Wall Township Public Schools	Board Approval Date: 8/19/2025

Course Title: Algebra 1 CP (WHS)

Course Description: This course is a systematic investigation of the properties of the real number system. It emphasizes the basic concepts and language of sets, operations with polynomials, solving equations, solving and graphing linear and quadratic equations, and properties of exponents and radicals. It integrates the elements of algebra with technology, problem solving, application and mathematical modeling. Through the Mathematical Practice Standards students experience mathematics as a coherent, useful, and logical subject that makes use of their ability to make sense of problem situations.

New Jersey Student Learning Standards - Math

Vision for Mathematics Education in New Jersey

A New Jersey education in Mathematics builds quantitatively and analytically literate citizens prepared to meet the demands of college and career, and to engage productively in an information-driven society. All students will have access to a high-quality mathematics education that fosters a population that:

- leverages data in decision-making and as a lens for discussing, analyzing, and responding to practical questions.
- persists to make sense of and model problems arising in everyday life, society, and the workplace.
- thinks critically and strategically to assess quantitative relationships and to solutions to complex problems.
- employs precise reasoning and constructs viable arguments to deduce conclusions, recognize false statements and assess peers' reasoning.
- interprets, evaluates and critiques the mathematics embedded in social, scientific and commercial systems, as well as the claims made in the private and public sectors.
- communicates precisely when conveying, representing, and justifying both qualitative and quantitative perspectives.

Standards for Mathematical Practice*

The Standards for Mathematical Practice describe varieties of expertise that mathematics educators at all levels should seek to develop in their students. These practices rest on important "processes and proficiencies" with longstanding importance in mathematics education. The first of these are the NCTM process standards of problem solving, reasoning and proof, communication, representation, and connections. The second are the strands of mathematical proficiency specified in the National Research Council's report Adding It Up: adaptive reasoning, strategic competence, conceptual understanding (comprehension of mathematical concepts, operations and relations), procedural fluency (skill in carrying out procedures flexibly, accurately, efficiently and appropriately), and productive disposition (habitual inclination to see mathematics as sensible, useful, and worthwhile, coupled with a belief in diligence and one's own efficacy).

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

**See end of document for additional information related to the mathematical practices.*

Inclusion of Climate Change Opportunities

() notes opportunities to integrate specific examples of climate change education provided by additional age-appropriate resources

The goal of inclusion of climate change education implementation is to foster generations of New Jersey students that can analyze, question, interpret, to think independently, and bring critical deduction to fulfill, and to lead in jobs created by burgeoning industries of the future green economy.

Instructional Notes

The Standards for Mathematical Content

The high school standards specify the mathematics that all students should study in order to be college and career ready. The high school standards are listed in conceptual categories and not course specific. It is important for instructors to pay close attention to the supplemental documents which align standards to courses and include clarifications on multi-course standards.

Conceptual Categories

- Number and Quantity
- Algebra
- Functions
- Modeling
- Geometry
- Statistics and Probability

Algebra1_CourseContentFramework_and_ContentEmphases.pdf

Limits_and_Clarifications_MultiCourseStandards Math.pdf

Students should spend the majority of their time on the major work of the grade (M). Supporting work (S) and, where appropriate, additional work (A) can engage students in the major work of the grade. See linked document for specifics.

Additional resources can be found at the end of this document.

Course Sequence & Pacing	
Unit Title	**Estimated Number of Instructional Periods**
Unit 1: Expressions	12
Unit 2: Equations in One Variable	13
Unit 3: Relations and Functions	13
Unit 4: Linear and Nonlinear Functions	13
Unit 5: Creating Linear Equations	10
Unit 6: Linear Inequalities	10
Unit 7: Systems of Linear Equations and Inequalities	10
Unit 8: Exponents and Roots	8
Unit 9: Polynomials	13
Unit 10: Quadratic Functions	12
Unit 11: Exponential Functions	11
Unit 12: Statistics	8
Total Instructional Periods	133

**Instructional periods are scheduled at WHS for 56 minutes on a rotating drop schedule meeting for approximately 125 - 135 instructional periods.

Unit 1

Desired Results

Unit 1: Expressions

Unit Summary: In this unit, students begin by learning to write and evaluate numerical expressions using the order of operations. They then transition to algebraic expressions, gaining experience with variables, constants, and combining like terms. The module emphasizes the properties of real numbers—commutative, associative, and distributive—as tools for simplifying expressions. A focused lesson on the Distributive Property helps students visualize and apply this concept using area models. Students also explore absolute value, understanding it as a measure of distance on the number line and evaluating expressions involving it. Finally, the module connects algebra to real-world contexts through descriptive modeling, encouraging students to use appropriate precision when reporting solutions. This unit builds both procedural fluency and conceptual understanding, preparing students for deeper algebraic problem-solving in future modules.

Learning Standards

NJSLS Math:

A.SSE Seeing Structure in Expressions
ASSE.A. Interpret the Structure of Expressions

1. Interpret expressions that represent a quantity in terms of its context. ★
    a. Interpret parts of an expression, such as terms, factors, and coefficients.
    b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.

2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

N.RN The Real Number System

N.RN.A. Extend the properties of exponents to rational exponents

3. Simplify radicals, including algebraic radicals (e.g. $\sqrt[3]{54} = 3\sqrt[3]{2}$, simplify $\sqrt{32x^2}$).

N.Q Quantities ★

N.Q.A. Reason quantitatively and use units to solve problems

2. Define appropriate quantities for the purpose of descriptive modeling.

3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Standards for Mathematical Practice

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

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)*:

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.

Computer Science & Design Thinking (*CS & DT*):

8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- How can mathematical expressions be represented and evaluated?
- How can mathematical expressions and units help us represent, solve, and make sense of real-world problems?
- Can expressions that appear to be different be equivalent?

Unit Enduring Understandings:

- Mathematical expressions can be used to represent real-world situations.
- Quantities and their relationships can be represented using variables and expressions.
- Units and quantities are essential in solving and interpreting mathematical problems.
- Reasoning quantitatively and using units can aid in solving problems and checking for errors.

Vocabulary: Absolute Value, Accuracy, Additive Identity, Additive Inverse, Algebraic Expression, Base, Closed, Coefficient, Constant Term, Define a Variable, Descriptive Modeling, Equivalent Expressions, Evaluate, Exponent, Like Terms, Metric, Multiplicative Identity, Multiplicative Inverse, Numerical Expression, Reciprocals, Simplest Form, Term, Variable, Variable Term

Students will be able to:

- Write and evaluate numerical expressions (A.SSE.1b, A.SSE.2)
- Write and evaluate algebraic expressions (A.SSE.1, A.SSE.2)
- Apply the properties of real numbers to simplify expressions (A.SSE.2, N.RN.3)
- Simplify expressions using the Distributive Property (A.SSE.1a, A.SSE.2)
- Evaluate absolute value expressions (A.SSE.2)
- Use quantities for the purpose of descriptive modeling, and report solutions with an appropriate level of accuracy (N.QA.2, N.QA.3)

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
- Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated.
- Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and based on their diagnostic results.
- Small Group Practice, Small Group Intervention, Small Group Activities, Differentiated Instruction, Enrichment Practice, Communicators, Thinking Tasks
- **Reveal Aligned Practice:**
    - Launch
        - Diagnostic Assessment
        - Video
        - Ignite!
        - Foldables
    - Lessons

        - Launch
        - Explore
        - Learn and Examples
        - Check
        - Exit Ticket
        - Practice
    - Close
        - Reflect
        - Test Practice
        - Module Assessments
- ALEKS

Lesson 6: Descriptive Modeling and Accuracy

- 1.6 Climate Change Activity - Students will use algebraic expressions to represent carbon emissions and examine how actions affect the environment.
- **N.Q.A.2 Climate Change Example:** Students may define appropriate quantities for a descriptive model of how variations in the flow of energy into and out of Earth's systems result in climate change. Note: changes in climate are limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.
- **N.Q.A.3 Climate Change Example:** Students may, when reporting quantities related to how variations in the flow of energy into and out of the Earth's systems result in climate change, choose a level of accuracy appropriate to limitations on how quantities were measured.

