Module 2 Topic 1

Content Area: **Math**
Course(s):
Time Period: **Full Year**
Length: **12 Sessions**
Status: **Published**

Linear Functions

Standards

MATH.9-12.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.
MATH.9-12.N.Q.A.2	Define appropriate quantities for the purpose of descriptive modeling.
MATH.9-12.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.
MATH.9-12.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.
MATH.9-12.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 $y = f(x)$.
MATH.9-12.F.IF.A.2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
MATH.9-12.F.IF.A.3	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
MATH.9-12.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.
MATH.9-12.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.
MATH.9-12.F.IF.C.7.a	Graph linear and quadratic functions and show intercepts, maxima, and minima.
MATH.9-12.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).
MATH.9-12.F.IF.C.9	Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
MATH.9-12.A.SSE.A.1.a	Interpret parts of an expression, such as terms, factors, and coefficients.
MATH.9-12.F.LE.A.1.a	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
MATH.9-12.F.LE.A.1.b	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

MATH.9-12.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).

Learning Objectives

- Lesson 1: Students connect an arithmetic, sequence in explicit form to a, linear function in slope-intercept, form. They prove that the common, difference and the slope are always, constant and equal. Students use first, differences to determine whether a, table represents a linear relationship, and learn about average rate of, change. They summarize what they, know about arithmetic sequences in, a graphic organizer.
- Lesson 2: Students determine whether, functions in different representations, are linear functions. They analyze, tables with input values that are not, consecutive integers. Students then, analyze scenarios and graphs, represented with functions in the, form $f(x) = ax$, $f(x) = a(x – c)$, and, $f(x) = a(x – c) + d$. They analyze the, meaning of the shifts in the graph in, terms of the context and compare the, structure to $f(x) = ax + b$.
- Lesson 3: Students identify key characteristics, of several linear functions. A graph, and a table of values for the basic, linear function $f(x) = x$ are given,, and students investigate $f(x) + D$ and $A, \cdot f(x)$. Given a function $g(x)$ in terms of, $f(x)$, students graph $g(x)$ and describe, each transformation on $f(x)$ to, produce $g(x)$. They test a video game, that uses transformations of linear, functions to hit targets.
- Lesson 4: Students compare linear functions, represented in different forms to, answer questions about real-world, scenarios. They also identify the, scale and origin on the graph of a, function given a situation description., Students generate and compare their, own linear functions using tables,, graphs, and equations.

Instructional Tasks/Activities

- Arts inspired projects
- Exit Ticket
- Formative Assessments
- Graphic Organizers
- Ladder Activity
- Mathia
- Pie Activity
- Quizizz
- Review, makeup assignments, complete missing assignments, absent work
- Stations or rotational activities
- Workbook Pages
- Worksheets

Assessment Procedure

- Exit Ticket/Entrance Ticket/Do Now
- Kahoot

- Problem Correction
- Project
- Quiz
- Review
- Rubric
- Teacher Collected Data
- Test
- Worksheet

Recommended Technology Activities

- Appropriate Content Specific Online Resource
- Chromebook
- Diffit
- Gimkit
- GoGuardian
- Google Classroom
- Google Docs
- Google Forms
- Google Slides
- Kahoot
- MagicSchool AI
- MATHia
- Online assessments
- Power Point
- Quizizz
- Screencastify

Accommodations & Modifications & Differentiation

Accommodations and Modifications should be used to meet individual needs. Their IEP and 504 plans should be used in addition to the following suggestions.

Gifted and Talented

- Compare & Contrast
- Conferencing
- Debates

- Jigsaw
- Peer Partner Learning
- Problem Solving
- Structured Controversy
- Think, Pair, Share
- Tutorial Groups

Instruction/Materials

- alter format of materials (type/highlight, etc.)
- color code materials
- eliminate answers
- extended time
- large print
- modified quiz as needed
- modified test as needed
- Modify Assignments as Needed
- Modify/Repeat/Model directions
- necessary assignments only
- Other (specify in plans)
- other- named in lesson
- provide assistance and cues for transitions
- provide daily assignment list
- read class materials orally
- reduce work load
- shorten assignments
- study guide/outline
- utilize multi-sensory modes to reinforce instruction

Environment

- alter physical room environment
- assign peer tutors/work buddies/note takers
- assign preferential seating
- individualized instruction/small group
- modify student schedule (Describe)
- other- please specify in plans
- provide desktop list/formula

Resources

- Carnegie Learning MATHbook
- Diffit
- www.KhanAcademy.com

State Mandated Topics in this Unit

State Mandated Topics Addressed in this Unit	
N/A	N/A