Foundations of Algebra Curriculum

Grade 9



NEPTUNE TOWNSHIP SCHOOL DISTRICT Office of the Superintendent 60 Neptune Blvd. Neptune, NJ 07753-4836

May 29, 2024

Document C1#1

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FOUNDATIONS OF ALGEBRA CURRICULUM GRADE 9

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Foundations of Algebra

Acknowledgements

The Foundations of Algebra curriculum guide was developed for Neptune High School through the dedicated efforts of Jennifer Hutson, teacher of mathematics, with guidance from Dawn Reinhardt, Department Chairperson, Lori Dalelio, Supervisor of STEM, and Sally A. Millaway, Ed.D., Director for Curriculum, Instruction and Assessment.

Ms. Hutson is to be commended for her dedication in creating this curriculum in the UbD format and her expertise in the area of mathematics. The Foundations of Algebra guide was developed to prepare students for success in Algebra 1 and written in alignment with the 2023 New Jersey Student Learning Standards for Mathematics and the interdisciplinary connections with the 2023 New Jersey Student Learning Standards in Computer Science and Design Thinking and Career Readiness, Life Literacies, and Key Skills addressing the increased rigor that those standards bring to the teaching and learning of mathematics. This curriculum guide devotes a great percentage of instructional time reinforcing skills imperative for future courses while promoting problem-solving and active learning. It is our hope that this guide will serve as a valuable resource for the staff members who teach this course and that they will feel free to make recommendations for its continued improvement.

DISTRICT MISSION STATEMENT

The primary mission of the Neptune Township School District is to prepare all of our students for a life-long learning process and to become confident, competent, socially-and culturally-conscious citizens in a complex and diverse world. It is with high expectations that our schools foster:

- A strong foundation in academic and modern technologies
- A positive, equitable, and varied approach to teaching and learning
- An emphasis on critical thinking skills and problem-solving techniques
- A respect for and an appreciation for our world, its resources, and its diverse people
- A sense of responsibility, good citizenship, and accountability
- An involvement by the parents and the community in the learning process

Neptune Township School District

Educational Outcome Goals

The students in the Neptune Township schools will become life-long learners and will:

- Become fluent readers, writers, speakers, listeners, and viewers with comprehension and critical thinking skills.
- Acquire the mathematical skills, understandings, and attitudes that are needed to be successful in their careers and everyday life.
- Understand fundamental scientific principles, develop critical thinking skills, and demonstrate safe practices, skepticism, and open-mindedness when collecting, analyzing, and interpreting information.
- Become technologically literate.
- Demonstrate proficiency in all New Jersey Student Learning Standards (NJSLS).
- Develop the ability to understand their world and to have an appreciation for the heritage of America with a high degree of literacy in civics, history, economics and geography.
- Develop a respect for different cultures and demonstrate trustworthiness, responsibility, fairness, caring, and citizenship.
- Become culturally literate by being aware of the historical, societal, and multicultural aspects and implications of the arts.
- Demonstrate skills in decision-making, goal setting, and effective communication, with a focus on character development.
- Understand and practice the skills of family living, health, wellness and safety for their physical, mental, emotional, and social development.
- Develop consumer, family, and life skills necessary to be a functioning member of society.
- Develop the ability to be creative, inventive decision-makers with skills in communicating ideas, thoughts and feelings.
- Develop career awareness and essential technical and workplace readiness skills, which are significant to many aspects of life and work.

FOUNDATIONS OF ALGEBRA

COURSE DESCRIPTION

(5 Credits)

This course is designed for students prior to taking the required 9th Grade Algebra 1 course. Foundations of Algebra course is a review of arithmetic operations and an introduction to the basics of algebra. This course emphasizes study skills for success in mathematics, both mental and paper-pencil calculations, and the fundamentals of solving equations and graphing functions. Topics covered in this course include whole numbers, integers, fractions, exponents, absolute values, order of operations, solving equations and pairs of linear equations, slope and graphing linear equations. This course will serve as an introduction to the concepts found in the Algebra I course. *This course does not meet the graduation requirement for Algebra 1*.

INTEGRATED SOCIAL AND EMOTIONAL LEARNING COMPETENCIES

The following social and emotional competencies are integrated in this curriculum document:

Self-	Self-Awareness		
	Recognize one's own feelings and thoughts		
	Recognize the impact of one's feelings and thoughts on one's own behavior		
X	Recognize one's personal traits, strengths and limitations		
X	Recognize the importance of self-confidence in handling daily tasks and challenges		
Self-	Management		
	Understand and practice strategies for managing one's own emotions, thoughts and behaviors		
X	Recognize the skills needed to establish and achieve personal and educational goals		
X	Identify and apply ways to persevere or overcome barriers through alternative methods to achieve one's goals		
Socia	ocial Awareness		
	Recognize and identify the thoughts, feelings, and perspectives of others		
	Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds		
X	Demonstrate an understanding of the need for mutual respect when viewpoints differ		
X	Demonstrate an awareness of the expectations for social interactions in a variety of setting		
Resp	oonsible Decision Making		
X	Develop, implement and model effective problem solving and critical thinking skill		
X	Identify the consequences associated with one's action in order to make constructive choices		
	Evaluate personal, ethical, safety and civic impact of decisions		
Rela	Relationship Skills		
X	Establish and maintain healthy relationships		
X	Utilize positive communication and social skills to interact effectively with others		
X	Identify ways to resist inappropriate social pressure		
X	Demonstrate the ability to present and resolve interpersonal conflicts in constructive ways		
X	Identify who, when, where, or how to seek help for oneself or others when needed		