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork

Summative Assessments: Cumulative Assessments
Common Benchmark Assessments: Common Unit Assessments, LinkIt! Benchmarks
Alternative Assessments: Modified Unit Assessments, Modified Projects, Other Modified Assessments

Core Instructional & Supplemental Materials
Math Program: McGraw Hill ConnectEd - Reveal Algebra 1, ALEKS (Assessment and Learning in Knowledge Spaces)
DeltaMath, Khan Academy, Desmos, Graphing Calculators
LinkIt! Benchmarks, LinkIt! Test Bank

Accommodations and Modifications: Students with Disabilities, English Language Learners, Students at Risk of Failure, Students with 504s, Gifted & Talented Students

Specific Strategies and Practices that Support Students with Disabilities:

Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, the instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

- Small group/One to one - Additional time - Review of directions - Student restates information - Space for movement or breaks - Extra visual and verbal cues and prompts - Preferential seating - Follow a routine/schedule - Rest breaks - Verbal and visual cues regarding directions and staying on task - Checklists - Immediate feedback

Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts - Personal Glossary - Extended Time - Simplified/Verbal Instructions - Frequent Breaks - Visual learning, including graphic organizers - Use of cognates to increase comprehension - Teacher modeling -

Pairing students with beginning English language skills with students who have more advanced English language skills - Scaffolding - Word walls - Think-pair-share - Cooperative learning groups
Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Students at Risk of Failure

- Home/School Connection - Alternative Assessments - Learning Contracts - Homogenous Grouping - Supplemental Instruction - Think-Pair-Share by Readiness - Homework Options - Differentiated Online Practice - Leveled Rubrics - Tiered Level of Supports - Tiered Activities - Small Group Instruction - Work Alone Choice - Group Work Choice
Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments
-Opportunities for make-up work or reduce number of assignments - Provide access to extra help when possible

Students with 504 Plans

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way. Students' accommodations are outlined in their individual 504 plan. -

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

-Homogenous Grouping - Small Group In-Depth Instruction - Differentiated Online Practice - Alternative Assessments - Pre-Assess to provide Differentiated Instruction to Accelerate Learning
Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Unit 2

Desired Results

Unit 2: Equations in One Variable

Unit Summary: This unit focuses on solving a variety of equations using algebraic methods. Students begin by writing equations from real-world situations and solving one-step and multi-step equations. They learn to solve equations with variables on both sides and determine when equations have no solution or infinitely many solutions. The module also covers solving absolute value equations, working with proportions, and using formulas in problem-solving. Emphasis is placed on interpreting solutions and applying algebra to real-life contexts with accuracy and clarity.

Learning Standards

NJSLS Math:

A.CED Creating Equations ★

A.CED.A Creating Equations that describe numbers or relationships

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.

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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

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.

A.REI Reasoning with Equations and Inequalities

A.REI.A Understand solving equations as a process of reasoning and explain the reasoning

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. Solve equations and inequalities in one variable

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

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them
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5. Use appropriate tools strategically
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7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)*:

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.1: Identify problem-solving strategies used in the development of an innovative product or practice.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task.

9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.
Computer Science & Design Thinking (*CS & DT***):** 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.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change. 8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:	**Unit Enduring Understandings:**
• How can writing and solving equations help you solve equations in the real world? • Can equations that appear to be different be equivalent? • What kinds of relationships can proportions represent? • In what ways does analyzing our mistakes deepen our understanding of equations and inequalities • What does it mean to solve an equation or inequality, and why do different types require different strategies	• Equations and inequalities express relationships between quantities. • Solving equations and inequalities involves finding all values that satisfy the given relationship. • Maintaining equality or inequality requires performing equivalent operations on both sides. • Different types of equations (linear, absolute value, systems) require different structural approaches. • Understanding the solution set strengthens reasoning and shapes further mathematical connections.

	• Checkpoint and error analysis enhance procedural fluency and conceptual depth.
Vocabulary: Constraint, Dimensional Analysis, Equation, Equivalent Equations, Formula, Identity, Literal Equation, Multi-step Equation, Proportion, Solution, Solving an Equation	
Students will be able to: • Create and interpret equations that describe relationships (A.CED.1, ACED.3) • Solve equations by using addition, subtraction, multiplication and division (A.CED.1, A.REI.1, A.REI.3) • Solve multi-step equations and equations for specific lettered coefficients by applying properties of equality (A.CED.1, A.REI.3) • Solve equations with the variable on each side by applying the properties of equality and the Distributive Property (A.CED.1, A.REI.3) • Solve absolute value equations (A.CED.1, A.REI.3) • Solve equations involving proportions (A.CED.1, A.REI.3) • Solve equations for specific variables and convert units of measure by applying the properties of equality (A.CED.4, A.REI.3)	
Learning Activities: • DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students. • Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated. • Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and	

based on their diagnostic results.

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        - Test Practice
        - Module Assessments
- ALEKS

Reveal Lesson 3: Solve Multi-step Equations

- Reflect/Practice: Using Formulas Practice Presentation: Example #25

Reveal Lesson 7: Using Formulas

- Reflect/Practice: Using Formulas Practice Presentation: Example #49

- **A.CED.A.1 Climate Change Example:** Students may create equations and/or inequalities to represent the economic impact of climate change.
- **A.CED.A.3 Climate Change Example:** Students may represent constraints describing the economic impact of climate change by equations, inequalities, and/or by systems of inequalities, and interpret solutions as viable or nonviable options.
- **A.CED.A.4 Climate Change Example:** Students may rearrange formulas related to the economic impact of climate change to highlight a quantity of interest, using the same reasoning as in solving equations.

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
Summative Assessments: Cumulative Assessments
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Unit 3

Desired Results

Unit 3: Relations and Functions

Unit Summary: This unit introduces students to the concept of relations and the special subset called functions. They begin by representing relations using tables, graphs, and mapping diagrams. Next, they learn to identify functions through the Vertical Line Test and understand domain and range. The module explores linearity by distinguishing between linear and non-linear relationships, including continuous vs. discrete graphs. Students examine key graph features such as intercepts and the general shapes of various functions. In the final lesson, they sketch graphs of different functions and compare them using modeling activities to reinforce understanding. Through these lessons, students gain a solid foundation in interpreting and analyzing how quantities relate and change.

Learning Standards

NJSLS Math:

N.Q Quantities ★

N.Q.A Reason quantitatively and use units to solve problems

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

F.IF Interpreting Functions

F.IF.A Understand the concept of a function and use function notation

1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and *x* is an element of its domain, then $f(x)$ denotes the output of *f* corresponding to the input *x*. The graph of f is the graph of the equation $y = f(x)$.

2. Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.B Interpret functions that arise in applications in terms of the context

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. ★

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. ★

F.IF. C Analyze functions using different representations

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

A.REI Reasoning with Equations and Inequalities

A.REI.D Represent and solve equations and inequalities graphically

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

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8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- Why are representations of relations and functions useful?
- How do relations and functions help us describe and analyze relationships between quantities?
- Why is it useful to represent functions in different ways?
- What does a constant rate of change tell us about a linear function?

Unit Enduring Understandings:

- Relations and functions describe relationships between quantities.
- Functions can be represented in multiple ways.
- The vertical line test determines if a graph represents a function.
- Understanding the domain and range is crucial.
- Linear functions have constant rates of change.
- Continuity in a graph indicates that the function has no breaks, jumps, or holes.

Vocabulary: Continuous function, decreasing, dependent variable, discrete function, domain, end behavior, extrema, function, function notation, increasing, independent variable, line symmetry, linear equation, linear function, mapping, negative, nonlinear function, positive, range, relation, relative maximum, relative minimum, root, scale, x-intercept, y-intercept, zero

Students will be able to:

- Represent relations with graphs, ordered pairs, tables, and mappings (N.Q.1, F.IF.1)
- Determine if a relation is a function and find function values (F.IF.1, F.IF.2)
- Identify linear and nonlinear functions and continuous and discrete functions (F.IF.4, F.IF.5)
- Identify intercepts of functions and solve equations by graphing (A.REI.10, F.IF.4)
- Identify symmetry, extrema and end behavior of functions (F.IF.4)

- Sketch graphs of functions and compare two or more functions (F.IF.4, F.IF.9**)**

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
- Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated.
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        - Exit Ticket
        - Practice
    - Close

        - Reflect
        - Test Practice
        - Module Assessments
- ALEKS

Reveal Lesson 3: Linearity and Continuity of Graphs

- Functions - Climate change
- **N.Q.A.1 Climate Change Example:** Students may use units to guide the solution of multi-step problems about how variations in the flow of energy into and out of the Earth's systems result in climate change. Note: Changes in climate are limited to changes in surface temperatures, precipitation patterns, glacial ice volumes, sea levels, and biosphere distribution.
- **F.IF.A.2 Climate Change Example:** Students may use function notation to determine the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), m, where c(m) is the number of molecules of carbon dioxide.
- **F.IF.B.5 Climate Change Example:** Students may relate the domain of a function c(m) representing the amount of carbon dioxide produced by burning m molecules of ethane (gasoline), to its graph in order to determine the appropriate domain for c(m).

Assessment Evidence
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DeltaMath, Khan Academy, Desmos, Graphing Calculators
LinkIt! Benchmarks, LinkIt! Test Bank

Accommodations and Modifications: Students with Disabilities, English Language Learners, Students at Risk of Failure, Students with 504s, Gifted & Talented Students

Specific Strategies and Practices that Support Students with Disabilities:

Students receiving Special Education programming have specific goals and objectives, as well as accommodations and modifications outlined within their Individualized Education Plans (IEP) due to an identified disability and/or diagnosis. In addition to exposure to the general education curriculum, the instruction is differentiated based upon the student's needs. The IEP acts as a supplemental curriculum guide inclusive of instructional strategies that support each learner.

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Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts - Personal Glossary - Extended Time - Simplified/Verbal Instructions - Frequent Breaks - Visual learning, including graphic organizers - Use of cognates to increase comprehension - Teacher modeling - Pairing students with beginning English language skills with students who have more advanced English language skills - Scaffolding - Word walls - Think-pair-share - Cooperative learning groups

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Students at Risk of Failure

- Home/School Connection - Alternative Assessments - Learning Contracts - Homogenous Grouping - Supplemental Instruction - Think-Pair-Share by Readiness - Homework Options - Differentiated Online Practice - Leveled Rubrics - Tiered Level of Supports - Tiered Activities - Small Group Instruction - Work Alone Choice - Group Work Choice
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-Opportunities for make-up work or reduce number of assignments - Provide access to extra help when possible

Students with 504 Plans

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way. Students' accommodations are outlined in their individual 504 plan. -

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

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Unit 4

Desired Results

Unit 4: Linear and Nonlinear Functions

Unit Summary: This unit explores the characteristics and behaviors of linear and nonlinear functions. Students begin by learning to graph linear functions using tables and intercepts, building a foundational understanding of linear relationships. The module then focuses on the concept of slope and rate of change, emphasizing their significance in interpreting linear functions. Students are introduced to the slope-intercept form of a linear equation, enabling them to graph linear equations efficiently. The module also covers transformations of linear functions, including translations, reflections, and dilations, and applies these concepts to absolute value functions. Additionally, students study arithmetic sequences, recognizing them as linear functions with a constant rate of change. The module concludes with an exploration of piecewise and step functions, highlighting their applications in modeling real-world situations.

Learning Standards

NJSLS Math:

A.CED Creating Equations ★

A.CED.A Create equations that describe numbers or relationships

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

A.REI Reasoning with Equations and Inequalities

A.REI.D. Represent and solve equations and inequalities graphically

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

F.IF Interpreting Functions

F.IF.A. Understand the concept of a function and use function notation

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

F.IF.B. Interpret functions that arise in applications in terms of the context

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. ★

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. ★

F.IF.C. Analyze functions using different representations

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. Graph linear and quadratic functions and show intercepts, maxima, and minima.

b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.BF Building Functions

F.BF.A. Build a function that models a relationship between two quantities

1. Write a function that describes a relationship between two quantities. ★

   a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

2. Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms. ★

F.BF.B. Build new functions from existing functions

3. Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F.LE Linear and Exponential Models

F.LE.A. Construct and compare linear and exponential models and solve problems

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.

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

F.LE.B. Interpret expressions for functions in terms of the situation they model

5. Interpret the parameters in a linear or exponential function in terms of a context.

Standards for Mathematical Practice

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

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)***:**

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task.

9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.

Computer Science & Design Thinking (*CS & DT***):**

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.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- What can a function tell you about the relationship that it represents?
- How can different methods be used to solve linear equations and inequalities, and when is each most effective?
- What do solutions to systems of linear equations reveal about the relationships between the equations?
- Why is it important to understand both algebraic and graphical representations of equations and systems?
- How does translating between equations, graphs, and solution sets help us solve and understand real-world problems?

Unit Enduring Understandings:

- Linear equations and inequalities can be solved using various algebraic techniques, including graphing, substitution, and elimination.
- Solutions to linear inequalities can be represented on number lines and as interval notation.
- Systems of linear equations can have one solution, no solution, or infinitely many solutions.
- Solving systems of equations algebraically and graphically reinforces the understanding of the relationships between equations.

	• Understanding how to translate between equations, graphs, and solution sets is essential for interpreting real-world problems.

Vocabulary: Absolute value function, arithmetic sequence, common difference, constant function, dilation, family of graphs, greatest integer function, identity function ,interval, nth term of a sequence, parameter, parent function, piecewise-defined function, piecewise linear function, rate of change, reflection, sequence, slope, step function, term of a sequence, transformation, translation, vertex

Students will be able to:

- Graph linear functions by using tables and intercepts (A.REI.10, F.IF.7a, F.LE.5)
- Find and interpret the rate of change and slopes of lines (F.IF.6, F.LE.5)
- Graph equations in slope intercept form (A.CED.2, F.IF.7a, F.LE.5)
- Identify the effects of transformations of the graphs of linear functions (F.IF.7a, F.BF.3)
- Write and graphs equations of arithmetic sequences (F.IF.3, F.BF.1a, F.BF.2, F.LE.2)
- Graph piecewise-defined and step functions (F.IF.4, F.IF.7b)
- Identify the effects of transformations of absolute value functions (F.IF.7b, F.BF.3)

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
- Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated.

- Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and based on their diagnostic results.
- Small Group Practice, Small Group Intervention, Small Group Activities, Differentiated Instruction, Enrichment Practice, Communicators, Thinking Tasks
- **Reveal Aligned Practice:**
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        - Diagnostic Assessment
        - Video
        - Ignite!
        - Foldables
    - Lessons
        - Launch
        - Explore
        - Learn and Examples
        - Check
        - Exit Ticket
        - Practice
    - Close
        - Reflect
        - Test Practice
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Lesson 2: Rate of Change and Slope & Lesson 3: Slope-Intercept Form:

- Linear Eq climate change

- **F.IF.B.6 Climate Change Example:** Students may calculate the average rate of change of a function c(m) presented symbolically or as a table, where c(m) represents the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline).

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
Summative Assessments: Cumulative Assessments
Common Benchmark Assessments: Common Unit Assessments, LinkIt! Benchmarks
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Core Instructional & Supplemental Materials
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Students at Risk of Failure

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Unit 5

Desired Results

Unit 5: Creating Linear Equations

Unit Summary: This unit focuses on developing skills to write and analyze linear equations. Students begin by learning to write equations in slope-intercept form (y = mx + b), identifying the slope and y-intercept from graphs and tables. They then explore writing equations in point-slope and standard forms, understanding the relationships between these forms and their applications. The module also covers creating scatter plots to represent data visually and fitting lines of best fit to make predictions. Students examine the concepts of correlation and causation, understanding how they relate to data analysis. Additionally, the module introduces linear regression techniques for finding the line that best fits a set of data points. Finally, students explore the concept of inverse functions, learning how to determine and interpret the inverse of a linear function

Learning Standards

NJSLS Math:

A.CED Creating Equations ★

A.CED.A Create equations that describe numbers or relationships

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

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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

F.BF Building Functions

F.BF.A. Build a function that models a relationship between two quantities

1. Write a function that describes a relationship between two quantities. ★

   a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

S.ID Interpreting Categorical and Quantitative Data

S.ID.B. Summarize, represent, and interpret data on two categorical and quantitative variables

6. Represent data on two quantitative variables on a scatter plot and describe how the variables are related.

a. Fit a function to the data (including with the use of technology); use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.

b. Informally assess the fit of a function by plotting and analyzing residuals, including with the use of technology.

c. Fit a linear function for a scatter plot that suggests a linear association.

S.ID.C. Interpret linear models

7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

9. Distinguish between correlation and causation.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them
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Interdisciplinary Connections

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Learning Targets	
Unit Essential Questions: • What can a function tell you about the relationship that it represents? • What does the slope of a line tell us about the relationship between two variables? • Why are linear equations useful for modeling real-world situations with a constant rate of change?	**Unit Enduring Understandings:** • Linear equations can be represented in multiple forms such as slope-intercept form, point-slope form, and standard form, each useful in different contexts. • The slope of a linear equation represents the rate of change and indicates the steepness and direction of the line.

• How can writing and interpreting linear equations help us analyze trends and make predictions?	• A linear equation describes a constant rate of change between two variables, which can model real-world relationships. • Understanding how to interpret and write linear equations enables solving problems that involve linear relationships, including predicting values and analyzing trends. • Linear equations can be used to model real-life situations such as budgeting, distance-rate-time problems, and proportional relationships.
Vocabulary: Absolute value function, arithmetic sequence, common difference, constant function, dilation, family of graphs, greatest integer function, identity function ,interval, nth term of a sequence, parameter, parent function, piecewise-defined function, piecewise linear function, rate of change, reflection, sequence, slope, step function, term of a sequence, transformation, translation, vertex	
Students will be able to: • Create linear equations in slope-intercept form (A.CED.2, S.ID.7) • Create linear equations in point-slope and standard form (A.CED.2, A.CED.3) • Use scatter plots to make and evaluate predictions (S.ID.6) • Determine if a relationship demonstrates correlation or causation (S.ID.9) • Use best-fit lines and correlation coefficients to determine how well linear functions fit sets of data (S.ID.6, S.ID.8)	
Learning Activities:	

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    - Close
        - Reflect
        - Test Practice

    - Module Assessments
- ALEKS

- **A.CED.A.3 Climate Change Example**: Students may represent constraints describing the economic impact of climate change by equations, inequalities, and/or by systems of inequalities, and interpret solutions as viable or nonviable options.
- **S.ID.B.6a Climate Change Example:** Students may use linear or exponential functions fitted to geoscience data to solve problems and analyze the results from global climate models to make an evidence-based forecast of the current rate of global climate change.

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
Summative Assessments: Cumulative Assessments
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Unit 6

Desired Results

Unit 6: Linear Inequalities

Unit Summary: In this unit, students build on their knowledge of linear equations to solve and graph linear inequalities. They begin with one-step inequalities, learning how to isolate variables and interpret solutions. The module then progresses to multi-step inequalities, including those that require applying the distributive property and combining like terms. Students also explore compound inequalities (using "and" / "or" statements) and absolute value inequalities, understanding how these differ from equations in terms of solution sets. Emphasis is placed on graphing solution sets on number lines and using inequalities to model real-world situations, such as budgeting and constraints in problem-solving.

Learning Standards

NJSLS Math:

A.CED Creating Equations ★

A.CED.A Creating Equations that describe numbers or relationships

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.
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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.REI Reasoning with Equations and Inequalities

A.REI. B Solve equations and inequalities in one variable

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

A.REI. D. Represent and solve equations and inequalities graphically

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

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Learning Targets	
Unit Essential Questions: • What can writing and solving inequalities help you solve problems in the real world? • What does the solution set of a linear inequality tell us, and how can it be represented? • In what ways can linear inequalities be used to model and solve real-world problems involving limits and conditions? • Why is it important to understand the difference between equations and inequalities when interpreting solutions?	**Unit Enduring Understandings:** • Linear inequalities represent relationships where one quantity is greater than or less than another, rather than equal. • The solution set of a linear inequality includes all values that make the inequality true, often represented as a range or region on a number line or coordinate plane. • Linear inequalities are essential for modeling real-world situations involving constraints and limits, such as budgeting or resource allocation.
Vocabulary: boundary, closed half-plane, compound inequality, half-plane, inequality, intersection, open	

half-plane, set-builder notation, union

Students will be able to:

- Solve inequalities by using addition, subtraction, multiplication, and division (A.CED.1, A.REI.3)
- Solve inequalities by using more than one step (A.CED.1, A.REI.3)
- Write and solve combinations of two inequalities joined by “and” or “or” (A.CED.1, A.CED.3)
- Solve absolute value inequalities (A.CED.1, A.CED.3)
- Graph linear inequalities on the coordinate plane (A.CED.3, A.REI.12)

Learning Activities:

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        - Exit Ticket
        - Practice
    - Close
        - Reflect
        - Test Practice
        - Module Assessments
- ALEKS

- **A.CED.A.3 Climate Change Example**: Students may represent constraints describing the economic impact of climate change by equations, inequalities, and/or by systems of inequalities, and interpret solutions as viable or nonviable options.
- **A.CED.A.1** Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.

