Algebra 1 Honors Unit 2: Two-Variable Linear Equations and Inequalities

Unit #:	APSDO-00017742	Duration:	6.0 Week(s)	Date(s):	

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Grades:
8, 8 (Honors), 9
Subjects:
Mathematics

Unit Focus

In this unit, Honors students will utilize function notation to solve linear functions, construct graphs using tables and patterns, and identify x- and y- intercepts. They will determine slopes of lines using graphs, tables, equations and use the slope formula. They will graph linear equations and inequalities (including absolute value inequalities) and write equations from tables, graphs and story problems. They will write the equation of a line given various information. They will transform the equation of a line into slope-intercept form as well as write equations of parallel and perpendicular lines. Honors students will understand the terminology associated with linear functions including domain/range and input/output. They will understand that slope is a rate of change that affects the steepness of the graph, including the special relationships of parallel and perpendicular lines. They will use all three forms of a linear equation and understand the relationships between them. Graphing calculators will be used to explore and solve two-variable equations. Primary instructional materials for this unit include Algebra I, Glencoe/McGraw Hill, 2014. Secondary resources will be added to ensure the complexity, sophistication, and authenticity of the types of problems for our Honors students.

Stage 1: Desired Results - Key Understandings

Established Goals	Transfer
Common Core *Mathematics: 8* • 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. For example, the function $A = s2$ giving the	**T1** (T50) Based on an understanding of any problem, initiate a plan, execute it and evaluate the reasonableness of the solution. **T2** (T53) Articulate how mathematical concepts relate to one another in the context of a problem or in the theoretical sense. **T3** (T51) Examine alternate methods to accurately and efficiently solve problems. **T4** (T52) Use appropriate tools strategically to deepen understanding of mathematical concepts.

area of a square as a function of its side length is not linear because its graph contains the points (1,1), (2,4) and (3,9), which are not on a straight line. *CCSS.MATH.CONTENT.8.F.A.3*

- 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. *CCSS.MATH.CONTENT.8.F.B.4*
- 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. *CCSS.MATH.CONTENT.8.F.B.5*

Mathematics: 9

- Determine an explicit expression, a recursive process, or steps for calculation from a context. *CCSS.MATH.CONTENT.HSF.BF.A.1.A*
- Graph linear and quadratic functions and show intercepts, maxima, and minima. *CCSS.MATH.CONTENT.HSF.IF.C.7.A*
- 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

T5 (T22) Describe and/or solve problems using algebraic expressions, equations, inequalities, and functions.
T6 (T23) Use functions or equations to model relationships among quantities.

Meaning

Understandings	Essential Questions
U1 (U203) Certain mathematical manipulations preserve the relationship in an expression or equation, even though they change the representation. **U2** (U205) Expressions, equations, inequalities, and functions use symbols to represent quantities, operations, and their relationships. **U3** (U209) Algebraic relationships can be represented by analytical geometry. **U4** (U540) The choice of a mathematical tool depends upon the information you have and the information you want. **U5** (U550) Attention to detail, such as specifying units of measure and labeling, leads to clarity in expressing mathematical information. **U6** (U560) Patterns and structures are characterized by consistent relationships. **U7** (U561) Recognition of patterns and structures fosters efficiency in solving problems.	**Q1** (Q205) How can I represent this relationship as a function or equation? (Gr. 6-12) **Q2** (Q206) How do I evaluate this function or solve the equation? (Gr. 6-12) **Q3** (Q540) What tool(s) is appropriate for use with this model? **Q4** (Q551) How precise do my quantities need to be for my calculations to be accurate? **Q5** (Q552) Does my solution make sense? **Q6** (Q560) What is the pattern/structure in this problem? **Q7** (Q562) How do values and/or concrete models relate to each other?

Acquisition of Knowledge and Skill

Knowledge	Skills
	S1 utilize function notation to solve linear functions **S2** construct graphs using tables and patterns

corresponding to the input x. The graph of f is the graph of the equation y = f(x).
CCSS.MATH.CONTENT.HSF.IF.A.1

- 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).
CCSS.MATH.CONTENT.HSF.LE.A.2
- Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
CCSS.MATH.CONTENT.HSA.CED.A.2
- Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.
CCSS.MATH.CONTENT.HSA.REI.D.12
- Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
CCSS.MATH.CONTENT.HSF.IF.A.2
- 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.
CCSS.MATH.CONTENT.HSF.IF.B.4
- Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).
CCSS.MATH.CONTENT.HSG.GPE.B.5

S3

identify x-and y-intercepts

S4

determine slopes of lines using graphs, tables, equations, and using the slope formula

S5

graph linear equations

S6

graph linear inequalities

S7

write equations from tables, graphs, and story problems

S8

write the equation of the line given a slope and y-intercept, given a slope and a coordinate, and given two coordinates

S9

write equations of parallel and perpendicular lines

S10

understand terminology associated with linear functions including domain/range and input/output (both set and interval notation)

S11

understand slope is a rate of change and affects the steepness of the graph

S12

| 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. *CCSS.MATH.CONTENT.HSF.IF.B.6* | | understand the relationship between the three forms of a linear equation (slope-intercept, point-slope, and standard form) |

- 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. *CCSS.MATH.CONTENT.HSF.IF.B.6*
- 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). *CCSS.MATH.CONTENT.HSA.REI.D.10*
- Attend to precision. *CCSS.MATH.MP.6*
- Look for and make use of structure. *CCSS.MATH.MP.7*
- Use appropriate tools strategically. *CCSS.MATH.MP.5*

understand the relationship between the three forms of a linear equation (slope-intercept, point-slope, and standard form)

S13

understand the relationship of the slopes of parallel and perpendicular lines

Stage 2: Assessment Evidence

Other Evidence

Coding	Code	Description
	OE1	**Untitled** **Other Evidence** Unit 3 Summative Honors **Resources** RES1 Unit 3 Summative - Honors [Download File](#)

Stage 3: Learning Plan

Coding	Code	Description of Learning Activity