Unit Plan Title	Unit 1: Algebraic Expressions
Suggested Time Frame	10 days

Overview / Rationale

In this unit students will extend their understanding of whole numbers and integers. Students will work with these numbers in multiple forms, including words and standard form. Students will perform arithmetic operations on whole numbers and integers. Students will simplify algebraic expressions.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

- a. Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
- b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- c. Understand subtraction of rational numbers as adding the additive inverse,

p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

- a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
- b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If *p* and *q* are integers,

then $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$. Interpret quotients of rational numbers by describing real world contexts.

- c. Apply properties of operations as strategies to multiply and divide rational numbers.
- d. Convert a rational number to a decimal using long division; know that the decimal form of a rational number terminates in 0s or eventually repeats.

7.NS.A.3 Solve real-world and mathematical problems involving the four operations with rational numbers. (Clarification: Computations with rational numbers extend the rules for manipulating fractions to complex fractions.) (Students may solve mathematical problems based on quantitative data related to the five main contributors to climate change:

- Burning coal, oil and gas produces carbon dioxide and nitrous oxide
- Cutting down forests (deforestation)
- Increasing livestock farming
- Fertilizers containing nitrogen produce nitrous oxide emissions, and
- Fluorinated gases are emitted from equipment and products that use these gases.

7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

7.EE.A.2 Understand that rewriting an expression in different forms in a problem context can shed light on the problem and how the quantities in it are related. For example,

a + 0.05a = 1.05a means that "increase by 5%" is the same as "multiply by 1.05."

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:
 How can we predict that the sum of two numbers is positive, negative or zero? What is the difference between the opposite and the absolute value of a number? How can the difference of two integers be restated as an equivalent addition statement? 	 Relationships exist between positive and negative integers. Applying number properties can simplify expressions. Understand additive inverse and that opposite quantities combine to make zero.

• How do we determine if the product or quotient of two integers is positive or negative?	 Understand subtraction of integers as adding the additive inverse and apply this to real world situations. Solving real-world problems involves using all properties of operations and all integer rules.
Knowledge:	Skills:
Students will know	Students will be able to
• The difference between an expression and	• Add, subtract, multiply, and divide whole
an equation.	numbers and integers.
• The order of operations.	• Write a number in words and standard
• Absolute value is a number's distance	form.
from zero.	• Simplify an expression by combining like
• Numbers can be represented in multiple	terms, using the distributive property, and
forms.	using the order of operations to isolate a
• How to perform arithmetic operations.	variable.
	• Determine the absolute value of a number.
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Interdisciplinary Connections

2023 New Jersey Student Learning Standards for English Language Arts

- RI.MF.9–10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.
- W.IW.9–10.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- SL.PE.9–10.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

2020 New Jersey Student Learning Standards for Computer Science and Design Thinking NJSLS 8.1 Computer Science

- 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
- 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

NJSLS 8.2 Design Thinking

- 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
- 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.

2020 New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills

NJSLS 9.1 Personal Financial Literacy

- 9.1.12.CFR.4: Demonstrate an understanding of the interrelationships among attitudes, assumptions, and patterns of behavior regarding money, saving, investing, and work across cultures.
- 9.1.12.CDM.8: Compare and compute interest and compound interest and develop an amortization table using business tools.

NJSLS 9.4 Life Literacies and Key Skills

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Student Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470763-1
- Larson and Boswell, <u>Algebra 1 Big Ideas Learning</u>, 2022. ISBN 13: 978-1-64727-416-0

Resources: Big Ideas Online Platform

- Vocabulary Checks
- Chapter Highlights
- Chapter Review
- Chapter Tests
- Getting Ready for the Test
- Cumulative Reviews
- Study Skill Builders
- Bigger Picture-Study Guide Outline
- Answers to Selected Exercises
- Google Classroom Practice Sets

Websites:

- Khan Academy | Free Online Courses, Lessons & Practice
- IXL Math | Learn math online
- <u>https://www.hippocampus.org/</u>
- <u>Purplemath | Home</u>
- <u>Flashcards</u>
- Linear Function and Linear Equation Games

- <u>Graphing Linear Equations</u>
- <u>https://www.superteachertools.us/</u>

Integrated Technology

- Google Suite: Docs, Sheets, Slides, Forms
- Big Ideas online program
- Devices:
- Chromebooks
- Texas Instruments (TI-83 Plus Calculators)

Teacher Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470848-5
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-7

Resources: Big Ideas Online Platform

- Instructor's Manual
- Solution Manual
- Lecture Slides
- PowerPoint Presentations
- Test Bank
- Google Classroom Practice Sets

