Unit 3: Linear Functions

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

The purpose of this unit is to understand different types of functions and how they apply to real-world situations. More specifically, students will analyze linear relationships in order to recognize constant rate patterns.

ESSENTIAL QUESTIONS

-What are the advantages and disadvantages of representing functions using tables, graphs, and equations?

-How does identifying and understanding linear functions versus nonlinear functions help to solve a variety of problems?

-Why is it important to determine and describe the relationship between two variables?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

New Jersey (NJSLS) - Grade 8 - Mathematics (2020)

MA.8.F	Functions
MA.8.F.A	Define, evaluate, and compare functions.
MA.8.F.A.1	Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
MA.8.F.A.2	Compare properties (e.g. rate of change, intercepts, domain and range) of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MA.8.F.A.3	Interpret the equation $y = mx + b$ as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
MA.8.F.B	Use functions to model relationships between quantities.

MA.8.F.B.4	Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
MA.8.F.B.5	Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

New Jersey (NJSLS) - K-12 - Math Practice Standards (2020)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

TECH.9.4.8.TL.1	Construct a spreadsheet in order to analyze multiple data sets, identify relationships, and facilitate data-based decision-making.
TECH.9.4.8.TL.3	Select appropriate tools to organize and present information digitally.
TECH.9.4.8.TL.5	Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.
TECH.9.4.8.TL.6	Collaborate to develop and publish work that provides perspectives on a real-world problem.

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.8.2.8.ED.2	Identify the steps in the design process that could be used to solve a problem.

PRE-ASSESSMENTS

None given for this unit.

INSTRUCTIONAL PLAN

MODULE 6

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about qualitative graphs so that we represent real-world situations in graphical form as v as to describe a real-world situation from a graph.
Student Learning Strategies	-Peardeck Lesson on Qualitative Graphs -IXL Lesson BB.26
Success Criteria	I can describe a real-world situation from a qualitativ graph. I can sketch a graph from a real-world situation.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks. Worksheet Graphs & Stories
Suggested Modifications	Students can work in groups.

Functions_Graphs_and_Stories.pdf

MODULE 5

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to graph linear functions given an equation using tables so that we can show the relationship between two variables.
Student Learning Strategies	-Peardeck Lesson on Graphing Functions. -IXL Lessons BB.9 through BB.13
Success Criteria	I can complete a function table given an equation. I can graph a function from values in a table. I can interpret graphs of functions to answer

	questions about real-world situations.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 4

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to find the slope of a line so that we can apply slope to problems involving constant rates of change.
Student Learning Strategies	-Peardeck Lesson on Slope of a Line -IXL Lessons AA.1 and AA.2
Success Criteria	I can find the slope of a line given the graph of th line. I can find the slope of a line given a table of value
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Slope

MODULE 3

Student Learning Intentions (SLI) WALT: (We	We are learning how to find the rate of change of linear functions so that we can apply rate of chan

are learning to…)	to real-world problems.
Student Learning Strategies	-Peardeck Lesson on Rate of Change -IXL Lessons BB.6 through BB.8
Success Criteria	I can find the rate of change for a function from tables and graphs. I can determine if the rate of a change for a funct is constant or non-constant (linear or nonlinear).
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Rate of Change: Graphs

Rates of Change & Slope

MODULE 2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to determine if a function is linear or nonlinear so that we can see if real-worl relationships are linear or nonlinear.
Student Learning Strategies	-Peardeck Lesson on Linear vs. Nonlinear Functi -IXL Lessons BB.19 and BB.20
Success Criteria	I can identify if a function is linear or nonlinear.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Linear & Nonlinear Functions

MODULE 1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to identify relations and functions so that we can apply and model functions to real world situations.
Student Learning Strategies	-Peardeck Lesson on Introduction to Functions -IXL Lessons BB.1 and BB.2
Success Criteria	I can define the terms function, relation, domain, anc range. I can explain what the difference is between a relation and a function. I can represent relations in functions in various ways, including graphs, equations, mapping diagrams, ordered pairs, and tables. I can apply the vertical line test to determine if a graph is a function.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 7

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to write linear equations fror various representations so that we can describe r world situations from equations.
Student Learning Strategies	-Peardeck Lessons on Writing Linear Equations/Functions -IXL Lessons BB.9 through BB.18

Success Criteria	I can write a linear equation given a table or a gra
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Writing Linear Equations From Tables

Writing Linear Equations Given Two Points
Writing Linear Equations From Situations

MODULE 8

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to graph linear functions in slope-intercept form so that we can easily graph functions that involve fractional rates of change a use graphs to answer questions related to real-w problems.
Student Learning Strategies	-Peardeck Lesson on Graphing Slope-Intercept Form -IXL Lessons AA.4 through AA.6
Success Criteria	I can identify the slope and y-intercept from an equation in the form y=mx+b I can use the slope-intercept form of an equation easily graph linear functions.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Graphing Linear Equations in Slope-Intercept Form

MODULE 9

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to write linear equations in slope-intercept form so that we can describe real world situations in equational form and also make connections to graphs of linear functions.
Student Learning Strategies	-Peardeck Lessons on Writing Linear Functions -IXL Lessons AA.11 and AA.12, BB.12 through BB.16
Success Criteria	I can write an equation in slope-intercept form fro graph. I can write an equation in slope-intercept form fro given real-world situation. I can write an equation in slope-intercept form giv two points. I can interpret the slope and y-intercept of a funct
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Writing Linear Equations in Slope-Intercept Form

REFLECTIONS

Overall, the unit went smoothly. Students did have a difficult time catching on to the graphs and stories portion of the unit. Take time going over the problems in the graphs and stories packet with the class.

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.8.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.8.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.