Algebra 2 Level A Unit 1

Marking Period	Unit Title	Recommended Instructional Days
1	Linear Functions	15 - 18 days

Domain: Number and Quantity, Algebra,

NJSLS Strand:
Key:

Major Cluster
Supporting Cluster
Additional Cluster

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.

Progress Indicator:
Tests • Quizzes • Practice problems for homework • Online textbook • Worksheets • Leveled assessments

Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit

Essential Question/s:
What does rate of change mean and how do you find it?
What kind of slope represents a negative rate of change? A positive rate of change?
What is the first step when graphing a line given the slope and y-intercept?

Activity Description:
Identifying Linear and Nonlinear Functions
Average Rate of Change (tables, graphs, equations)
Slope Formula
Graphing in Slope-intercept form
Writing Equations in Slope intercept form (graph, points, tables)
Standard Form and Graphing using Intercepts
Deciding if a point lies on a line
Application Problems (slope, average rate of change, linear equations)

Interdisciplinary Connections: Career Readiness, life Literacies and Key Skills Content: Money Management ;NJSLS#: 9.4.12.PB.2

Arabica coffee cost $28 per pound and Robusta coffee cost $8.75 per pound. How many pounds of Arabica coffee must you mix with 3 pounds of Robusta coffee to make a blend that costs $15.50 per pound?

Answer:
Write an equation to represent the situation
$28a + 26.25 = 15.5(a + 3)$
$a = 1.62$

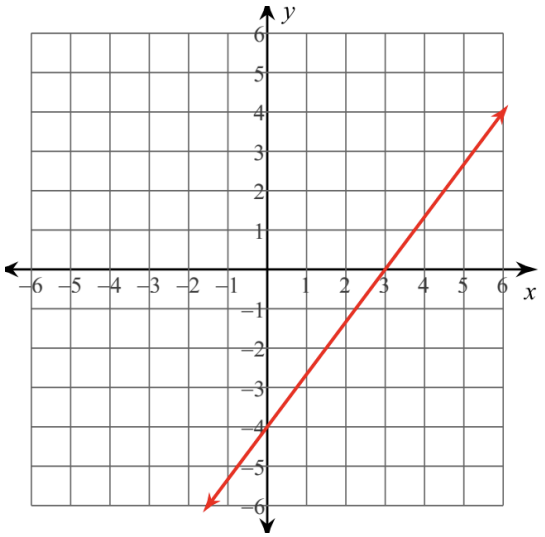
N.Q.A.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. **A.CED.A.1** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **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		You must mix 1.62 pounds of Arabica coffee with 3 pounds of Robusta coffee to make a blend that cost $15.50 **Example Tasks:** **Task 1:** Last year, the area of Jamie's garden was 32 square feet. This year, she added a new rectangular-shape section to her garden. The length of the new section of the garden is 12 feet. The total area of her garden now, last year's garden plus the new section is 116 square feet. • Write an equation that can be used to determine the width (w) in feet of the garden. • What is the width, in feet, of the new section of the garden? **Answer:** • 32 + 12W = 116 • 7 Feet **Task 2:** Becky is competing in an 8-mi road race. She runs at a constant speed of 6mi/h. Write an equation in slope-intercept form to represent the distance Becky has left to run. **Answer:** $y = -6x + 8$ **Task 3:** Graph the following equation: $y = \frac{4}{3}x - 4$ **Answer:**

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.*

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 solutions approximately; e.g., using technology to graph 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.*

F-IF.B.4 For a function that models a relationship



Task 4:

Find the average rate of change of the function over the interval $[-2, 7]$.

$$f(x) = -3x^2 - 4x + 8$$

Answer: - 19

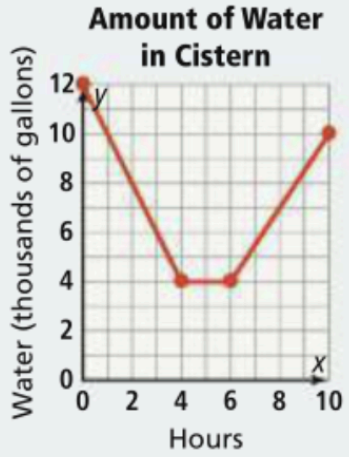
At the end of each topic please review the Assessment Practice and Performance Tasks questions.

between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given in a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*.*

F-IF.B.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.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
b. Graph square root, cube root, and piecewise-defined functions, including step

Performance Task The graph shows the amount of water in a water tank over several hours.



Part A What is the average rate of change on the interval [0, 4] and on the interval [6, 10]? What is a possible explanation for what each rate of change indicates?

Part B What is a possible explanation for what occurred between 4 and 6 h?