Websites:

- <u>https://www.bigideasmath.com/BIM/login</u>
- <u>www.desmos.com</u>
- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>
- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Investigating Endangered and Threatened Species
- Magic Squares

- Top Grossing Movies
- Order of Operations

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra *LinkIt*! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review
- Do Now/Anticipatory Assignments
- Peer/Self Assessments
- Guided Practice (individually, in pairs, groups)
- Exit Slips/Closure Activities
- Informal Observations
- Class notes and Assignments
- Class Discussions
- Foundations of Algebra *LinkIt*! NJSLS Form B

Summative Assessments:

- Chapter Tests
- LinkIt! Midterm Foundations of Algebra
- *LinkIt!* Final Foundations of Algebra
- Foundations of Algebra *LinkIt*! NJSLS Form C
- <u>NJDOE Digital Item Library</u>

Stage 3 – Learning Plan

- Study Skills and Tips for Success in Mathematics
- Exponents and Order of Operations with Positive Numbers
- Order of Operations Including Negative Numbers
- Evaluating and Determining Solutions
- Translating and Problem Solving
- Combining Like Terms and Distributive Property

Unit Plan Title	Unit 2: Fractions
Suggested Time Frame	12 days

Overview / Rationale

In this unit students will extend their understanding of fractions. Students will work with these numbers in multiple forms, including words and standard form. Students will perform arithmetic operations on fractions.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

7.NS.A.1 Apply and extend previous understandings of addition and subtraction to add and subtract rational numbers; represent addition and subtraction on a horizontal or vertical number line diagram.

- a. Describe situations in which opposite quantities combine to make 0. For example, in the first round of a game, Maria scored 20 points. In the second round of the same game, she lost 20 points. What is her score at the end of the second round?
- b. Understand p + q as the number located a distance |q| from p, in the positive or negative direction depending on whether q is positive or negative. Show that a number and its opposite have a sum of 0 (are additive inverses). Interpret sums of rational numbers by describing real-world contexts.
- c. Understand subtraction of rational numbers as adding the additive inverse,

p - q = p + (-q). Show that the distance between two rational numbers on the number line is the absolute value of their difference, and apply this principle in real-world contexts.

d. Apply properties of operations as strategies to add and subtract rational numbers.

7.NS.A.2 Apply and extend previous understandings of multiplication and division and of fractions to multiply and divide rational numbers.

- a. Understand that multiplication is extended from fractions to rational numbers by requiring that operations continue to satisfy the properties of operations, particularly the distributive property, leading to products such as (-1)(-1) = 1 and the rules for multiplying signed numbers. Interpret products of rational numbers by describing real-world contexts.
- b. Understand that integers can be divided, provided that the divisor is not zero, and every quotient of integers (with non-zero divisor) is a rational number. If *p* and *q* are integers, then $-\left(\frac{p}{q}\right) = \frac{(-p)}{q} = \frac{p}{(-q)}$. Interpret quotients of rational numbers by describing real world contexts.
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7.EE.A.1 Apply properties of operations as strategies to add, subtract, factor, and expand linear expressions with rational coefficients.

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Standards for Mathematical Practice

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- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:
 Why are fractions needed? How are fractions that represent the same quantity are related? Which methods can we use to compare rational numbers? How are equivalent fractions helpful when solving a problem? 	 Numerical representations can be used to describe and compare the value of real-world quantities. Understand that a rational number is the quotient of two integers.
Knowledge:	Skills:
Students will know	Students will be able to
• The division properties of 0 and 1.	 Identify a numerator and a denominator. Write a number as a product of primes

٠	Fractions can be used to represent real life	•	Add, subtract, multiply, and divide
	data.		fractions.
٠	When a fraction is in its simplest form.	•	Evaluate exponential expressions with
٠	Whether two fractions are equivalent.		fractional bases.
•	How to solve application problems		

involving fractions.

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- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>
- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Lobster Classification
- Fractions of Words Game
- Equivalent Fraction Memory
- Math Portal: Performance Tasks
- MARS Tasks

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra LinkIt! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review

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Stage 3 – Learning Plan

- Factors and Simplest Form
- Multiplying Fractions
- Dividing Fractions
- Adding and Subtracting Fractions with Like Denominators
- Adding and Subtracting Fractions with Unlike Denominators

Unit Plan Title	Unit 3: Linear Equations in One Variable
Suggested Time Frame	17 days

Overview / Rationale

In this unit, students will extend their understanding of numbers and transition from performing operations with numbers to working with variables, expressions, and equations, which are the building blocks of algebra. Students will solve many different types of linear equations including one-step, two-step, multi-step, and variables on both sides. Upon the conclusion of this unit, students will be able to rearrange a formula in order to highlight a particular variable.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

A.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.

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

A.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. (Students may examine the economic impact of climate change and investigate the claim that the economic impact of climate change is modeled by a quadratic function rather than a linear function. A new paper, <u>Few and Not So Far Between: A</u> <u>Meta-analysis of Climate Damage Estimates</u> is a good source for background information.) **A.CED.A.4** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law V = IR to highlight resistance *R*. (Students may examine the economic impact of climate change and rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.)

