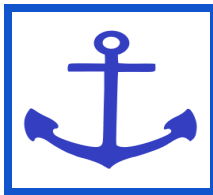


Ocean Academy Charter High School
Algebra 1 Part A Curriculum Guide
Grade: 9-12



Original Adoption:	August 2024
Created by:	Stephen Nichol & Amy Labarca

Ocean Academy Charter High School Algebra 1 Part A Curriculum	
Content Area: Mathematics	
Course Title: Algebra 1 Part A	
Grade Level: 9-12	
Unit Title	Pacing Guide in Days
Unit Plan 1: Modeling with Linear Equation and Inequalities	50 Days
Unit Plan 2: Modeling with Linear Functions Linear Systems and Exponential Functions	40 Days

Ocean Academy Charter High School Unit 1 Overview	
Content Area: Algebra 1 Part A Mathematics	
Unit 1 Title: Modeling with Linear Equations and Inequalities	Duration: 50 Days
Target Course/Grade Level: 9-12	

Introduction/Unit 1 Focus-

- Creating Equations/Reasoning with Equations and Inequalities/ Interpreting Functions/Building Functions
- Reason quantitatively and use units to solve problems
- Solve [linear] equations and inequalities in one variable
- Understand solving equations as a process of reasoning and explain the reasoning
- Create equations that describe numbers or relationships
- Interpret the structure of expressions
- Represent and solve equations graphically
- Summarize, represent, and interpret data on quantitative variables.
- Interpret linear models

Primary interdisciplinary connections: Infused within the unit are connection to the NJSLS for Mathematics, Language Arts Literacy and Technology. <http://nj.gov/education/cccs/>

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A 52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion

C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

1. The instruction shall:
 - (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
 - (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
 - (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

"Twenty-first century themes and skills" means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy."

Disciplinary Concepts for Unit 1.

Career Readiness, Life Literacies, and Key Skills

Critical Thinking

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Creativity and Innovation Computer Science and Design Thinking Impacts of Computing			
Unit 1 Focus Standards (Major Standards) New Jersey Student Learning Standards-Mathematics			
Content Standards with Statement	BIM Resource	Suggested Mathematical Practices	Critical Knowledge and Skills Objectives
N.Q.A.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. N.Q.A.2. Define appropriate quantities for the purpose of descriptive modeling. N.Q.A.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.	1.2, 1.5, 3.4 3.3, 4.1, 5.1, 5.2, 5.3, 5.5, 6.6, 7.7, 8.2, 8.3, 8.6, 9.2, 9.4, 9.5, 10.2, 10.3 4.5, 6.2, 6.4, 8.6, 9.3, 10.1, 10.2	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	LG 1 Solve multi-step problems, using units to guide the solution, interpreting units consistently in formulas and choosing an appropriate level of accuracy on measurement quantities. Develop descriptive models by defining appropriate quantities. Units are associated with variables in expressions and equations in context. Quantities may be used to model attributes of real world situations. Measurement tools have an inherent amount of uncertainty in measurement. ➤ use units to understand real world problems. ➤ use units to guide the solution of multi-step real world problems (e.g. dimensional analysis). ➤ choose and interpret units while using formulas to solve problems. ➤ identify and define appropriate quantities for

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			descriptive modeling. ➤ choose a level of accuracy when reporting measurement quantities.
A.REI.B.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A.REI.A.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method. A.CED.A.4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance R.	1.1, 1.2, 1.3, 1.4, 2.2, 2.3, 2.4, 2.5, 2.6 1.1, 1.2, 1.3, 1.4, 6.5, 9.3, 9.4, 9.5, 10.3	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	LG2 Literal equations can be rearranged using the properties of equality. ➤ solve linear equations with coefficients represented by letters in one variable. ➤ use the properties of equality to justify steps in solving linear equations. ➤ solve linear inequalities in one variable. rearrange linear formulas and literal equations, isolating a specific variable.
A.SSE.A.1. Interpret expressions that represent a quantity in terms of its context. A.SSE.A.1a. Interpret parts of an expression, such as terms, factors, and coefficients.	3.2, 3.3, 3.5, 7.1	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively.	LG3 Interpret terms, factors, coefficients, and other parts of expressions in terms of a context . ➤ identify different parts of an expression, including terms, factors and constants. ➤ explain the meaning of parts of an expression in context.
A.CED.A.1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear functions and quadratic functions, and simple rational and exponential functions.		MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics.	LG4 Equations and inequalities describe relationships. Equations can represent real-world and mathematical problems.

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A.REI.A.1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.	1.1, 1.2, 1.3, 1.4, 6.5, 9.3, 9.4, 9.5, 10.3	MP.7 Look for and make use of structure.	➤ identify and describe relationships between quantities in word problems. ➤ create linear equations in one variable. ➤ create linear inequalities in one variable. ➤ use equations and inequalities to solve real world problems. ➤ explain each step in the solution process.
A.CED.A.2. Create equations in two or more variables to represent relationships between quantities; Graph equations on coordinate axes with labels and scales. N.Q.A.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. A.REI.D.10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). [Focus on linear equations.]	1.2, 1.5, 3.5 3.2, 3.7, 4.7, 6.3, 8.1, 8.3, 10.1, 10.2	MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.7 Look for and make use of structure.	LG5 Equations represent quantitative relationships. ➤ create linear equations in two variables, including those from a context. ➤ select appropriate scales for constructing a graph. ➤ interpret the origin in graphs. ➤ graph equations on coordinate axes, including labels and scales. ➤ identify and describe the solutions in the graph of an equation.
S.ID.B.6. Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. S.ID.B.6a. Fit a function to the data (including the use of	4.4, 4.5	MP.1 Make sense of problems and persevere in solving them.	LG6 LG7 Scatter plots represent the relationship between two variables. Scatter plots can be used to determine the nature of the

