.4.b NJSLS-F-IF.C.8.A, NJSLS-F-IF.C.7.A NJSLS-A-REI.C.7				