F.BF.B.4.a 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. For example, $f(x) = 2x^3$ or $f(x) = \frac{(x+1)}{(x-1)}$ for $x \neq 1$.

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.

- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:	
 How can we simplify equations using the number properties? What is the first step when converting real world situations into equations? Can equations that appear to be different be equivalent? How can linear equations be useful in solving real-world problems? What makes a problem solving method both affective and afficient? 	 LInear models can be used to represent real-world situations that would otherwise be difficult to solve. Various methods can be used to solve problems with different degrees of difficulty. Formulas can be rearranged in order to fit one's needs. Not all equations have solutions and some have infinitely many solutions. 	
	nave mininery many solutions.	
Knowledge:	Skills:	
Students will know	Students will be able to	
 Different methods for solving linear equations and what a reasonable answer looks like. How to solve literal equations and rewrite formulas. Linear relationships are algebraic functions that allow us to organize data and make predictions. A formula can be rearranged to isolate a different variable. 	 Use mathematical properties to solve equations. Evaluate real-world expressions and equations. Formulate and use different strategies to solve one-step and multi-step linear equations. Recognize identities and equations with no solution. Use formulas to solve problems. 	

Interdisciplinary Connections

2023 New Jersey Student Learning Standards for English Language Arts

- RI.MF.9–10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.
- W.IW.9–10.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.

• SL.PE.9–10.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

2020 New Jersey Student Learning Standards for Computer Science and Design Thinking NJSLS 8.1 Computer Science

- 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
- 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

NJSLS 8.2 Design Thinking

- 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
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2020 New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills

NJSLS 9.1 Personal Financial Literacy

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- 9.1.12.CDM.8: Compare and compute interest and compound interest and develop an amortization table using business tools.

NJSLS 9.4 Life Literacies and Key Skills

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Student Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470763-1
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-0

Resources: Big Ideas Online Platform

- Vocabulary Checks
- Chapter Highlights
- Chapter Review
- Chapter Tests
- Getting Ready for the Test

- Cumulative Reviews
- Study Skill Builders
- Bigger Picture-Study Guide Outline
- Answers to Selected Exercises
- Google Classroom Practice Sets

Websites:

- Khan Academy | Free Online Courses, Lessons & Practice
- IXL Math | Learn math online
- <u>https://www.hippocampus.org/</u>
- <u>Purplemath | Home</u>
- <u>Flashcards</u>
- <u>Linear Function and Linear Equation Games</u>
- <u>Graphing Linear Equations</u>
- <u>https://www.superteachertools.us/</u>

Integrated Technology

- Google Suite: Docs, Sheets, Slides, Forms
- Big Ideas online program
- Devices:
- Chromebooks
- Texas Instruments (TI-83 Plus Calculators)

Teacher Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470848-5
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-0

Resources: Big Ideas Online Platform

- Instructor's Manual
- Solution Manual
- Lecture Slides
- PowerPoint Presentations
- Test Bank
- Google Classroom Practice Sets

Websites:

- <u>https://www.bigideasmath.com/BIM/login</u>
- <u>www.desmos.com</u>
- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>

- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Investigating Endangered and Threatened Species
- Magic Squares
- Modeling Equation Solving with Addition and Subtraction
- Top Grossing Movies
- Order of Operations
- Solving Equations

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra *LinkIt*! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review
- Do Now/Anticipatory Assignments
- Peer/Self Assessments
- Guided Practice (individually, in pairs, groups)
- Exit Slips/Closure Activities
- Informal Observations
- Class notes and Assignments
- Class Discussions
- Foundations of Algebra LinkIt! NJSLS Form B

Summative Assessments:

- Chapter Tests
- LinkIt! Midterm Foundations of Algebra
- *LinkIt*! Final Foundations of Algebra
- Foundations of Algebra *LinkIt*! NJSLS Form C
- <u>NJDOE Digital Item Library</u>

Stage 3 – Learning Plan

- Solving One-Step Equations
- Solving Two-Step Equations
- Solving Multi-Step Equations
- Solving Equations with Variables on Both Sides
- Word Problems
- Solving Absolute Value Equations
- Rewriting Equations and Formulas

Unit Plan Title	Unit 4: Linear Inequalities in One Variable
Suggested Time Frame	13 days

Overview / Rationale

In this unit students will analyze and solve linear inequalities using the properties of mathematics. Students will understand their method of solving an inequality and will be able to explain their reasoning. Students will determine the similarities and differences between compound inequalities and absolute value inequalities. Students will solve application problems.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

A.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.

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

A.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. (Students may examine the economic impact of climate change and investigate the claim that the economic impact of climate change is modeled by a quadratic function rather than a linear function. A new paper, <u>Few and Not So Far Between: A Meta-analysis of Climate Damage Estimates</u> is a good source for background information.)