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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, quadratic, and exponential models. S.ID.B.6c. Fit a linear function for a scatter plot that suggests a linear association. S.ID.C.7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. S.ID.C.8. Compute (using technology) and interpret the correlation coefficient of a linear fit. S.ID.C.9. Distinguish between correlation and causation.	4.4, 4.5 4.4, 4.5 4.5 4.5	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically.	association between the variables. Linear models may be developed by fitting a linear function to approximately linear data. The correlation coefficient represents the strength of a linear association. ➤ distinguish linear models representing approximately linear data from linear equations representing “perfectly” linear relationships. ➤ create a scatter plot and sketch a line of best fit. ➤ fit a linear function to data using technology. ➤ solve problems using prediction equations. ➤ interpret the slope and the intercepts of the linear model in context. ➤ determine the correlation coefficient for the linear model using technology. ➤ determine the direction and strength of the linear association between two variables.
A.REI.D.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive	5.5, 6.5, 8.6, 9.2, 9.6, 10.3	MP.1 Make sense of problems and persevere in solving them. MP.3 Construct viable arguments and	LG8 LG9 $y = f(x)$, $y = g(x)$ represent a system of equations. Systems of equations can be solved graphically ➤ explain the relationship between the x-coordinate of a point

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approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* [Focus on linear equations.]		critique the reasoning of others. MP.5 Use appropriate tools strategically.	of intersection and the solution to the equation $f(x) = g(x)$ for linear equations $y = f(x)$ and $y = g(x)$. ➤ find approximate solutions to the system by making a table of values, graphing, and finding successive approximations.
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Unit 1 Interdisciplinary Standards [NJSLs ELA](#)

New Jersey Student Learning Standards: Interdisciplinary Connections

RI.CR.9-10.1. Cite a range and thorough textual evidence and make clear and relevant connections, to strongly support an analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text.

RI.MF.9-10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.

L.VL.9-10.3. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9-10 reading and content, including technical meanings, choosing flexibly from a range of strategies.

- A. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
- B. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy).
- C. Analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
- D. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.
- E. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

RI.CT.9-10.8. Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) seminal and informational text of historical and scientific significance, including how they relate in terms of themes and significant concepts.

RI.AA.9-10.7. Describe and evaluate the argument and specific claims in an informational text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.

RI.IT.9-10.3. Analyze how an author unfolds ideas throughout the text, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn

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between them.

Unit 1 New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills

Core Ideas	Performance Expectations (Identified with Standard Number and statement)
The design of this version of the NJSLS-Career Readiness, Life Literacies, and Key Skills is intended to: ➤ There are strategies to improve one's professional value and marketability ➤ foster greater coherence and appropriate progressions across grade bands; ➤ establish meaningful connections among the major areas of study; ➤ Career planning requires purposeful planning based on research, self-knowledge, and informed choices. ➤ An individual's income and benefit needs and financial plan can change over time. ➤ Securing an income involve an understanding of the costs and time in preparing for a career field, interview and negotiation skills, job searches, resume development, prior experience, and vesting and retirement plans. ➤ There are ways to assess a business's feasibility and risk and to align it with an individual's financial goals.	9.2.12.CAP.1: Analyze unemployment rates for workers with different levels of education and how the economic, social, and political conditions of a time period are affected by a recession. 9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment. 9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest 9.2.12.CAP.10: Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans). 9.2.12.CAP.13: Analyze how the economic, social, and political conditions of a time period can affect the labor market. 9.2.12.CAP.14: Analyze and critique various sources of income and available resources (e.g., financial assets, property, and transfer payments) and how they may substitute for earned income. 9.2.12.CAP.21: Explain low-cost and low-risk ways to start a business. 9.2.12.CAP.22: Compare risk and reward potential and use the comparison to decide whether starting a business is feasible.

Unit 1 New Jersey Student Learning Standards: Computer Science and Design Thinking

Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
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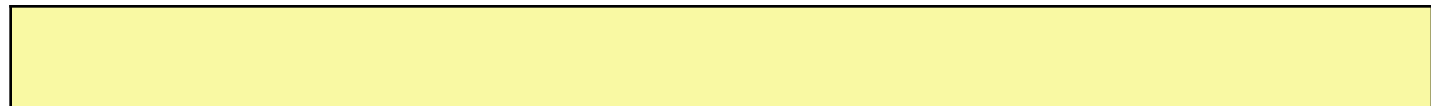
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The design of this version of the NJSLS - Computer Science and Design Thinking is intended to: ➤ Successful troubleshooting of complex problems involves multiple approaches including research, analysis, reflection, interaction with peers, and drawing on past experiences. ➤ Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task. ➤ Promote the development of curricula and learning experiences that reflect the vision and mission of computer science and design thinking as stated in the beginning of this document; ➤ Foster greater coherence and appropriate progressions across grade bands; ➤ Prioritize the important ideas and core processes that are central to computing and have lasting value beyond the classroom ➤ Reflect the habits of mind central to technology that lead to post-secondary success. ➤ Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people. ➤ Large data sets can be transformed, generalized,	9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.). 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6). 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices 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. 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process. 8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. 8.2.12.NT.2: Redesign an existing product to improve form or function.
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simplified, and presented in different ways to influence how individuals interpret and understand the underlying information. ➤ Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization ➤ Engineers use science, mathematics, and other disciplines to improve technology. Increased collaboration among engineers, scientists, and mathematicians can improve their work and designs. Technology, product, or system redesign can be more difficult than the original design.	
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New Jersey Student Learning Standards: Climate Change Mandate	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Individuals select digital tools and design automated processes to collect, transform, generalize, simplify and present large data sets in different ways to influence how other people interpret and understand the underlying information.	8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.



Knowledge and Skills

Unit Learning Targets / Objectives:

Students will be able to:

- Determine if two quantities have a direct variation using graphical, numerical, algebraic, or verbal representations.
- Calculate the constant rate of change in a linear relationship.
- Represent a linear relationship graphically or numerically when provided with its constant rate of change.
- Evaluate whether a relationship shown graphically or numerically is linear by analyzing its rate of change.
- Identify whether a relationship is linear or nonlinear from a numerical sequence with a consistent interval between indices.
- Translate between different representations of an arithmetic sequence.
- Use function notation to express the relationship between input and output values.
- Convert among multiple representations of a linear function.
- Translate between algebraic forms of a linear function through purposeful algebraic manipulation.
- Model real-world situations using linear functions.
- Convert between different forms of a linear equation.
- Interpret the meaning of solutions to a linear equation in two variables.
- Solve for one variable in a two-variable linear equation to maintain the solution set using purposeful manipulation.
- Construct equations for lines that are parallel or perpendicular.
- Interpret the context of a piecewise linear graph.
- Create a piecewise linear graph to represent a given scenario.
- Evaluate a scatterplot to determine if a linear model is appropriate.