Assessment Evidence
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Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts - Personal Glossary - Extended Time - Simplified/Verbal Instructions - Frequent Breaks - Visual learning, including graphic organizers - Use of cognates to increase comprehension - Teacher modeling - Pairing students with beginning English language skills with students who have more advanced English language skills - Scaffolding - Word walls - Think-pair-share - Cooperative learning groups Alternate or reduced work within Digital Platforms such as Math IXL, Delta Math, and Link It assignments

Students at Risk of Failure

- Home/School Connection - Alternative Assessments - Learning Contracts - Homogenous Grouping - Supplemental Instruction - Think-Pair-Share by Readiness - Homework Options - Differentiated Online Practice - Leveled Rubrics - Tiered Level of Supports - Tiered Activities - Small Group Instruction - Work Alone Choice - Group Work Choice Alternate or reduced work within Digital Platforms such as Math IXL, Delta Math, and Link It assignments -Opportunities for make-up work or reduce number of assignments - Provide access to extra help when possible

Students with 504 Plans

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan. 504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way. Students' accommodations are outlined in their individual 504 plan. -

Specific Strategies and Practices that Support Gifted & Talented Students

It is critical that all teachers are able to recognize a high-ability student who may need more depth and complexity in instruction.

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-Enrichment/Extension Activities within Digital Platforms such as Math IXL, Delta Math, and Link It assignments

Unit 7

Desired Results

Unit 7: Systems of Linear Equations and Inequalities

Unit Summary: This unit introduces students to systems of linear equations and inequalities. They explore multiple methods for solving systems of equations—graphing, substitution, and elimination—selecting the most appropriate strategy based on the problem. Students learn to interpret solutions that may be unique, infinite, or nonexistent. The module extends to systems of linear inequalities, where students graph solution regions and identify feasible solutions. Real-world applications, such as business profit maximization and resource allocation, are used to contextualize these concepts, helping students understand the practical importance of systems in decision-making.

Learning Standards

NJSLS Math:

A.CED Creating Equations ★

A.CED.A Creating Equations that describe numbers or relationships

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. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A.REI Reasoning with Equations and Inequalities

A.REI. C. Solve systems of equations

6. Solve systems of linear equations algebraically (include using the elimination method) and graphically, focusing on pairs of linear equations in two variables.

A.REI.D. Represent and solve equations and inequalities graphically

11. Explain why the *x*-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = f(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions. ★
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

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

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)*:

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task. 9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.
Computer Science & Design Thinking (*CS & DT*): 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.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets	
Unit Essential Questions: • How are systems of equations useful in the real world? • What does the solution to a system of linear equations represent, and how can it be found? • Why are there different methods for solving systems of equations, and how do we choose the most effective one? • How do systems of equations and inequalities model situations that involve finding common or optimal solutions?	**Unit Enduring Understandings:** • A system of linear equations consists of two or more linear equations with the same set of variables, and the solution to the system is the point(s) where the graphs intersect. • There are multiple methods for solving systems of linear equations, including graphing, substitution, and elimination, each useful depending on the problem context. • Graphing systems of inequalities helps identify feasible solution regions in real-world problems involving multiple constraints, such

	as budgeting, resource allocation, and optimization.

Vocabulary: consistent, dependent, elimination, inconsistent, independent, substitution, system of equations, system of inequalities

Students will be able to:

- Solve systems of equations by graphing (A.REI.6, A.REI.11)
- Solve systems of equations by using substitution (A.CED.3, A.REI.6)
- Solve systems of equations by elimination with addition or subtraction (A.CED.3, A.REI.6)
- Solve systems of equations by elimination with multiplication (A.REI.5, A.REI.6)
- Solve systems of inequalities by graphing (A.CED.3, A.REI.12)

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
- Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated.
- Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and based on their diagnostic results.
- Small Group Practice, Small Group Intervention, Small Group Activities, Differentiated Instruction, Enrichment Practice, Communicators, Thinking Tasks
- **Reveal Aligned Practice:**
    - Launch

        - Diagnostic Assessment
        - Video
        - Ignite!
        - Foldables
    - Lessons
        - Launch
        - Explore
        - Learn and Examples
        - Check
        - Exit Ticket
        - Practice
    - Close
        - Reflect
        - Test Practice
        - Module Assessments
- ALEKS

- **A.CED.A.3 Climate Change Example**: Students may represent constraints describing the economic impact of climate change by equations, inequalities, and/or by systems of inequalities, and interpret solutions as viable or nonviable options.

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
Summative Assessments: Cumulative Assessments
Common Benchmark Assessments: Common Unit Assessments, LinkIt! Benchmarks
Alternative Assessments: Modified Unit Assessments, Modified Projects, Other Modified Assessments

Core Instructional & Supplemental Materials
Math Program: McGraw Hill ConnectEd - Reveal Algebra 1, ALEKS (Assessment and Learning in Knowledge Spaces)
DeltaMath, Khan Academy, Desmos, Graphing Calculators
LinkIt! Benchmarks, LinkIt! Test Bank

Accommodations and Modifications: Students with Disabilities, English Language Learners, Students at Risk of Failure, Students with 504s, Gifted & Talented Students

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Specific Strategies and Practices that Support Gifted & Talented Students

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Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Unit 8

Desired Results

Unit 8: Exponents and Roots

Unit Summary: This unit covers the fundamental laws of exponents, including the product, quotient, and power rules, as well as zero and negative exponents. Students practice simplifying expressions involving integer exponents and learn how to apply these laws consistently. The module introduces exponential functions, highlighting their distinctive growth and decay patterns compared to linear functions. Students analyze graphs of exponential functions, explore common applications such as population growth and radioactive decay, and solve basic exponential equations. The concept of scientific notation is also integrated to strengthen students' understanding of large and small numbers.

Learning Standards

NJSLS Math:

A.SSE Seeing Structure in Expressions
A.SSE.A Interpret the structure of expressions

2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $\left(x^2\right)^2 - \left(y^2\right)^2$, thus recognizing it as a difference of squares that can be factored as $\left(x^2 - y^2\right)\left(x^2 + y^2\right)$.

A.SSE.B Write expressions in equivalent forms to solve problems

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★

c. Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $\left(1.15^{1/12}\right)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

N.RN The Real Number System

N.RN.A. Extend the properties of exponents to rational exponents

3. Simplify radicals, including algebraic radicals (e.g. $\sqrt[3]{54} = 3\sqrt[3]{2}$, simplify $\sqrt{32x^2}$).

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them
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3. Construct viable arguments and critique the reasoning of others
4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
8. Look for and express regularity in repeated reasoning

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)*:

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task.

9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.

Computer Science & Design Thinking (*CS & DT*):

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.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- How do you perform operations and represent real-life situations with exponents?
- How do the laws of exponents help us simplify and solve mathematical expressions and equations?
- What is the relationship between exponents and roots, and how do they help us solve problems involving powers?
- In what ways do the properties of exponents and roots apply to both numbers and variables?

Unit Enduring Understandings:

- Exponents represent repeated multiplication, and understanding the laws of exponents is essential for simplifying expressions.
- Roots are the inverse operations of exponents and help solve equations involving powers.
- Simplifying expressions with exponents and roots often requires rewriting radicals as fractional exponents and vice versa.
- Real-world problems frequently involve exponential growth or decay, and understanding how to manipulate exponents is key to modeling and solving these problems.
- The properties of exponents and roots apply to both numerical and algebraic expressions, enabling simplification and solving equations.