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:		
 How can linear inequalities be useful in solving real-world problems? How can you represent relations using inequalities? How does solving absolute value inequalities relate to solving compound inequalities? 	 Real world problems may be represented by the formation and solution of linear inequalities. Inequalities have an infinite number of solutions and can be represented on a number line. Various methods can be used to solve problems with different degrees of efficiency. 		
Knowledge:	Skills:		
Students will know	Students will be able to		
 The meaning of <, ≤, >, ≥, =, and ≠. The solution to an inequality can be represented both algebraically and graphically. When an inequality can have more than one solution and why. 	 Find a solution set and graph the solution set to an inequality. Evaluate real-world inequalities. Create inequalities to describe relationships. Translate sentences into mathematical statements Use mathematical properties to solve inequalities. Graph inequalities on a number line. 		

Interdisciplinary Connections

2023 New Jersey Student Learning Standards for English Language Arts

- RI.MF.9–10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.
- W.IW.9–10.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- SL.PE.9–10.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

2020 New Jersey Student Learning Standards for Computer Science and Design Thinking NJSLS 8.1 Computer Science

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- 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

NJSLS 8.2 Design Thinking

- 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
- 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.

2020 New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills

NJSLS 9.1 Personal Financial Literacy

- 9.1.12.CFR.4: Demonstrate an understanding of the interrelationships among attitudes, assumptions, and patterns of behavior regarding money, saving, investing, and work across cultures.
- 9.1.12.CDM.8: Compare and compute interest and compound interest and develop an amortization table using business tools.

NJSLS 9.4 Life Literacies and Key Skills

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Student Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470763-1
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-0

Resources: Big Ideas Online Platform

- Vocabulary Checks
- Chapter Highlights
- Chapter Review
- Chapter Tests
- Getting Ready for the Test
- Cumulative Reviews
- Study Skill Builders
- Bigger Picture-Study Guide Outline
- Answers to Selected Exercises
- Google Classroom Practice Sets

Websites:

• Khan Academy | Free Online Courses, Lessons & Practice

- IXL Math | Learn math online
- <u>https://www.hippocampus.org/</u>
- Purplemath | Home
- <u>Flashcards</u>
- <u>Linear Function and Linear Equation Games</u>
- <u>Graphing Linear Equations</u>
- <u>https://www.superteachertools.us/</u>

Integrated Technology

- Google Suite: Docs, Sheets, Slides, Forms
- Big Ideas online program
- Devices:
- Chromebooks
- Texas Instruments (TI-83 Plus Calculators)

Teacher Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470848-5
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-7

Resources: Big Ideas Online Platform

- Instructor's Manual
- Solution Manual
- Lecture Slides
- PowerPoint Presentations
- Test Bank
- Google Classroom Practice Sets

Websites:

- <u>https://www.bigideasmath.com/BIM/login</u>
- <u>www.desmos.com</u>
- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>
- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Fatal Mudslides
- Instructor's Gradebook
- Every Dollar Counts

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra *LinkIt*! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review
- Do Now/Anticipatory Assignments
- Peer/Self Assessments
- Guided Practice (individually, in pairs, groups)
- Exit Slips/Closure Activities
- Informal Observations
- Class notes and Assignments
- Class Discussions
- Foundations of Algebra LinkIt! NJSLS Form B

Summative Assessments:

- Chapter Tests
- LinkIt! Midterm Foundations of Algebra
- *LinkIt!* Final Foundations of Algebra
- Foundations of Algebra *LinkIt*! NJSLS Form C
- NJDOE Digital Item Library

Stage 3 – Learning Plan

- Writing & Graphing Inequalities
- Solving Inequalities using Addition and Subtractions
- Solving Inequalities using Multiplication and Division
- Multi-Step Inequalities
- Compound Inequalities
- Absolute Value Inequalities

Unit Plan Title	Unit 5: Evaluating and Graphing Functions
Suggested Time Frame	14 days

Overview / Rationale

In this unit students will extend their understanding of a coordinate plane. Students will define, evaluate, and compare functions and function notation. Students will use functions to model relationships between quantities. Students will be able to graph linear, absolute value, exponential, and quadratic functions using a table.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

F.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).

F.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. (Students can use the function f(x) = 2x to determine the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), x, where f(x) is the number of molecules of carbon dioxide.)

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.

F.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. (Students may graph the function f(x) = 2x to represent the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), in which case the positive integers would be an appropriate domain for the function.)

F.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

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.

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:		
 How can a graph, table, ordered pair, or an algebraic rule help describe the relationship between two variables? What is the difference between a relation and a function? What are domain and range, and how are they related to a graph? How can functions be represented? 	 Mathematical change can be represented in various ways, including algebraically and graphically, depending on the situation. Algebraic representations can be used to communicate and generalize patterns and relationships. Real world scenarios and situations can be modeled by graphs, equations, and inequalities. Each representation of a given function is simply a different way of expressing the same idea. 		
Knowledge:	Skills:		
Students will know	Students will be able to		
 A graph of paired data creates a scatter diagram. How the different representations of equations and inequalities are related. Making changes to a function changes its graph. 	 Plot ordered pairs. Understand the definition and concept of a function including function notation; choose the appropriate domain for an application function. Graph absolute value, exponential and quadratic functions using a table; Compare two functions represented in different ways 		

