Updated August 2024

Marking Period	Unit Title:	Recommended Instructional Days
1	Graphing Linear Functions	8-18 days

Domain: Algebra

NJSLS
Strand:
Standards (Taught and Assessed):
Key:

Major Cluster
Supporting Cluster
Additional Cluster

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

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

Essential Question/s:

1. **What does rate of change mean and how do you find it?**
2. **What kind of slope represents a negative rate of change? A positive rate of change?**
3. **What is the first step when graphing a line given the slope and y-intercept?**
4. **What is function notation? And how do you use it?**
5. **How do you graph linear functions in standard form? In slope-intercept form?**
6. **How do you graph an absolute value function?**

Activity Description:

- **Functions**
- **Characteristics of Functions**
- **Linear Functions**
- **Function Notation**
- **Graphing Linear Equations in standard form**
- **Graphing Linear equations in Slope-intercept form**
- **Graphing Absolute Value Functions**

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

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

F.IF.A.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use

Interdisciplinary Connections: Physical Education: 2.2 Physical Wellness; Physical Fitness; **NJSLS#: 2.2.12.PF.2**

In a basketball game, Marlene made 16 baskets. Each of the baskets was worth either 2 or 3 points and she scored a total of 39 points. Let x represent the number of two-point shots and y represent the number of 3-point shots. Write a system of equations in terms of x and y to model the situation.

Answer:

x + y = 16
2x + 3y = 39

Highlight on:
Application to Arts and Crafts
Analyze Real-World Functions

An artist spends an afternoon making bracelets using beads she already has. She uses 15 beads for each bracelet. The remaining number R of beads in her supply can be modeled by the function shown, where b represents the number of bracelets she makes. Find and interpret R(0) and R(3). Then graph R(b).

Highlight on: Climate Change

Understand the difference between climate and weather

One common refrain you might hear is, "It snowed 20 inches today, so explain how global warming is real?" That's when it's time to tackle the

function notation in terms of a context. ***F.IF.B.4*** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. ★ ***F.IF.B.5*** Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function. ★ ***F.IF.B 6*** Calculate and interpret the average rate of		difference between weather (the current conditions) and climate (the average of those conditions over time in a particular region). Make an anchor chart. Then try a sorting activity to help kids understand the difference between the two. **Climate Change** Example: Students may use function notation to determine the amount of carbon dioxide produced by burning a given number of molecules of ethane (gasoline), m, where c(m) is the number of molecules of carbon dioxide. **Example Tasks** **Task 1:** You have $170. You start a part-time job that pays $8.50 per hour. **a.** Does the situation represent a function? If so, identify the independent and dependent variables. **b.** You work no more than 4 hours. Find the domain and range. **Task 2:** A goalie kicks a soccer ball so that it lands about 60 meters away, reaching a maximum height of about 15 meters after traveling a horizontal distance of about 30 meters. The graph shows the path of the second kick. Compare the two kicks

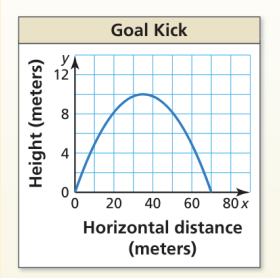
change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ★

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. ★

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

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

c. Graph polynomial functions, identifying zeros when suitable factorizations are



Task 3:
You lose track of how many 2-point baskets and 3-point baskets a team makes in a basketball game. The team misses all the 1-point baskets and still scores 54 points. The equation $2x + 3y = 54$ models the total points scored.

a. What do the terms and coefficients of the equation represent?

b. Can the number of 3-point baskets made be odd? Explain your reasoning.

c. Graph the equation. Interpret the intercepts.

d. Find four possible solutions in the context of the problem.

available, and showing end behavior. d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. e. Graph exponential and logarithmic functions, showing intercepts and end behavior. f. (+)Graph trigonometric functions, showing period, midline, and amplitude. ***F.BF.B.3*** Identify the effect on the graph of replacing $f(x)$ by $f(x)+k$, $kf(x)$, $f(kx)$, and $f(x+k)$ for specific values of *k* (both positive and negative); find the value of *k* given the graphs. Experiment with cases and illustrate an explanation of the		

effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **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.		
Mathematics Practices		
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.		

Social and Emotional Learning: ***Competencies***	**Social and Emotional Learning:** ***Sub-Competencies***	
Self- awareness Social Awareness Self- Management Relationship Skills Responsible Decision-Making	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. 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 **Summative Assessments:** ● District Assessments ● Midterms

	• Standardized Tests

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**
• Big Ideas • 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, Online math manipulatives** **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**	**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**

	preferential seating as needed, review, restate and repeat directions, provide study guides, and/or break assignments into segments of shorter tasks.		

NJSLS CAREER READINESS, LIFE LITERACIES & KEY SKILLS	**Disciplinary Concept: Digital Citizenship**	
	Core Ideas:	**Digital communities influence many aspects of society, especially the workforce. The increased connectivity between people in different cultures and different career fields have changed the nature, content, and responsibilities of many careers.**
	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*		LGBT and Disabilities Law: *N.J.S.A. 18A:35-4.35*	x	Diversity & Inclusion: *N.J.S.A. 18A:35-4.36a*	X	Standards in Action: *Climate Change*