Updated:
November 2021

Marking Period 2	Unit Unit Title: Algebra 1 – Linear and Exponential Modeling: Functions and Bivariate Statistics – Unit 2 - Module B	Recommended Instructional Days 10-12

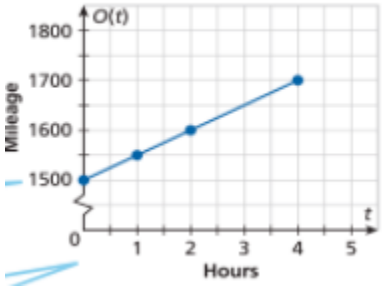
Domain:		
Strand: ***F.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.★*** ***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***	***Progress Indicator:*** ● ***Tests*** ● ***Quizzes*** ● ***Practice problems for homework*** ● ***Workbook pages*** ● ***Worksheets*** ● ***Focus Packet*** ● ***Leveled assessments***	**Recommended Activities, Investigations, Interdisciplinary Connections, and/or Student Experiences to Explore NJSLS-CLKS within Unit**

the rate of change from a graph. ***F.IF.C.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.*** ***F.BF.B.3 Identify the effect on the graph of replacing f(x) by f(x) + k, k f(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.A.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. ***a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.*** ***b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.*** ***c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.*** ***F.LE.A.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. ***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★*** ***e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.***		
Mathematics Practices 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.		**Essential Question/s:** 1. How do you represent relations and functions ? 2. What is a linear function?

		Activity Description: **Interdisciplinary Connections: Content: ;NJSLS#:** **Activity: Student Experiences** Model with Linear Functions  **Jim has a long drive home from a conference.** **He notes that his odometer reads 1500 miles at** **the beginning of his journey. Jim reaches home** **after 4 hours of driving. How can you model the mileage on his odometer as a function of driving time? Graph the function, and identify any minimum or maximum values.**
Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	

Self-Awareness Social Awareness Self-Management Relationship Skills Responsible Decision-Making	• Recognize one's feelings and thoughts • Recognize the impact of one's feelings and thoughts on one's own behavior • Recognize One's personal traits, strengths, and limitations • Recognize the importance of self-confidence in handling daily tasks and challenges • Recognize and identify the thoughts, feelings, and perspectives of others • Demonstrate an awareness of the differences among individuals, groups, and others' cultural backgrounds • Demonstrate an understanding of the need for mutual respect when viewpoints differ • Demonstrate an awareness of the expectations for social interactions in a variety of settings • Understand and practice strategies for managing one's own emotions, thoughts, and behaviors • Recognize the skills needed to establish and achieve personal and educational goals • Identify and apply ways to persevere or overcome barriers through alternative • methods to achieve one's goals • Establish and maintain healthy relationships	**Use a verbal model to write a function rule.** Mileage on odometer (mi) = Average speed (mi/h) · Driving time (h) + Starting mileage (mi) $O(t)$ = 50 · t + 1500 **O(t) = 50t + 1500** **A. Why does it make sense for O(t) to be a linear function?** **Graph the function.**  **Identify a point on the graph of the function O.** **O(0) = 50(0) + 1500 = 1500** **So, (0, 1500) is on the graph of the function O.** **B. What does O(0) represent?** **Identify the slope of the function O.**

	• Utilize positive communication and social skills to interact effectively with others • Identify ways to resist inappropriate social pressure • Demonstrate the ability to prevent and resolve interpersonal conflicts in constructive ways • Identify who, when, where, or how to seek help for oneself or others when needed • Develop, implement, and model effective problem-solving and critical thinking skills • Identify the consequences associated with one's actions in order to make constructive choices • Evaluate personal, ethical, safety, and civic impact of decisions	**The slope is 50.** **C. How does the slope help you sketch a graph?** **D. Is the function increasing or decreasing? How does that make sense in this context?** **The domain of the function is limited to the hours of Jim's drive home. The minimum number of miles on his odometer occurs at the beginning of his trip, so the minimum value of the function O is 1500 miles. Since Jim reached home after 4 hours of driving, then O(4) = 1700 miles is a maximum value of O(t).** **E. What do the domain and range of O(t) represent in this context? How many miles did Jim drive for?** **Application to Finance and Investments** **A new investment account is opened with $4000 at the interest rate shown. If no additional money is invested, what will be the value of the investment after 5 years?**

Write the exponential growth function that models this situation.

$f(x) = a(1 + r)^x$

$= 4000(1 + 0.045)^x$

$= 4000(1.045)^x$

A. How was the value of *a* determined?

B. How was the value of *r* determined?

Find the value in 5 years.

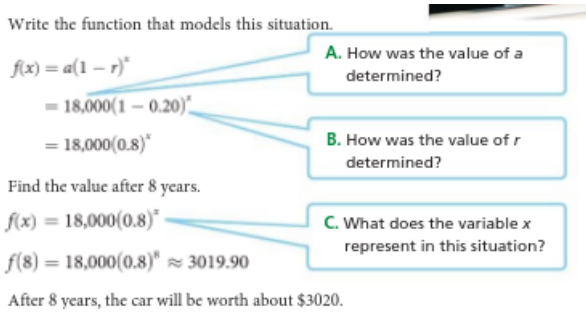
$f(x) = 4000(1.045)^x$

$f(5) = 4000(1.045)^5$

≈ 4984.73

C. What does the variable *x* represent in this situation?

Modeling

		 Highlight on: **Nazi Concentration Camps** Students use an informational chart about Nazi concentration and death camps to complete a mapping activity and a chart-reading activity.

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 **Summative Assessments:** ● units assessments ● District assessments ● Standardized test

Differentiated Student Access to Content: Teaching and Learning *Resources/Materials*			
Core Resources	**Alternate Core Resources *IEP/504/At-Risk/ESL***	**ELL Core Resources**	**Gifted & Talented Core Resources**
http://my.hrw.com https://www.khanacademy.org https://www.desmos.com http://www.edulastic.com http://www.quizzizz.com http://www.edpuzzle.com http://www.youtube.com https://www.mathsisfun.com/	• Reteaching worksheets • Skill building workbook • Math manipulatives • Leveled practice worksheets • Differentiation Options • Small group activities	• Dictionary for native language • Video tutorial in native language • Success for English Learners • worksheets • Leveled Strategies for English • Learners • Linguistic Support	• Enrichment worksheets and activities • Challenge questions • Problem Solving workshop • Leveled assessments
Supplemental Resources			
Technology: Chromebooks, Graphing Calculators • Other: Google Meets, Jamboard , whiteboard.fi, Google Classroom			
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**

<table>
<tr><td rowspan="4">NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS</td><td colspan="2">Disciplinary Concept: Information and Media Literacy</td></tr>
<tr><td>Core Ideas:</td><td>Advanced search techniques can be used with digital and media resources to locate information and to check the credibility and the expertise of sources to answer questions, solve problems, and inform the decision-making.</td></tr>
<tr><td>Performance Expectation/s:</td><td>• 9.4.12.IML.1: Compare search browsers and recognize features that allow for filtering of information.
• 9.4.12.IML.2: Evaluate digital sources for timeliness, accuracy, perspective, credibility of the source, and relevance of information, in media, data, or other resources (e.g., NJSLSA.W8, Social Studies Practice: Gathering and Evaluating Sources.</td></tr>
<tr><td colspan="2">Career Readiness, Life Literacies, & Key Skills Practices</td></tr>
<tr><td colspan="2">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.</td></tr>
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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*	X	Holocaust Law: *N.J.S.A. 18A:35-28*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*		Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*		Standards in Action: *Climate Change*