Part C What is the average rate of change on the interval [0, 10]? What does the rate of change mean? Does this rate of change give a good indication as to what is happening with the water in the cistern from 0 h to 10 h? Explain.

functions and absolute value functions.		**ASSESSMENT PRACTICE** If $12 - 3(x + 2) = x + 8$, then what is the value of x? **(A)** $-\frac{5}{2}$ **(B)** $-\frac{1}{2}$ **(C)** $\frac{1}{2}$ **(D)** $\frac{3}{2}$ **(E)** $\frac{5}{2}$ **Spot Light on:** LGBT and Disabilities Law: N.J.S.A 18A:34-4.35 • Sally Ride: First American woman in space. Climate Change Examples: • 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. ● Students may create equations and/or inequalities to represent the economic impact of climate change. ● 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. ● 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. ● 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. ● Students may**,** when reporting quantities related to how variations in the flow of energy into and out of the Earth's

<table>
<tr><td colspan="2"></td><td>systems result in climate change, choose a level of accuracy appropriate to limitations on how quantities were measured.</td></tr>
<tr><td colspan="2">Mathematics Practices</td><td rowspan="4"></td></tr>
<tr><td colspan="2">1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reason 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.</td></tr>
<tr><td>Social and Emotional Learning:
Competencies</td><td>Social and Emotional Learning:
Sub-Competencies</td></tr>
<tr><td>Self- awareness

Social Awareness

Self- Management

Relationship Skills

Responsible Decision-Making</td><td>Recognizing the importance of self-confidence in handling daily tasks and challenges.
Demonstrate an awareness of the expectations for social interactions in a variety of ways.
Demonstrate an understanding of the need for mutual respect when viewpoints differ.</td></tr>
</table>

	Recognize the skills needed to establish and achieve personal and educational goals. Utilize positive communication and social skills to interact effectively with others. Develop, implement, and model effective problem-solving and critical thinking skills.	

Assessments (Formative) ***To show evidence of meeting the standard/s, students will successfully engage within:***	**Assessments (Summative)** ***To show evidence of meeting the standard/s, students will successfully complete:***
Formative Assessments: ● Entry and Exit Slips ● Quizzes ● Self Assessments	**Benchmarks:** ● Chapter Tests ● Projects ● LinkIT **Summative Assessments:** ● District Assessments ● Standardized Tests

Differentiated Student Access to Content: **Teaching and Learning *Resources/Materials***			
Core	**Alternate**	**ELL**	**Gifted & Talented**

Resources	Core Resources *IEP/504/At-Risk/ESL*	Core Resources	Core Resources
• Savvas Envision • Achieve the core • Khan Academy • Desmos	• Skill building worksheets • Math Manipulatives	• Dictionary for native languages • Videos in their native language.	• Leveled Assessments • Enrichment worksheets

Supplemental Resources
Technology: • **Chromebooks, Graphing Calculators, Smartboards** **Other:** • **Zoom and Google Meets, Schoology, Interactive Textbooks**

Differentiated Student Access to Content: **Recommended *Strategies & Techniques***			
Core Resources	**Alternate Core Resources** ***IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core**
Deliver instruction utilizing varied learning styles including audio, visual, and tactile/kinesthetic, provide individual instruction as needed, modify assessments and/or rubrics, repeat	**Utilize a multi-sensory (VAKT) approach during instruction, provide alternate presentations of skills by varying the method (repetition, simple explanations, additional examples, modeling, etc.), modify test content and/or format, allow students to retake test for additional credit, provide additional times and preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.**	**Extend time requirements, preferred seating, positive reinforcement, check often for understanding/review, oral/visual directions/prompts when necessary, supplemental materials including use of an online bilingual dictionary, and modified assessment and/or rubric.**	**Create an enhanced set of introductory activities, integrate active teaching/learning opportunities, incorporate authentic components, propose interest-based extension activities, and connect student to related**

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: Creativity and Innovation**	
	Core Ideas:	**With a growth mindset, failure is an important part of success**
	Performance Expectation/s:	**9.4.12.CI.1: Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).**
	Career Readiness, Life Literacies, & Key Skills Practices	
	Act as a responsible and contributing community member and employee. **Attend to financial well-being.** **Consider the environmental, social, and economic impacts of decisions.** **Demonstrate creativity and innovation.** **Utilize critical thinking to make sense of problems and persevere in solving them.** **Model integrity, ethical leadership, and effective management.** **Plan education and career paths aligned to personal goals.** **Use technology to enhance productivity, increase collaboration, and communicate effectively.** **Work productively in teams while using cultural/global competence.**	

New Jersey Legislative Statutes and Administrative Code (place an "X" before each law/statute if/when present within the curriculum map)									
	Amistad Law: *N.J.S.A. 18A 52:16A-88*		Holocaust Law: *N.J.S.A. 18A:35-28*	X	LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*