- Derive an equation for a trend line that represents a linear pattern in a scatterplot.
 - Use the trend line equation to make predictions within a given context.
 - Convert between different representations of a linear inequality.
 - Identify the solution set of a two-variable linear inequality.
 - Rewrite a linear inequality in terms of one variable using purposeful algebraic manipulation while preserving its solution set.
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Unit Enduring Understandings:

Students will understand that:

- A linear relationship is characterized by a constant rate of change, which is represented as the slope of its graph.
- Linear functions can be expressed in multiple algebraic forms, each highlighting different features of the function.
- Linear models are effective for representing situations involving a constant rate of change or when data shows a generally linear trend.
- The solution to a two-variable linear equation or inequality is any ordered pair that satisfies the equation or inequality.

Unit Essential Questions:

Unit I: Expressions and Equations

- How can the structure of an algebraic expression reveal different strategies for rewriting it?
- In what ways do the properties of real numbers influence the manipulation of expressions?
- How are real number properties applied when solving equations?

- What conditions lead to an equation having no real solutions or solutions that include all real numbers?
- How can verbal or written statements be translated into algebraic equations?
- How are the properties of equality used to solve and simplify equations?
- What determines whether an absolute value equation has one solution, two solutions, or none at all?
- Why is it beneficial to express a literal equation in multiple forms?
- When does a relation qualify as a function?
- What is function notation, and how is it used to represent functions?
- What are the defining characteristics of a function, and how can they be identified?
- How are linear functions represented graphically?
- Why might a linear equation be written in different forms, and what does each form reveal?
- What information can be derived from the equation of a line?
- How can trends and predictions be drawn from data represented in a scatter plot?
- How are the properties of real numbers applied in solving inequalities?
- In what ways are solving linear equations and solving linear inequalities similar or different?

Unit 1: Instructional Plan

Linear relationships are a key concept in both mathematics and the real world, as they provide a simple yet powerful way to understand how two variables change in relation to each other. In this unit, students will explore the characteristics of linear relationships, where the rate of change between two variables remains constant. This constant rate of change, often represented by the slope in a linear equation, plays a crucial role in understanding many real-world scenarios, such as budgeting, speed, and growth over time.

Throughout the unit, students will tackle a variety of problems involving linear relationships. These include contextual problems, where they will apply their understanding of constant rates of change to solve real-world situations. Additionally, students will work with lines on the coordinate plane, where they will interpret the meaning of slope and y-intercept and learn how to graph linear equations. They will also explore arithmetic sequences, which are closely related to linear functions, and discover how these sequences represent constant change from one term to the next.

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An important focus of this unit will be using algebraic expressions and equations to model linear relationships between two quantities. Students will learn how to form and manipulate linear equations, understand the relationship between their graphical and algebraic forms, and solve these equations to find solutions to problems.

By the end of the unit, students will have a deeper understanding of linear functions and equations, both conceptually and practically. They will develop the skills necessary to represent and analyze linear relationships in various contexts, and they will gain an appreciation for how linear functions serve as the foundation for more complex mathematical concepts. This unit not only enhances students' algebraic skills but also helps them see the power and relevance of linear relationships in everyday life and in more advanced areas of mathematics.

Resources & Text	Suggested Activities
➤ enVision Platform ➤ enVision Textbook ➤ Calculator ➤ Graphing Paper	➤ IXL ➤ KhanAcademy ➤ DESMOS ➤ Nearpod ➤ Edpuzzle ➤ Kahoot ➤ Quizizz ➤ Blooket ➤ Kuta Software

Unit 1 Evidence of Student Learning

Formative Assessments:

- Observation
- Homework
- Whiteboards/communicators
- Class Participation
- Think-Pair-Share
- Do-Now
- Notebook Checks
- Writing Prompts
- Exit Tickets
- Classroom Games
- Self-assessment

Summative Assessments

- Chapter/Unit Test
- Quizzes
- Presentations
- Unit Projects

Benchmark Assessments:

- State Standardized Assessments
- Quarterly Benchmark Assessment

Alternative Assessments

- Portfolio Project
- Modified assignments

Performance Tasks: (When appropriate) This type of task demonstrates students transfer of learning and application to a performance task. Think about what you want the students to be able to do at the end of the unit.

Differentiation & Inclusive Support Strategies:

Multilingual Learners:

- Provide guided reading and writing in small groups
- Use visuals, labeled classroom materials, and cognates
- Pre-teach academic vocabulary using sentence and speaking frames
- Integrate WIDA Can Do Descriptors into lesson scaffolding
- Use screen readers, audio tools, and visual glossaries
- Offer extended time and oral/dictated responses
- Integrate culturally relevant texts and technology tools

Students with IEPs or 504 Plans:

- Follow all IEP/504 accommodations and modifications
- Use audio books, large print, or Braille/digital formats
- Provide peer tutoring, scribes, and augmentative communication tools
- Allow oral responses and extended time
- Offer modified assignments, assessments, and guided notes
- Utilize leveled texts and differentiated materials
- Use flexible seating and small group instruction

Students At Risk of Academic Failure:

- Scaffold instruction using visuals, chants, and songs
- Offer modified tasks and flexible grouping
- Use technology to support organization and engagement
- Provide structured routines and clear expectations
- Assign peer mentors and provide goal-setting checklists
- Include culturally relevant content to boost connection
- Embed mini-lessons and tiered intervention strategies

Gifted and Talented Learners:

- Provide open-ended and inquiry-based tasks
- Incorporate Bloom's Taxonomy (analyzing, evaluating, creating)
- Offer choices in content, process, and product
- Use advanced reading lists and tiered assignments
- Encourage discovery and student-designed projects
- Offer enrichment centers and flexible grouping
- Facilitate problem-solving simulations and debriefing