Vocabulary: cube root, exponential equation, index, monomial, negative exponent, nth term, perfect cube, perfect square, principal square root, radical expression, radicand, rational exponent, square root	
Students will be able to: ● Apply the multiplication properties of exponents to simplify expressions (A.SSE.2, A.SSE.3c) ● Apply the division properties of exponents to simplify expressions (A.SSE.2, A.SSE.3c) ● Apply the properties of zero and negative exponents to simplify expressions (A.SSE.2) ● Simplify radical expressions (N.RN.3)	
Learning Activities: ● DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students. ● Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated. ● Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and based on their diagnostic results. ● Small Group Practice, Small Group Intervention, Small Group Activities, Differentiated Instruction, Enrichment Practice, Communicators, Thinking Tasks ● **Reveal Aligned Practice:** ○ Launch ■ Diagnostic Assessment	

        - Video
        - Ignite!
        - Foldables
    - Lessons
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Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
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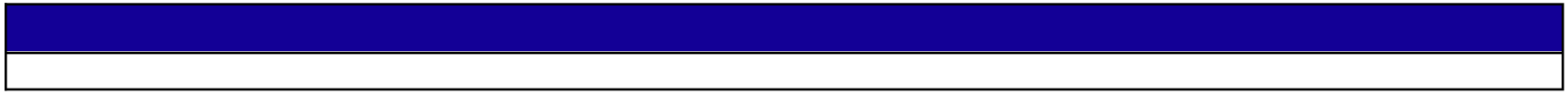
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Unit 9

Desired Results

Unit 9: Polynomials

Unit Summary: This unit introduces students to polynomials and their properties. Students learn to classify polynomials by degree and number of terms, and perform operations including addition, subtraction, and multiplication of polynomials. The module covers special products such as the square of a binomial and the difference of squares, helping students recognize patterns for efficient computation. Students also explore how to write polynomial expressions in standard form and understand how polynomials can model real-world situations.

Learning Standards

NJSLS Math:

A.SSE Seeing Structure in Expressions
A.SSE.A Interpret the structure of expressions

1. Interpret expressions that represent a quantity in terms of its context. ★

    a. Interpret parts of an expression, such as terms, factors, and coefficients.

2. Use the structure of an expression to identify ways to rewrite it. For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.

A.APR Arithmetic with Polynomials and Rational Expressions

A.APR.A. Perform arithmetic operations on polynomials

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.

Standards for Mathematical Practice

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3. Construct viable arguments and critique the reasoning of others
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Learning Targets	
Unit Essential Questions: • How can you perform operations on polynomials and use them to represent real-life situations?	**Unit Enduring Understandings:** • Understanding the degree of a polynomial helps classify and analyze its behavior and the shape of its graph. • Polynomial functions can model a variety of real-world phenomena with nonlinear relationships. • Understanding how to manipulate polynomials is foundational for more advanced topics, including quadratic functions, rational expressions, and calculus.
Vocabulary: binomial, degree of monomial, degree of polynomial, difference of two squares, factoring, factoring by grouping, leading coefficient, perfect square trinomials, polynomials, prime polynomial, quadratic expression, standard form of a polynomial, trinomial	
Students will be able to:	

- Add and subtract polynomials by combining like terms (A.SSE.1a, A.APR.1)
- Multiply polynomials by monomials (A.APR.1)
- Multiply polynomials by polynomials (A.APR.1)
- Multiply binomials by applying special patterns (A.APR.1)
- Factor polynomials by applying the distributive property (A.SSE.2)
- Factor trinomials into two binomials (A.SSE.2)
- Factor polynomials by using special patterns (A.SSE.2)

Learning Activities:

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Unit 10

Desired Results

Unit 10: Quadratic Functions

Unit Summary: This unit introduces quadratic functions, emphasizing their parabolic graphs, vertices, and axes of symmetry. Students learn how to graph quadratic functions using vertex form and standard form equations. They develop strategies to solve quadratic equations through factoring, completing the square, and applying the quadratic formula. The discriminant is introduced as a tool to determine the nature and number of solutions. Practical applications, such as projectile motion and area problems, reinforce the connection between quadratic functions and real-life phenomena.

Learning Standards

NJSLS Math:

F.IF Interpreting Functions

F.IF.B Interpret functions that arise in applications in terms of the context

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.C Analyze functions using different representations

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. Graph linear and quadratic functions and show intercepts, maxima, and minima.

8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

    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.

F.BF Building Functions

F.BF.A. Build a function that models a relationship between two quantities

1. Write a function that describes a relationship between two quantities. ★

    b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

F.BF.B. Build new functions from existing functions

3. Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.SSE Seeing Structure in Expressions
A.SSE.B Write expressions in equivalent forms to solve problems

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★

    a. Factor a quadratic expression to reveal the zeros of the function it defines.

    b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A.REI Reasoning with Equations and Inequalities

A.REI. B. Solve equations and inequalities in one variable

4. Solve quadratic equations in one variable.

    a. Use the method of completing the square to transform any quadratic equation in *x* into an equation of the form that has the same solutions. Derive the quadratic formula from this form.

b. Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

A.CED Creating Equations ★

A.CED.A Creating Equations that describe numbers or relationships

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.

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

F.LE Linear and Exponential Models

F.LE.A. Construct and compare linear and exponential models and solve problems

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.

3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.

Standards for Mathematical Practice

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

Interdisciplinary Connections

Career Readiness, Life Literacies, & Key Skills *(CLKS)*:

9.4.12.CI.1 Demonstrate the ability to reflect, analyze, and use creative skills and ideas.

9.4.12.CT.2: Explain the potential benefits of collaborating to enhance critical thinking and problem solving

9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task.

9.4.12.TL.3 Analyze the effectiveness of the process and quality of collaborative environments.

Computer Science & Design Thinking (*CS & DT***):**

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.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- Why is it helpful to have different methods to analyze quadratic functions and solve quadratic equations?
- How do different forms of a quadratic function help us understand and solve real-world problems?
- What does the vertex form of a quadratic function tell us about its graph and real-world meaning?

Unit Enduring Understandings:

- Quadratic functions can be modeled and represented in multiple forms — standard form, vertex form, and factored form — each providing different insights into the function's properties.
- The vertex form of a quadratic function reveals the maximum or minimum value, making it easier to analyze the function's range and optimal values in real-world contexts.
- Quadratic functions model many real-world phenomena, such as projectile motion, area problems, and optimization scenarios.

