Unit A - *Graphs and Equations*

Overview

In this unit, students review graphing and properties of linear equations. Technology such as graphing calculators will be used to model the linear relationship between two variables. Students will also review equation solving techniques which will be used throughout the remainder of the course.

21st Century Capacities: Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense of problems and persevere in solving them
MP2 Reason abstractly and quantitatively
MP4 Model with Mathematics
MP5 Use appropriate tools strategically

CCSS.MATH.CONTENT.HSN.CN.C.7
Solve quadratic equations with real coefficients that have complex solutions.

CCSS.MATH.CONTENT.HSA.SSE.A.1
Interpret expressions that represent a quantity in terms of its context.*

CCSS.MATH.CONTENT.HSA.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*.

CCSS.MATH.CONTENT.HSA.CED.A.2

Transfer:

Students will be able to independently use their learning in new situations to...

1. Manipulate equations/expressions or objects to create order and establish relationships. (analyzing)
2. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (analyzing)
3. Use appropriate tools to make reaching solutions more efficient, accessible and accurate.

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Effective problem solvers work to make sense of the problem before trying to solve it.
2. Mathematicians flexibly use different tools, strategies, and operations to build conceptual knowledge or solve problems.
3. Mathematicians represent and analyze mathematical situations and structures using algebraic symbols to communicate thinking.
4. Mathematicians use models to represent and make meaning of quantitative relationships.

ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:*

A. What does the solution tell me?
B. How can I use what I know to help me find what is missing?
C. What math tools/models/strategies can I use to solve the problem?
D. What is the most efficient way to solve this problem?

	Acquisition:	
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.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. CCSS.MATH.CONTENT.HSA.REI.A.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. CCSS.MATH.CONTENT.HSA.REI.B.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. CCSS.MATH.CONTENT.HSA.REI.B.4 Solve quadratic equations in one variable. CCSS.MATH.CONTENT.HSA.REI.B.4.B Solve quadratic equations by inspection (e.g., for x^2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b. CCSS.MATH.CONTENT.HSA.REI.D.11 Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x)$ =	*Students will know…* 1. How to use a graphing calculator to enter data, create scatter plots, and find linear regression equations 2. How to determine if a triangle is a right triangle, given three vertices 3. How to interpret the meaning of a regression line including slope and intercepts 4. How to interpolate and extrapolate to make predictions 5. Vocabulary: regression, linear regression, discriminant, solution, inequality, symmetry, scatter plot, slope, intercepts,	*Students will be skilled at…* 1. How to create a scatter plot on a graphing calculator 2. Using algebraic tests to determine x-axis, y-axis, and origin symmetry 3. Solving linear, quadratic, rational, and absolute value equations 4. Solving linear and absolute value inequalities

$g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* CCSS.MATH.CONTENT.HSF.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. CCSS.MATH.CONTENT.HSF.IF.B.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. CCSS.MATH.CONTENT.HSF.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.* CCSS.MATH.CONTENT.HSG.GPE.B.5 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).		