Diversity and Inclusion:

- Celebrate cultural identity through inclusive texts
- Provide alternative formats for assignments and assessments
- Collaborate with ESL staff and use closed captions when available
- Offer wait time and avoid idioms or slang
- Create a nurturing classroom with visual routines and structured expectations
- Encourage family engagement and home language maintenance
- Use word walls and accessible academic vocabulary tools

Unit 1: Supplemental Resources

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Instructional Materials

- enVision Textbook
- enVision Platform
- Graph Paper
- Calculator
- Manipulatives
- Microsoft Excel/PowerPoint
- Teacher-made tests, worksheets, warm-ups, and quizzes
- Computer software to support unit

Supplemental Materials

- IXL
- Khan Academy
- Desmos
- Cool Math
- Nearpod
- Edpuzzle
- Kahoot
- Quizizz
- Blooket
- Kuta Software
- Illustrative Math Activities
 - N.Q.A.1 Runners' World
 - N.Q.A.2 Giving Raises
 - N.Q.A.3 Calories in a Sports Drink
 - A.REI.B.3, A.REI.A.1 Reasoning with linear inequalities
 - A.CED.A.4 Equations and Formulas
 - A.SSE.A.1 Kitchen Floor Tiles
 - A.CED.A.1 Planes and wheat
 - A-CED.A.1 Paying the rent
 - A.REI.A.1 Zero Product Property 1
 - A.CED.A.2 Clear on an Escalator
 - S.ID.B.6,S.ID.C.7-9 Coffee and Crime

Intervention Materials

- Anchor activities
- Flexible grouping
- Varied computer programs
- Mini workshops to re-teach or extend skills
- Think-Pair-Share

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- Games to practice mastery of information and skill
- Multiple levels of questions
- Tiered assignment/ product
- Stations/ Learning Centers
- Organizers
- Alternative Assessments

Ocean Academy Charter High School
Unit 2 Overview

Content Area: Algebra 1 Mathematics

Unit 2 Title: Modeling with Linear Functions, Linear Systems and Exponential Functions

Duration: 40 Days

Target Course/Grade Level: 9-12

Introduction/Unit 2 Focus-

- Solve linear systems of equations
- Create equations that describe numbers or relationships
- Interpret the structure of expressions
- Represent and solve equations and inequalities graphically
- Construct & compare linear & exponential models
- Interpret expressions for functions in terms of the situation
- Build a function that models a relationship between two quantities
- Understand the concept of a function and use function notation
- Interpret functions that arise in applications in terms of the context
- Analyze functions using different representations

Primary interdisciplinary connections: Infused within the unit are connections to the NJSLs for Mathematics, Language Arts Literacy and Technology. <http://nj.gov/education/cccs/>

Disciplinary Concepts for the Unit

Standard 9.1 Personal Financial Literacy

This standard outlines the important fiscal knowledge, habits, and skills that must be mastered in order for students to make informed decisions about personal finance. Financial literacy is an integral component of a student's college and career readiness, enabling students to achieve fulfilling, financially-secure, and successful careers.

Standard 9.2 Career Awareness, Exploration, Preparation and Training

This standard outlines the importance of being knowledgeable about one's interests and talents, and being well informed about postsecondary and career options, career planning, and career requirements.

Standard 9.4 Life Literacies and Key Skills

This standard outline key literacies and technical skills such as critical thinking, global and cultural awareness, and technology literacy* that are critical for students to develop to live and work in an interconnected global economy.

Standard 8.1 Computer Science

Computer Science outlines a comprehensive set of concepts and skills, such as data and analysis, algorithms and programming, and computing systems.

Standard 8.2 Design Thinking

Technology, outlines the technological design concepts and skills essential for technological and engineering literacy. The framework design includes Engineering Design, Ethics and Culture, and the Effects of Technology on the Natural world among the disciplinary concepts

Amistad Law: N.J.S.A. 18A:52:16A-88 Every board of education shall incorporate the information regarding the contributions of African-Americans to our country in an appropriate place in the curriculum of elementary and secondary school students.

Holocaust Law: N.J.S.A. 18A:35-28 Every board of education shall include instruction on the Holocaust and genocide in an appropriate place in the curriculum of all elementary and secondary school pupils. The instruction shall further emphasize the personal responsibility that each citizen bears to fight racism and hatred whenever and wherever it happens.

LGBT and Disabilities Law: N.J.S.A. 18A:35-4.35 A board of education shall include instruction on the political, economic, and social contributions of persons with disabilities and lesbian, gay, bisexual, and transgender people, in an appropriate place in the curriculum of middle school and high school students as part of the district's implementation of the New Jersey Student Learning Standards (N.J.S.A. 18A:35-4.36) A board of education shall have policies and procedures in place pertaining to the selection of instructional materials to implement the requirements of N.J.S.A. 18A:35-4.35.

Diversity and Inclusion

C.18A:35-4.36a Curriculum to include instruction on diversity and inclusion.

1. The instruction shall:
 - (1) highlight and promote diversity, including economic diversity, equity, inclusion, tolerance, and belonging in connection with gender and sexual orientation, race and ethnicity, disabilities, and religious tolerance;
 - (2) examine the impact that unconscious bias and economic disparities have at both an individual level and on society as a whole; and
 - (3) encourage safe, welcoming, and inclusive environments for all students regardless of race or ethnicity, sexual and gender identities, mental and physical disabilities, and religious beliefs.

Asian Americans and Pacific Islanders (AAPI)

Ensures that the contributions, history, and heritage of Asian Americans and Pacific Islanders (AAPI) are included in the New Jersey Student Learning Standards (NJSLS) for Social Studies in kindergarten through Grade 12 (P.L.2021, c.416).