Vocabulary: axis of symmetry, coefficient of determination, completing the square, curve fitting, discriminant, double root, maximum, minimum, parabola, quadratic equation, quadratic function, standard form of a quadratic function, vertex form

Students will be able to:

- Analyze and graph quadratic functions (F.IF.4, F.IF.7a)
- Identify the effects of transformations of the graphs of quadratic functions (F.IF.7a, F.BF.3)
- Write quadratic equations and solve them by graphing (F.IF.7a, F.IF.8a)

- Solve quadratic equations by factoring and using the square root property (A.SSE.3a, A.REI.4b, F.IF.8a)
- Solve quadratic equations by completing the square (A.SSE.3b, A.REI.4, F.IF.8a)
- Solve quadratic equations by using the quadratic formula (A.CED.1, A.REI.4b)
- Use the discriminant to determine the number of solutions of a quadratic equation (A.REI.4a)
- Model data with linear, exponential and quadratic functions (F.LE.1, F.LE.3)

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
- Khan Academy's platform allows customised learning experiences, catering to each student's unique pace and style. Engagement Through Interactive Content: The engaging videos and interactive exercises keep students interested and motivated.
- Students will work in DeltaMath, and Khan Academy completing recommended skills from their teacher and based on their diagnostic results.
- Small Group Practice, Small Group Intervention, Small Group Activities, Differentiated Instruction, Enrichment Practice, Communicators, Thinking Tasks
- **Reveal Aligned Practice:**
    - Launch
        - Diagnostic Assessment
        - Video
        - Ignite!
        - Foldables
    - Lessons
        - Launch

        - Explore
        - Learn and Examples
        - Check
        - Exit Ticket
        - Practice
    - Close
        - Reflect
        - Test Practice
        - Module Assessments
- ALEKS

- **A.CED.A.1** Climate Change Example: Students may create equations and/or inequalities to represent the economic impact of climate change.

Assessment Evidence
Formative Assessments: Quizzes, Warm-Ups, Exit Passes, Communicators, Classwork
Summative Assessments: Cumulative Assessments
Common Benchmark Assessments: Common Unit Assessments, LinkIt! Benchmarks
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Accommodations and Modifications:
Students with Disabilities, English Language Learners,
Students at Risk of Failure, Students with 504s, Gifted & Talented Students

Specific Strategies and Practices that Support Students with Disabilities:

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Specific Strategies and Practices that Support English Language Learners

English language learner (ELL) is a national-origin-minority student who is limited-English-proficient. This term is often preferred over limited-English-proficient (LEP) as it highlights accomplishments rather than deficits.

- Pre-teaching of vocabulary and concepts - Personal Glossary - Extended Time - Simplified/Verbal Instructions - Frequent Breaks - Visual learning, including graphic organizers - Use of cognates to increase comprehension - Teacher modeling - Pairing students with beginning English language skills with students who have more advanced English language skills - Scaffolding - Word walls - Think-pair-share - Cooperative learning groups Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Students at Risk of Failure

- Home/School Connection - Alternative Assessments - Learning Contracts - Homogenous Grouping - Supplemental Instruction - Think-Pair-Share by Readiness - Homework Options - Differentiated Online Practice - Leveled Rubrics - Tiered Level of Supports - Tiered Activities - Small Group Instruction - Work Alone Choice - Group Work Choice Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

-Opportunities for make-up work or reduce number of assignments - Provide access to extra help when possible

Students with 504 Plans

Teachers are responsible for implementing designated services and strategies identified on a student's 504 Plan.
504 plans are formal plans that schools develop to give kids the support they need and covers any condition that limits daily activities in a major way. Students' accommodations are outlined in their individual 504 plan. -

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Alternate or reduced work within Digital Platforms such as ALEKS, ConnectEd, Delta Math, and Link It assignments

Unit 11

Desired Results

Unit 11: Exponential Functions

Unit Summary: This unit focuses on exponential functions, emphasizing the difference between linear and exponential growth. Students learn to recognize exponential functions from tables, graphs, and equations.. They practice graphing these functions, noting key features like rapid increase or decrease and the horizontal asymptote. The module also covers transformations such as shifts, reflections, and stretches that change the shape or position of the graph. Real-world applications play a big role, with examples like population growth, radioactive decay, and compound interest helping students see how exponential functions model real situations. By working through problems, students build skills in writing exponential functions from descriptions, interpreting their parameters, and making predictions.

Learning Standards

NJSLS Math:

F.IF Interpreting Functions

F.IF.C. Analyze functions using different representations

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

    e. Graph exponential and logarithmic functions, showing intercepts and end behavior.

8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

    b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (.97)^t$, $y = (1.01)^{12t}$, $y = (1.01)^{\frac{t}{10}}$, and classify them as representing exponential growth or decay.

F.LE Linear and Exponential Models

F.LE.A. Construct and compare linear and exponential models and solve problems

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

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

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

F.LE.B. Interpret expressions for functions in terms of the situation they model

5. Interpret the parameters in a linear or exponential function in terms of a context.

F.BF Building Functions

F.BF.B Build new functions from existing functions

3. Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

A.SSE Seeing Structure in Expressions
A.SSE.B. Write expressions in equivalent forms to solve problems

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. ★

    c. Use the properties of exponents to transform expressions for exponential functions. For example, the expression 1.15^t can be rewritten as $\left(1.15^{1/12}\right)^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.

Standards for Mathematical Practice

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4. Model with mathematics
5. Use appropriate tools strategically
6. Attend to precision
7. Look for and make use of structure
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Interdisciplinary Connections

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8.1.12.DA.5: Create data visualizations from large data sets to summarize, communicate, and support different interpretations of real-world phenomena.

8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product.

Learning Targets

Unit Essential Questions:

- When and how can exponential functions represent real-world situations?
- How do exponential functions model situations involving growth or decay at constant relative rates?
- What key characteristics distinguish exponential functions from linear functions?
- Why is it important to understand different forms of exponential functions when solving and interpreting real-world problems?

Unit Enduring Understandings:

- Exponential functions model real-world situations where quantities grow or decay at constant relative rates.
- The key characteristics of exponential functions include their base (growth factor), initial value, and rate of change, which differentiate them from linear functions. Recognizing the role of the base and initial value in the function's behavior helps in graphing and modeling situations accurately.
- Exponential functions can be expressed in different forms, including standard form and transformations, and understanding these forms aids in solving and interpreting problems.

Vocabulary: asymptote, common ratio, compound interest, explicit formula, exponential decay function, exponential function, exponential growth function, geometric sequence, recursive formula

Students will be able to:

- Graph exponential functions (F.IF.7e, F.LE.1c, F.LE.5)
- Identify the effects of transformations on the graphs of exponential functions (F.IF.7e, F.BF.3)
- Create exponential functions and solve problems involving exponential growth and decay (F.LE.2, F.LE.5)

- Use properties of exponents to transform expressions for exponential functions (A.SSE.3c, F.IF.8b)
- Write and graph equations of geometric sequences (F.BF.2, F.LE.2)

Learning Activities:

- DeltaMath practice based on each lesson. DeltaMath includes a variety of interactive features and student response types which enable teachers to effectively scaffold and differentiate concepts to meet the needs of all students.
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Assessment Evidence
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Unit 12

Desired Results

Unit 12: Statistics

Unit Summary: This unit focuses on understanding and interpreting data using statistical methods. Students learn to analyze data sets by calculating measures of central tendency (mean, median, mode) and measures of variability (range, interquartile range). The unit covers creating and interpreting various data displays such as histograms, box plots, and scatter plots. Students also explore concepts of correlation and causation, learning how to describe relationships between variables and assess the strength and direction of associations. Real-world applications are emphasized to help students make informed decisions based on data.

Learning Standards

NJSLS Math:

N.Q Quantities ★

N.Q.A. Reason quantitatively and use units to solve problems

2. Define appropriate quantities for the purpose of descriptive modeling.

S.ID Interpreting Categorical and Quantitative Data

S.ID. A. Summarize, represent, and interpret data on a single count or measurement variable

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Standards for Mathematical Practice

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Learning Targets	
Unit Essential Questions: • How do you summarize and interpret data? • How do different types of graphs help us understand data distribution and relationships? • How can patterns and trends in data be used to make inferences and predictions? • How does statistical reasoning help us make informed decisions in real-world situations?	**Unit Enduring Understandings:** • Data can be represented and analyzed using various statistical measures to summarize and describe patterns. • Different types of graphs and visual representations (such as histograms, box plots, and scatter plots) provide insights into data distribution and relationships. • Understanding and calculating measures of variability and spread are essential to describe the consistency and reliability of data.

