8th Grade Unit 2: Modeling Linear Relationships and Functions

Overview:

In this unit, students will analyze the connections between proportional and nonproportional lines and equations and relate their graphs to their solution sets in the coordinate plane. Students will be able to identify whether functions are linear or nonlinear through functional and graphical reasoning, and interpret, write, graph, and solve linear functions in different forms.

Learning Targets:

In Unit 2, students will:

- Use the proportional equation $y = mx$ for a line through the origin to derive the non-proportional equation $y = mx + b$ for a line intersecting the vertical axis at b
- Show and explain that the graph of an equation representing an applicable situation in two variable is the set of all its solutions plotted in the coordinate plane
- Show and explain that a function is a rule that assign each input exactly one output
- Identify, describe, and graph functions that are linear or nonlinear and their qualitative features
- Relate the domain of a linear function to its graph and the quantitative relationship it describes
- Compare properties (rate of change and initial value) of two functions used to model an authentic situation each represented in a different way (algebraically, graphically, verbal descriptions, etc.)
- Write and explain the equation $y = mx + b$ (slope-intercept form), $Ax + By = C$ (standard form), and $(y - y_1) = m(x - x_1)$ (point-slope form) as defining a straight line linear function to explain features of the function
- Write a linear function in different but equivalent forms to reveal and explain different properties of the function
- Construct a function to model a linear relationship between two quantities
- Determine the rate of change and initial value of a function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph
- Explain the meaning of 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
- Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations

Key Vocabulary: (linked to GA DOE Interactive Glossary)

Constant of Proportionality	Domain	Function	Horizontal Axis
Initial Value	Key Characteristics of a Function	Linear Relationship	Non-Linear Relationship
Non-Proportional Relationship	Point-Slope Form	Proportional Relationship	Properties of a Function
Range	Rate of Change	Slope	Slope-Intercept Form
Standard Form	Vertical Axis	X-Intercept	Y-Intercept

Supporting Resources:

http://ctlslearn.cobbk12.org/

https://gavirtual.instructure.com/courses/34331

Different Forms of Linear Equations

Finding Rate of Change From Two Points