21st Century Themes and Skills

“Twenty-first century themes and skills” means themes such as global awareness; financial, economic, business, and entrepreneurial literacy; civic literacy; health literacy; learning and innovation skills, including creativity and innovation, critical thinking and problem solving, and communication and collaboration; information, media, and technology skills; and life and career skills, including flexibility. Career readiness, life literacies, and key skills education provides students with the necessary skills to make informed career and financial decisions, engage as responsible community members in a digital society, and to successfully meet the challenges and opportunities in an interconnected global economy.”

Disciplinary Concepts for the Unit.

Career Readiness, Life Literacies, and Key Skills

Critical Thinking

Creativity and Innovation

Computer Science and Design Thinking

Impacts of Computing

Unit 2 Focus Standards (Major Standards) [New Jersey Student Learning Standards-Mathematics](#)

Content Standards with Statement	BIM Resource	Suggested Mathematical Practices	Critical Knowledge Concepts	Skills Objectives
A.REI.C.6 Solve systems of linear equations algebraically (include using the elimination method) and graphically, focusing on pairs of linear equations in two variables.	5.1, 5.2, 5.3, 5.4	MP.1 Make sense of problems and persevere in solving them.	LG1 Solve multistep contextual problems by identifying variables, writing equations, and solving systems of linear equations in two variables algebraically and graphically. ➤ identify and define variables representing essential features for the model. ➤ model real world situations by creating a system of linear equations. ➤ solve systems of linear equations using the	
A.CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>	5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7	MP 2 Reason abstractly and quantitatively MP.3 Construct viable arguments and critique the reasoning of others.		
A.REI.C.5 (+) Prove that, given a system of two equations in two	5.3			

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variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.		MP.4 Model with mathematics.	elimination or substitution method. ➤ solve systems of linear equations by graphing. ➤ interpret the solution(s) in context.
A.REI.D.12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. A.CED.A.3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. <i>For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</i>	5.6, 5.7 5.1, 5.2, 5.3, 5.4, 5.5, 5.6, 5.7	MP.1 Make sense of problems and persevere in solving them. MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.5 Use appropriate tools strategically. MP.6 Attend to precision.	LG2 Graph linear inequalities and systems of linear inequalities in two variables and explain that the solution to the system. ➤ model real world situations by creating a system of linear inequalities given a context. ➤ interpret the solution(s) in context.
F.IF.A.1. Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then $f(x)$ denotes the output of f corresponding to the input x. The graph of f is the graph of the equation $y = f(x)$. F.IF.A.2. Use function notation, evaluate functions for inputs in	3.1, 3.3 3.3	MP.2 Reason abstractly and quantitatively MP.6 Attend to precision. MP.7 Look for and make use of structure.	LG3 Explain the definition of a function, including the relationship between the domain and range. Use function notation, evaluate functions and interpret statements in context. $F(x)$ is an element in the range and x is an element in the domain. ➤ use the definition of a function to determine

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their domains, and interpret statements that use function notation in terms of a context.			whether a relationship is a function. ➤ use function notation once a relation is determined to be a function. ➤ evaluate functions for given inputs in the domain. ➤ explain statements involving function notation in the context of the problem.
F.LE.A.1. Distinguish between situations that can be modeled with linear functions and with exponential functions. F.LE.A.1a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. F.LE.A.1b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. F.LE.A.1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another	3.5, 6.3 3.2, 4.1, 4.2, 8.6 6.3, 6.4, 8.6	MP.3 Construct viable arguments and critique the reasoning of others. MP.6 Attend to precision	LG4 Distinguish between and explain situations modeled with linear functions and with exponential functions. Linear functions grow by equal differences over equal intervals. Exponential functions grow by equal factors over equal intervals. ➤ identify and describe situations in which one quantity changes at a constant rate. ➤ identify and describe situations in which a quantity grows or decays by a constant percent. ➤ show that linear functions grow by equal differences over equal intervals. ➤ show that exponential functions grow by equal

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			factors over equal intervals.
F.LE.A.2. Construct linear and exponential functions - including arithmetic and geometric sequences - given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). *[Algebra 1 limitation: exponential expressions with integer exponents] F.IF.A.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. <i>For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.</i>	4.1, 4.2, 4.3, 4.6, 6.3, 6.4, 6.6, 6.7 4.6, 6.6, 6.7	MP 2 Reason abstractly and quantitatively. MP 4. Model with mathematics MP.1 Make sense of problems and persevere in solving them. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.7 Look for and make use of structure.	LG5 Write linear and exponential functions given a graph, table of values, or written description; construct arithmetic and geometric sequences. Sequences are functions, sometimes defined and represented recursively. Sequences are functions whose domain is a subset of integers. ➤ create arithmetic and geometric sequences from verbal descriptions. ➤ create arithmetic sequences from linear functions. ➤ create geometric sequences from exponential functions. ➤ identify recursively defined sequences as functions. ➤ create linear and exponential functions given - a graph; - a description of a relationship; - a table of values.
F.BF.A.1. Write a function that describes a relationship between two quantities. 1a. Determine an explicit expression, a recursive process,	4.1, 4.2, 4.4, 4.6, 6.3, 6.4,	MP 2 Reason abstractly and quantitatively.	LG6 Write explicit expressions, recursive processes and steps for calculation from a context that describes a linear or exponential relationship between two quantities.

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or steps for calculation from a context. A.SSE.A.1. Interpret expressions that represent a quantity in terms of its context A.SSE.A.1a: Interpret parts of an expression, such as terms, factors, and coefficients. A.SSE.A.1b: Interpret complicated expressions by viewing one or more of their parts as a single entity. <i>For example, interpret $P(1+r)^n$ as the product of P and a factor not depending on P.</i>[Algebra 1 limitation: exponential expressions with integer exponents]	6.7, 8.4, 8.5, 8.6 3.2, 3.3, 3.5, 7.1 1.2, 6.4, 7.4	MP.4 Model with mathematics	➤ given a context, write an explicit expressions, a recursive process or steps for calculation for linear and exponential relationships. ➤ interpret parts of linear and exponential functions in context.
A.SSE.B.3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. A.SSE.B.3c. Use the properties of exponents to transform expressions for exponential functions. <i>For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.</i> [Algebra 1: limit to exponential expressions with integer exponents]	6.4	MP.1 Make sense of problems and persevere in solving them. MP 2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.7 Look for and make use of structure	LG7 Use properties of exponents to produce equivalent forms of exponential expressions in one variable. ➤ use the properties of exponents to simplify or expand exponential expressions, recognizing these are equivalent forms.