Interdisciplinary Connections

2023 New Jersey Student Learning Standards for English Language Arts

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- Google Suite: Docs, Sheets, Slides, Forms
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- <u>www.desmos.com</u>
- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>
- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Create your own graph on coordinate plane
- Function Notation Mystery Activity
- Graphing Linear Functions Sailboat
- Pasta Bridge Experiment
- Graphing Functions Project

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra *LinkIt*! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review
- Do Now/Anticipatory Assignments
- Peer/Self Assessments
- Guided Practice (individually, in pairs, groups)
- Exit Slips/Closure Activities
- Informal Observations

- Class notes and Assignments
- Class Discussions
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Summative Assessments:

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- LinkIt! Final Foundations of Algebra
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- <u>NJDOE Digital Item Library</u>

Stage 3 – Learning Plan

- The Rectangular Coordinate System
- Introduction to Functions
- Function Notation
- Graphing Linear Functions Using a Table
- Graphing Absolute Value Functions
- Graphing Quadratic Functions
- Graphing Exponential Functions

Unit Plan Title	Unit 6: Graphing Linear Functions	
Suggested Time Frame	14 days	

Overview / Rationale

In this unit, students will learn to represent functions in various ways using tables, graphs, and equations. Students will then develop and understand the properties of linear functions represented on the graph including intercepts and rate of change. Students will use these to graph linear functions. Moving on in the unit, students will write linear equations in slope-intercept form and standard form. Students will represent and analyze data in a variety of formats. Students will use linear functions to model relationships between quantities.

Stage 1 – Desired Results

New Jersey Student Learning Standards for Mathematics (2023)

Established Goals:

Standards to be covered...

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.

F.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. (Students may graph the function f(x) = 2x to represent the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), in which case the positive integers would be an appropriate domain for the function.)

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. (Students may use the graph of the function

f(x) = 2x, which represents the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), x, students will calculate and interpret the rate of change f(x).

F.IF.C.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

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.

S.ID.B.6 Represent data on two quantitative variables on a scatter plot and describe how the variables are related. (Students may represent data, with plots on the real number line, as they analyze geoscience data, and the results from global climate modeling, to make an evidence-based-forecast of the current rate of global climate change.)

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.

Standards for Mathematical Practice

- Make sense of problems and persevere in solving them.
- Reason abstractly and quantitatively.
- Construct viable arguments and critique the reasoning of others.
- Model with mathematics.
- Use appropriate tools strategically.
- Attend to precision.
- Look for and make use of structure.
- Look for and express regularity in repeated reasoning.

Essential Questions:	Enduring Understandings:	
Listentian Questions:		
 What is slope, and how is it useful in both creating and reading graphs? What does a positive, negative, or zero slope look like? What information does the equation of a line give you? How are equations and graphs related? 	 You need two points to graph a line. Slope is a ratio that shows a relationship between two quantities. A line on a graph can be represented by a linear equation. The graph of an inequality in two variables is the set of points that represents all solutions to the inequality. There are multiple ways to represent a linear inequality. 	
Knowledge:	Skills:	
Students will know	Students will be able to	
 That slope represents a rate of change between two quantities and that the y-intercept represents the initial value. How to represent an equation or inequality on the coordinate plane. How the different representations of equations and inequalities are related. 	 Identify the intercepts of a graph Identify and graph horizontal and vertical lines. Find slope of a line given two points, an equation, or a graph. Graph a linear equation or inequality using a table, intercepts, and slope-intercept form. 	

Interdisciplinary Connections

2023 New Jersey Student Learning Standards for English Language Arts

- RI.MF.9–10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.
- W.IW.9–10.2. Write informative/explanatory texts (including the narration of historical events, scientific procedures/ experiments, or technical processes) to examine and convey complex ideas, concepts, and information clearly and accurately through the effective selection, organization, and analysis of content.
- SL.PE.9–10.1. Initiate and participate effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with peers on grades 9–10 topics, texts, and issues, building on others' ideas and expressing their own clearly and persuasively.

2020 New Jersey Student Learning Standards for Computer Science and Design Thinking NJSLS 8.1 Computer Science

- 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.
- 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process.
- 8.1.12.AP.1: Design algorithms to solve computational problems using a combination of original and existing algorithms.

NJSLS 8.2 Design Thinking

- 8.2.12.ED.1: Use research to design and create a product or system that addresses a problem and make modifications based on input from potential consumers.
- 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis.

2020 New Jersey Student Learning Standards for Career Readiness, Life Literacies, and Key Skills

NJSLS 9.1 Personal Financial Literacy

- 9.1.12.CFR.4: Demonstrate an understanding of the interrelationships among attitudes, assumptions, and patterns of behavior regarding money, saving, investing, and work across cultures.
- 9.1.12.CDM.8: Compare and compute interest and compound interest and develop an amortization table using business tools.

NJSLS 9.4 Life Literacies and Key Skills

- 9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).
- 9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).