	• Statistical reasoning involves making inferences and predictions based on data patterns and trends, including understanding the relationship between variables.. • Sampling and data collection methods impact the accuracy and validity of statistical conclusions. • Statistics provide a way to make informed decisions and solve problems based on quantitative information in real-world contexts.
Vocabulary: bar graph, bias, box plot, categorical data, conditional relative frequency, distribution, dot plot, extreme values, five-number summary, histogram, interquartile range, joint frequencies, linear, transformation, lower quartile, marginal frequencies, measurement data, measures of center, measures of spread, median, negatively skewed distribution, outlier, percentile, population, positively skewed distribution, quartile, range, relative frequency, sample, standard deviation, statistic, symmetric distribution, two-way frequency table, two-way relative frequency table, univariate data, upper quartile, variable, variance	
Students will be able to: • Represent sets of data using measures of center and percentiles • Represent data using dot plots, histograms and bar graphs (N.Q.1, S.ID.1) • Analyze data collection and representation methods to determine bias or identify misleading information (N.Q.1) • Represent sets of data using measure of spread (N.Q.1, S.ID.1)	

- Analyze the shapes of distributions to determine appropriate statistics and identify extreme data points (S.ID.3)
- Use statistics appropriate to the shapes of the distributions to compare the measures of center and spread of two data sets (S.ID.2, S.ID.3)

Learning Activities:

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        - Exit Ticket
        - Practice
    - Close
        - Reflect
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- **S.ID.A.1 Climate Change Example:** Students may represent geoscience data, with plots on the real number line, as they analyze results from global climate models.

Assessment Evidence
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Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider

analogous problems and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary. Older students might, depending on the context of the problem, transform algebraic expressions or change the viewing window on their graphing calculator to get the information they need. Mathematically proficient students can explain correspondences between equations, verbal descriptions, tables, and graphs or draw diagrams of important features and relationships, graph data, and search for regularity or trends. Younger students might rely on using concrete objects or pictures to help conceptualize and solve a problem. Mathematically proficient students check their answers to problems using a different method, and they continually ask themselves, “Does this make sense?” They can understand the approaches of others to solving complex problems and identify correspondences between different approaches.

2. Reason abstractly and quantitatively

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to *decontextualize*—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to *contextualize*, to pause as needed during the manipulation process to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3. Construct viable arguments and critique the reasoning of others

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is. Elementary students can construct arguments using concrete referents such as objects, drawings, diagrams, and actions. Such arguments can make sense and be correct, even though they are not generalized or made formal until later grades. Later, students learn to determine domains to which an argument applies. Students at all grades can listen or read

the arguments of others, decide whether they make sense, and ask useful questions to clarify or improve the arguments.

4. Model with mathematics

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace. In early grades, this might be as simple as writing an addition equation to describe a situation. In middle grades, a student might apply proportional reasoning to plan a school event or analyze a problem in the community. By high school, a student might use geometry to solve a design problem or use a function to describe how one quantity of interest depends on another. Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5. Use appropriate tools strategically

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and their limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. Mathematically proficient students at various grade levels are able to identify relevant external mathematical resources, such as digital content located on a website, and use them to pose or solve problems. They are able to use technological tools to explore and deepen their understanding of concepts.

6. Attend to precision

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign

consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, express numerical answers with a degree of precision appropriate for the problem context. In the elementary grades, students give carefully formulated explanations to each other. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7. Look for and make use of structure

Mathematically proficient students look closely to discern a pattern or structure. Young students, for example, might notice that three and seven more is the same amount as seven and three more, or they may sort a collection of shapes according to how many sides the shapes have. Later, students will see 7×8 equals the well-remembered$7 \times 5 + 7 \times 3$, in preparation for learning about the distributive property. In the expression $x^2 + 9x + 14$ older students can see the 14 as $2 \times 7$and the 9 as $2 + 7$. They recognize the significance of an existing line in a geometric figure and can use the strategy of drawing an auxiliary line for solving problems. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects. For example, they can see $5 - 3(x - y)^2$ as 5 minus a positive number times a square and use that to realize that its value cannot be more than 5 for any real numbers x and y.

8. Look for and express regularity in repeated reasoning

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. Upper elementary students might notice when dividing 25 by 11 that they are repeating the same calculations over and over again, and conclude they have a repeating decimal. By paying attention to the calculation of slope as they repeatedly check whether points are on the line through (1, 2) with slope 3, middle school students might abstract the equation $\frac{(y-2)}{(x-1)} = 3$. Noticing the regularity in the way terms cancel when expanding $(x - 1)(x + 1)$, $(x - 1)\left(x^2 + x + 1\right)$ and $(x - 1)\left(x^3 + x^2 + x + 1\right)$ might lead them to the general formula for the sum of a geometric series. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

Algebra 1 Course Content Framework and Content Emphases

Students should spend the majority of their time on the major work of the grade (**M**). Supporting work (**S**) and, where appropriate, additional work (**A**) can engage students in the major work of the grade

Number and Quantity Conceptual Category

Quantities (N.Q)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Reason quantitatively and use units to solve problems	1, 2*, 3	S

Algebra Conceptual Category

Seeing Structure in Expressions (A.SSE)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Interpret the structure of expressions	1	M
B. Write expressions in equivalent forms to solve problems	3a–b, 3c*	S

Creating Equations (A.CED)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Create equations that describe numbers or relationships	1*, 2, 3, 4	M

Reasoning with Equations and Inequalities (A.REI)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Understand solving equations as a process of reasoning and explain the reasoning	1*	M
B. Solve equations and inequalities in one variable	3, 4a, 4b*	M
C. Solve systems of equations	6*	A
D. Represent and solve equations and inequalities graphically	10, 11*, 12	M

Functions Conceptual Category

Interpreting Functions (F.IF)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Understand the concept of function and use function notation	1, 2, 3*	M
B. Interpret functions that arise in applications in terms of the context	4*, 5, 6*	M
C. Analyze functions using different representations	7a, 7b*, 7e*, 8a, 9*	S

Building Functions (F.BF)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Build a function that models a relationship between two quantities	1a*	S
B. Build new functions from existing functions	3*	A

Linear and Exponential Models (F.LE)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Construct and compare linear and exponential models and solve problems	1, 2*, 3	S
B. Interpret expressions for functions in terms of the situation they model	5*	S

Statistics and Probability Conceptual Category

Interpreting categorical and quantitative data (S.ID)

Cluster Letter and Heading	Standard Number	Content Emphasis
A. Summarize, represent, and interpret data on a single count or measurement variable	1*, 2*, 3*	A
B. Summarize, represent, and interpret data on two categorical and quantitative variables	6a–b*, 6c	S

C. Interpret linear models	7, 8, 9	M

Limits and Clarifications for Multi-Course Standards

Mathematics Content Guide for the New Jersey Graduation Proficiency Assessment (NJGPA)

NJ Digital Item Library

High School Mathematics Course Frameworks and Content Emphases - Identifies the standards that are Major, Supporting, and Additional in a core Algebra 1 course