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F.IF.B.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. <i>Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.</i> <i>*[Focus on exponential functions]</i> F.LE.B.5. Interpret the parameters in a linear or exponential function in terms of a context. F.IF.B.5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. <i>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</i>	3.3, 3.5, 6.3, 8.4, 8.5, 9.2, 10.1, 10.2 3.5, 4.4, 4.5, 6.4 3.2, 3.4	MP.2 Reason abstractly and quantitatively. MP.4 Model with mathematics. MP.6 Attend to precision.	LG8 Sketch graphs of linear and exponential functions expressed symbolically or from a verbal description. Show key features and interpret parameters in context. ➤ given a verbal description of a relationship, sketch linear and exponential functions. ➤ identify intercepts and intervals where the function is positive/negative. ➤ interpret parameters in context. ➤ determine the <i>practical</i> domain of a function.
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F.IF.C.9. Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). <i>For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</i> *[Limit to linear and exponential] F.IF.B.6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph	3.3, 4.2, 6.3, 8.3, 10.1, 10.2 6.4, 8.6, 10.1, 10.2	MP.1 Make sense of problems and persevere in solving them. MP.3 Construct viable arguments and critique the reasoning of others. MP.5 Use appropriate tools strategically. MP.6 Attend to precision. MP.8 Look for and express regularity in repeated reasoning.	LG9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). LG10 Calculate and interpret the average rate of change of a function present symbolically or as a table; estimate the rate of change from a graph. Rate of change of non-linear functions varies. ➤ compare key features of two linear functions represented in different ways. ➤ compare key features of two exponential functions represented in different ways. ➤ calculate the rate of change from a table of values or from a function presented symbolically. ➤ estimate the rate of change from a graph.
F.IF.C.7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.	(a) 3.2, 3.3, 3.4, 3.5, 3.6,	MP.1 Make sense of problems and persevere in solving them. MP.5 Use appropriate	LG11 Graph linear, square root, cube root, and piecewise-defined functions (including step and absolute value functions) expressed symbolically. Graph by hand in simple cases and using technology in more

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F.IF.C.7a. Graph linear and quadratic functions and show intercepts, maxima, and minima. F.IF.C.7b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.	8.1, 8.2, 8.3, 9.2 (b)3.7, 4.7, 10.1, 10.2	tools strategically. MP.6 Attend to precision.	complex cases, showing key features of the graph. Piecewise-defined functions may contain discontinuities. Absolute value functions are piecewise functions. ➤ graph linear, square root, cube root, and piecewise-defined functions. ➤ graph more complicated cases of functions using technology. ➤ identify and describe key features of the graphs of square root, cube root, and piecewise-defined functions .
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Unit 2 Interdisciplinary Standards [NJSL ELA](#)

New Jersey Student Learning Standards: Interdisciplinary Connections

RI.CR.9-10.1. Cite a range and thorough textual evidence and make clear and relevant connections, to strongly support an analysis of multiple aspects of what an informational text says explicitly and inferentially, as well as interpretations of the text.

RI.MF.9-10.6. Analyze, integrate, and evaluate multiple interpretations (e.g., charts, graphs, diagrams, videos) of a single text or text/s presented in different formats (visually, quantitatively) as well as in words in order to address a question or solve a problem.

L.VL.9-10.3. Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grades 9-10 reading and content, including technical meanings, choosing flexibly from a range of strategies.

- A. Use context (e.g., the overall meaning of a sentence, paragraph, or text; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
- B. Identify and correctly use patterns of word changes that indicate different meanings or parts of speech (e.g., analyze, analysis, analytical; advocate, advocacy).
- C. Analyze the cumulative impact of specific word choices on meaning and tone (e.g., how the language of a court opinion differs from that of a newspaper).
- D. Consult general and specialized reference materials (e.g., dictionaries, glossaries, thesauruses), both print and digital, to find the pronunciation of a word or determine or clarify its precise meaning, its part of speech, or its etymology.
- E. Verify the preliminary determination of the meaning of a word or phrase (e.g., by checking the inferred meaning in context or in a dictionary).

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RI.CT.9-10.8. Analyze and reflect on (e.g., practical knowledge, historical/cultural context, and background knowledge) seminal and informational text of historical and scientific significance, including how they relate in terms of themes and significant concepts.

RI.AA.9-10.7. Describe and evaluate the argument and specific claims in an informational text, assessing whether the reasoning is valid and the evidence is relevant and sufficient; identify false statements and reasoning.

RI.IT.9-10.3. Analyze how an author unfolds ideas throughout the text, including the order in which the points are made, how they are introduced and developed, and the connections that are drawn between them.

Unit 2 New Jersey Student Learning Standards: Career Readiness, Life Literacies, and Key Skills

Core Ideas

Performance Expectations

(Identified with Standard Number and statement)

The design of this version of the NJSLS-Career Readiness, Life Literacies, and Key Skills is intended to:

- There are strategies to improve one's professional value and marketability
- Foster greater coherence and appropriate progressions across grade bands;
- Establish meaningful connections among the major areas of study;
- Career planning requires purposeful planning based on research, self-knowledge, and informed choices.
- An individual's income and benefit needs and financial plan can change over time.
- Securing an income involves an understanding of the costs and time in preparing for a career field, interview and negotiation skills, job searches, resume

9.2.12.CAP.1: Analyze unemployment rates for workers with different levels of education and how the economic, social, and political conditions of a time period are affected by a recession.

9.2.12.CAP.4: Evaluate different careers and develop various plans (e.g., costs of public, private, training schools) and timetables for achieving them, including educational/training requirements, costs, loans, and debt repayment.

9.2.12.CAP.7: Use online resources to examine licensing, certification, and credentialing requirements at the local, state, and national levels to maintain compliance with industry requirements in areas of career interest

9.2.12.CAP.10: Identify strategies for reducing overall costs of postsecondary education (e.g., tuition assistance, loans, grants, scholarships, and student loans).