Student Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470763-1
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-0

Resources: Big Ideas Online Platform

- Vocabulary Checks
- Chapter Highlights
- Chapter Review
- Chapter Tests
- Getting Ready for the Test
- Cumulative Reviews
- Study Skill Builders
- Bigger Picture-Study Guide Outline
- Answers to Selected Exercises
- Google Classroom Practice Sets

Websites:

- Khan Academy | Free Online Courses, Lessons & Practice
- IXL Math | Learn math online
- <u>https://www.hippocampus.org/</u>
- <u>Purplemath | Home</u>
- <u>Flashcards</u>
- Linear Function and Linear Equation Games
- <u>Graphing Linear Equations</u>
- <u>https://www.superteachertools.us/</u>

Integrated Technology

- Google Suite: Docs, Sheets, Slides, Forms
- Big Ideas online program
- Devices:
- Chromebooks
- Texas Instruments (TI-83 Plus Calculators)

Teacher Resources

Texts:

- Martin-Gay, <u>Prealgebra & Introductory Algebra</u>, 5th Edition, 2019. ISBN 13: 978-0-13-470848-5
- Larson and Boswell, Algebra 1 Big Ideas Learning, 2022. ISBN 13: 978-1-64727-416-7

Resources: Big Ideas Online Platform

- Instructor's Manual
- Solution Manual
- Lecture Slides

- PowerPoint Presentations
- Test Bank
- Google Classroom Practice Sets

Websites:

- https://www.bigideasmath.com/BIM/login
- <u>www.desmos.com</u>
- <u>www.mathwarehouse.com</u>
- <u>https://learnzillion.com</u>
- <u>https://www.ixl.com</u>
- <u>https://www.illustrativemathematics.org</u>
- <u>www.nctm.org</u>
- <u>https://www.khanacademy.org</u>
- <u>www.insidemathematics.org</u>
- <u>www.softschools.com</u>
- <u>https://www.edhelper.com</u>
- <u>www.hippocampus.org</u>
- <u>New Jersey Climate Education Hub</u>

Stage 2 – Assessment Evidence

Performance Task(s):

- Finding a Linear Model
- Medicare Data
- Microcomputers in Automobiles
- Slope of Road
- <u>Scooter Rental</u>

Pre-Assessments:

- Pre-Assessment: Open-ended, paper assessment
- Do Now/Anticipatory Assignments
- Introduction Activities
- Foundations of Algebra *LinkIt*! NJSLS Form A

Formative Assessments:

- Vocabulary and Readiness Checks
- Exercise sets
- Concept Extensions
- Integrated Review
- Do Now/Anticipatory Assignments
- Peer/Self Assessments
- Guided Practice (individually, in pairs, groups)
- Exit Slips/Closure Activities
- Informal Observations
- Class notes and Assignments

- Class Discussions
- Foundations of Algebra *LinkIt*! NJSLS Form B

Summative Assessments:

- Chapter Tests
- *LinkIt*! Midterm Foundations of Algebra
- LinkIt! Final Foundations of Algebra
- Foundations of Algebra *LinkIt*! NJSLS Form C
- <u>NJDOE Digital Item Library</u>

Stage 3 – Learning Plan

- Graphing Linear Equations
- Intercepts
- Slope and Rate of Change
- Equations of Lines
- Graphing Linear Inequalities in Two Variables

Accommodations and Modifications

Below please find a list of suggestions for accommodations and modifications to meet the diverse needs of our students. Teachers should consider this a resource and understand that they are not limited to the recommendations included below.

An accommodation *changes* HOW *a student learns*; the change needed does not alter the grade-level standard. A modification *changes* WHAT *a student learns*; the change alters the grade-level expectation.

Special Education and 504 Plans

All modifications and accommodations must be specific to each individual child's IEP (Individualized Educational Plan) or 504 Plan.

- Pre-teach or preview vocabulary
- Repeat or reword directions
- Have students repeat directions
- Use of small group instruction
- Pair visual prompts with verbal presentations
- Ask students to restate information, directions, and assignments
- Repetition and time for additional practice
- Model skills/techniques to be mastered
- Extended time to complete task/assignment/work
- Provide a copy of class notes
- Strategic seating (with a purpose eg. less distraction)
- Flexible seating
- Repetition and additional practice
- Use of manipulatives
- Use of assistive technology (as appropriate)
- Assign a peer buddy
- Emphasize key words or critical information by highlighting
- Use of graphic organizers
- Scaffold with prompts for sentence starters
- Check for understanding with more frequency
- Provide oral reminders and check student work during independent practice
- Chunk the assignment broken up into smaller units, work submitted in phases
- Encourage student to proofread assignments and tests
- Provide regular home/school communication
- Teacher checks student planner
- Provide student with clear expectations in writing and grading criteria for assignments (rubrics)

Testing Accommodations:

Students should receive all testing accommodations for Benchmark assessments that they receive for State testing.

- Setting: Alternate setting for assessments, small groups, screens to block distractions
- Presentation: large print, test readers, use of audio, fewer questions on each page
- Response: answer verbally, use large block answer sheet, speech-to-text dictation, accept short answers
- Allow for retakes
- Provide study guides
- Use of reference aids such as glossary, multiplication tables, calculator
- Choice of test format (multiple-choice, essay, true-false)
- Alternate ways to evaluate (projects or oral presentations instead of written tests)
- Open-book or open-note tests

Multilingual Learners:

All modifications and accommodations should be specific to each individual child's LEP level as determined by the WIDA screening or ACCESS, utilizing the WIDA Can Do Descriptors.