9.2.12.CAP.13: Analyze how the economic, social, and political conditions of a time period can affect the labor market.

9.2.12.CAP.14: Analyze and critique various sources of income and available resources (e.g., financial assets, property, and transfer payments) and how they may substitute for earned income.

9.2.12.CAP.21: Explain low-cost and low-risk ways to start a business.

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development, prior experience, and vesting and retirement plans. ➤ There are ways to assess a business's feasibility and risk and to align it with an individual's financial goals.	9.2.12.CAP.22: Compare risk and reward potential and use the comparison to decide whether starting a business is feasible.
Unit 2 New Jersey Student Learning Standards: <u>Computer Science and Design Thinking</u>	
Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
The design of this version of the NJSLS - Computer Science and Design Thinking is intended to: ➤ Successful troubleshooting of complex problems involves multiple approaches including research, analysis, reflection, interaction with peers, and drawing on past experiences. ➤ Digital tools differ in features, capacities, and styles. Knowledge of different digital tools is helpful in selecting the best tool for a given task. ➤ Promote the development of curricula and learning experiences that reflect the vision and mission of computer science and design thinking as stated in the beginning of this document; ➤ Foster greater coherence and appropriate progressions across grade bands; ➤ Prioritize the important ideas and core processes that are central to computing and have lasting value beyond the classroom	9.4.12.TL.1: Assess digital tools based on features such as accessibility options, capacities, and utility for accomplishing a specified task (e.g., W.11-12.6.). 9.4.12.TL.2: Generate data using formula-based calculations in a spreadsheet and draw conclusions about the data. 9.4.12.TL.3: Analyze the effectiveness of the process and quality of collaborative environments. 9.4.12.TL.4: Collaborate in online learning communities or social networks or virtual worlds to analyze and propose a resolution to a real-world problem (e.g., 7.1.AL.IPERS.6). 8.1.12.CS.4: Develop guidelines that convey systematic troubleshooting strategies that others can use to identify and fix errors 8.1.12.IC.1: Evaluate the ways computing impacts personal, ethical, social, economic, and cultural practices 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. 8.1.12.DA.6: Create and refine computational models to better represent the relationships among different elements of data collected from a phenomenon or process. 8.2.2.ED.2: Collaborate to solve a simple problem, or to illustrate how to build a product using the design process.

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➤ Reflect the habits of mind central to technology that lead to post-secondary success. ➤ Collaborative digital tools can be used to access, record and share different viewpoints and to collect and tabulate the views of groups of people. ➤ Large data sets can be transformed, generalized, simplified, and presented in different ways to influence how individuals interpret and understand the underlying information. ➤ Engineering design is a complex process in which creativity, content knowledge, research, and analysis are used to address local and global problems. Decisions on trade-offs involve systematic comparisons of all costs and benefits, and final steps that may involve redesigning for optimization ➤ Engineers use science, mathematics, and other disciplines to improve technology. Increased collaboration among engineers, scientists, and mathematicians can improve their work and designs. Technology, product, or system redesign can be more difficult than the original design.	8.2.12.ED.3: Evaluate several models of the same type of product and make recommendations for a new design based on a cost benefit analysis. 8.2.12.NT.1: Explain how different groups can contribute to the overall design of a product. 8.2.12.NT.2: Redesign an existing product to improve form or function.
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Core Ideas	Performance Expectations (Identified with Standard Number and Statement)
Individuals select digital tools and design automated processes to collect, transform, generalize, simplify and present large data sets in different ways to influence how other people interpret and understand the underlying information.	8.1.12.DA.1: Create interactive data visualizations using software tools to help others better understand real world phenomena, including climate change.

Unit 2 Knowledge and Skills
Unit 2: Learning Targets / Objectives
<i>Students will be able to...</i> ➤ Estimate the solution of a system of equations using graphs or tables of values. ➤ Determine the number of real solutions in a system of two linear equations. ➤ Identify the point(s) of intersection between the graphs of two functions, f and g. ➤ Solve systems of linear equations using algebraic techniques (e.g., substitution, elimination). ➤ Justify each step in the algebraic process used to solve a system of equations. ➤ Represent and analyze real-world scenarios using systems of linear equations. ➤ Interpret and compare rates of change in a system of linear equations to draw conclusions in context. ➤ Use algebra to verify whether an ordered pair satisfies a system of linear inequalities. ➤ Graph the solution set of a system of two-variable linear inequalities. ➤ Construct models of real-world situations using systems of linear inequalities. Unit 2: Enduring Understandings <i>Students will understand that...</i> ➤ A solution to a system of linear equations or inequalities is an ordered pair that satisfies all components of the system.

- Solving systems involves finding the value(s) that make all equations or inequalities in the system true.
 - Systems of linear equations or inequalities effectively model scenarios involving multiple conditions or constraints, such as resources, goals, or tolerances.
 - The properties of exponents arise from the fundamental rules of multiplication and division.
 - Exponential functions represent constant multiplicative growth or decay over time.
 - Real-life contexts involving exponential change can be modeled using exponential functions.
 - Graphs and tables are valuable tools for approximating solutions to equations that include exponential expressions.
-

Unit 2: Essential Questions

- What are the three main methods for solving systems of equations?
- How can systems of equations and inequalities be applied to model real-life situations?
- In what ways are solving systems of inequalities similar to or different from solving systems of equations?
- When is it most appropriate to use substitution, elimination, or graphing to solve a system?
- What does each region of a graph of a system of inequalities represent in a real-world context?
- How can expressions with exponents be simplified using the laws of exponents?
- How can extremely large or small numbers be expressed more efficiently?
- What are the defining characteristics of exponential functions?
- How can we determine whether a set of data is best modeled by a linear, quadratic, or exponential function?

Unit: 2 Instructional Plan

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In this unit, students will develop a solid understanding of quadratic functions, a key concept in algebra. Quadratic functions differ from linear ones in that they have a changing rate of change. Students will learn that quadratic functions can be represented by equations that involve the square of a variable, leading to a curve when graphed, known as a parabola. These functions are often used to model real-world situations where there is symmetry around a specific point, such as the height of an object in motion or the maximum or minimum values in optimization problems. By grasping this foundational concept of quadratics, students will gain a deeper understanding of nonlinear functions and set the stage for further study of more complex functions, like polynomial and rational functions in Algebra 2.

Along with quadratic functions, students will explore exponent rules. This section builds on concepts from geometric sequences and explores the rules governing multiplication and division with exponents. Rather than simply memorizing these rules, students will be encouraged to understand their derivation and why they work the way they do. For example, students will examine how the product of powers rule (multiplying numbers with the same base) and the quotient of powers rule (dividing numbers with the same base) arise from the properties of exponents and how they can be applied to simplify expressions and solve equations. Understanding these rules conceptually will allow students to apply them with greater ease in future problems.

The unit will culminate in a study of exponential functions, which are used to model real-world situations involving constant multiplicative growth, such as population growth, compound interest, or the spread of diseases. Unlike linear functions, which represent additive growth, exponential functions show how quantities grow or shrink at a constant rate that multiplies over time. Students will examine how exponential growth differs from linear growth and understand the similarities and differences between the two types of functions. By comparing linear and exponential functions, students will see how both can model real-life scenarios, but exponential functions offer a faster and more dramatic rate of change.

Through these explorations, students will not only strengthen their understanding of quadratic and exponential functions but also make connections between these different types of functions and how they apply to real-world situations. By the end of the unit, students will have a clear grasp of how nonlinear functions work and how to apply these functions in both mathematical and real-life contexts. This foundational knowledge will also prepare them for more advanced algebraic concepts in future coursework.

Resources & Text	Suggested Activities
➤ enVision Platform ➤ enVision Textbook ➤ Calculator ➤ Graphing Paper	➤ IXL ➤ KhanAcademy ➤ DESMOS ➤ Nearpod ➤ Edpuzzle ➤ Kahoot ➤ Quizizz ➤ Blooket ➤ Kuta Software

Unit 2: Evidence of Student Learning

Formative Assessments:

- Observation
- Homework
- Class Participation
- Whiteboards/communicators
- Think-Pair-Share
- Do-Now
- Notebook Checks
- Writing Prompts
- Exit Tickets
- Classroom Games
- Self-assessment

Summative Assessments

- Chapter/Unit Test
- Quizzes
- Presentations
- Unit Projects

Benchmark Assessments:

- State Standardized Assessments
- Quarterly Benchmark Assessment

Alternative Assessments

- Portfolio Project
- Modified assignments

Performance Tasks: (When appropriate) This type of task demonstrates students transfer of learning and application to a performance task. Think about what you want the students to be able to do at the end of the unit.

Differentiation & Inclusive Support Strategies:

Multilingual Learners:

- Provide guided reading and writing in small groups
- Use visuals, labeled classroom materials, and cognates
- Pre-teach academic vocabulary using sentence and speaking frames
- Integrate WIDA Can Do Descriptors into lesson scaffolding
- Use screen readers, audio tools, and visual glossaries
- Offer extended time and oral/dictated responses
- Integrate culturally relevant texts and technology tools

Students with IEPs or 504 Plans:

- Follow all IEP/504 accommodations and modifications
- Use audio books, large print, or Braille/digital formats
- Provide peer tutoring, scribes, and augmentative communication tools
- Allow oral responses and extended time
- Offer modified assignments, assessments, and guided notes
- Utilize leveled texts and differentiated materials
- Use flexible seating and small group instruction

Students At Risk of Academic Failure:

- Scaffold instruction using visuals, chants, and songs
- Offer modified tasks and flexible grouping
- Use technology to support organization and engagement
- Provide structured routines and clear expectations
- Assign peer mentors and provide goal-setting checklists
- Include culturally relevant content to boost connection
- Embed mini-lessons and tiered intervention strategies

Gifted and Talented Learners:

- Provide open-ended and inquiry-based tasks
- Incorporate Bloom's Taxonomy (analyzing, evaluating, creating)
- Offer choices in content, process, and product
- Use advanced reading lists and tiered assignments
- Encourage discovery and student-designed projects
- Offer enrichment centers and flexible grouping
- Facilitate problem-solving simulations and debriefing

Diversity and Inclusion:

- Celebrate cultural identity through inclusive texts
- Provide alternative formats for assignments and assessments
- Collaborate with ESL staff and use closed captions when available
- Offer wait time and avoid idioms or slang
- Create a nurturing classroom with visual routines and structured expectations
- Encourage family engagement and home language maintenance
- Use word walls and accessible academic vocabulary tools

Unit 2: Supplemental Resources

For further clarification refer to NJ Class Standard Introductions at www.njcccs.org.

Instructional Materials

- enVision Textbook
- enVision Platform
- Graph Paper
- Calculator
- Manipulatives
- Microsoft Excel/PowerPoint
- Teacher-made tests, worksheets, warm-ups, and quizzes
- Computer software to support unit

Supplemental Materials

- IXL
- Khan Academy
- Desmos
- Cool Math
- Nearpod
- Edpuzzle
- Kahoot
- Quizizz
- Blooket
- Kuta Software
- Illustrative Math Activities
 - N.Q.A.1 Runners' World
 - N.Q.A.2 Giving Raises

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- N.Q.A.3 Calories in a Sports Drink
- A.REI.B.3, A.REI.A.1 Reasoning with linear inequalities
- A.CED.A.4 Equations and Formulas
- A.SSE.A.1 Kitchen Floor Tiles
- A.CED.A.1 Planes and wheat
- A-CED.A.1 Paying the rent
- A.REI.A.1 Zero Product Property 1
- A.CED.A.2 Clear on an Escalator
- S.ID.B.6,S.ID.C.7-9 Coffee and Crime

Intervention Materials

- Anchor activities
- Flexible grouping
- Varied computer programs
- Mini workshops to re-teach or extend skills
- Think-Pair-Share
- Games to practice mastery of information and skill
- Multiple levels of questions
- Tiered assignment/ product
- Stations/ Learning Centers
- Organizers
- Alternative Assessments