- Pre-teach or preview vocabulary
- Repeat or reword directions
- Have students repeat directions
- Use of small group instruction
- Scaffold language based on their Can Do Descriptors
- Alter materials and requirements according to Can Do Descriptors
- Adjust number of paragraphs or length of writing according to their Can Do Descriptor
- TPR (Total Physical Response-Sheltered Instruction strategy) Demonstrate concepts through multi-sensory forms such as with body language, intonation
- Pair visual prompts with verbal presentations
- Repetition and additional practice
- Model skills and techniques to be mastered
- Native Language translation (peer, assistive technology, bilingual dictionary)
- Emphasize key words or critical information by highlighting
- Use of graphic organizers
- Scaffold with prompts for sentence starters
- Check for understanding with more frequency
- Use of self-assessment rubrics
- Increase one-on-one conferencing; frequent check ins
- Use study guide to organize materials
- Make vocabulary words available in a student created vocabulary notebook, vocabulary bank, Word Wall, or vocabulary ring
- Extended time
- Select text complexity and tiered vocabulary according to Can Do Descriptors
- Projects completed individually or with partners
- Use online dictionary that includes images for words: <u>http://visual.merriamwebster.com/</u>.
- Use online translator to assist students with pronunciation: <u>http://www.reverso.net/text_translation.aspx?lang=EN</u>.

Students at Risk of Failure:

- Use of self-assessment rubrics for check-in
- Pair visual prompts with verbal presentations
- Ask students to restate information and/or directions
- Opportunity for repetition and additional practice
- Model skills/techniques to be mastered
- Extended time
- Provide copy of class notes
- Strategic seating with a purpose
- Provide students opportunity to make corrections and/or explain their answers
- Support organizational skills
- Check daily planner
- Encourage student to proofread work
- Assign a peer buddy
- Build on students' strengths based on Multiple Intelligences: Linguistic (verbal); Logical (reasoning); Musical/Rhythmic; Intrapersonal Intelligence (understanding of self); Visual Spatial Intelligence; Interpersonal Intelligence (the ability to interact with others effectively); Kinesthetic (bodily); Naturalist Intelligence; and Learning Styles: Visual; Auditory; Tactile; Kinesthetic; Verbal

High Achieving:

Extension Activities

- Allow for student choice from a menu of differentiated outcomes; choices grouped by complexity of thinking skills; variety of options enable students to work in the mode that most interests them
- Allow students to pursue independent projects based on their individual interests
- Provide enrichment activities that include more complex material
- Allow opportunities for peer collaboration and team-teaching
- Set individual goals
- Conduct research and provide presentation of appropriate topics
- Provide students opportunity to design surveys to generate and analyze data to be used in discussion
- Allow students to move through the assignment at their own pace (as appropriate)

Strategies to Differentiate to Meet the Needs of a Diverse Learning Population

- Vocabulary Sorts-students engage with the vocabulary word by sorting into groups of similar/different rather than memorizing definitions
- Provide "Realia" (real life objects to relate to the five senses) and ask questions relating to the senses
- Role Play-students create or participate in role playing situations or Reader's Theater
- Moving Circle-an inside and outside circle partner and discuss, circles moves to new partner (Refer to Kagan Differentiated Strategies)

- Brainstorm Carousel-Large Post Its around the room, group moves in a carousel to music. Group discusses topic(s) and responses on paper. Groups rotate twice to see comments of others. (Refer to Kagan Differentiated Strategies)
- Gallery Walk-Objects, books, or student work is displayed. Students examine artifacts and rotate.
- Chunking-chunk reading, tests, questions, homework, etc to focus on particular elements.
- Think Pair Share Write
- Think Talk Write
- Think Pair Share
- Note-taking -can be done through words, pictures, phrases, and sentences depending on level
- KWL (Know, Want to Know, Learned)/KWHL(Know, What to Know, How Will I Learn, learned)/KWLS (Know, Want to Know, Learned, Still Want to Know) /KWLQ (Know, What to Know, Learned, Questions I Still Have) Charts
- Corners Cooperative Learning Strategy: http://cooperativelearningstrategies.pbworks.com/w/page/28234420/Corners.
- Circle Map strategy- place the main topic in a small circle and add student ideas in a bigger circle around the topic. Students may use their native language with peers to brainstorm.
- Flexible grouping -as a whole class, a small group, or with a partner, temporary groups are created: <u>http://www.teachhub.com/flexible-grouping-differentiated-instruction-strategy</u>.
- Jigsaw Activities -cooperative learning in a group, each group member is responsible for becoming an "expert" on one section of the assigned material and then "teaching" it to the other members of the team: <u>http://www.adlit.org/strategies/22371/</u>.

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NEPTUNE TOWNSHIP SCHOOL DISTRICT Office of the Superintendent 60 Neptune Blvd. Neptune, NJ 07753

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