

Functions: Pre-Algebra

Stage 1 Desired Results		
ESTABLISHED GOALS: <u>Competencies:</u> - Students will demonstrate the ability to solve equations, inequalities and systems by analyzing structure and applying the properties of equality, inequality and rational expressions. - Students will demonstrate the ability to reason with quantities by defining, evaluating, and comparing functions. - Students will demonstrate the ability to model real world problems by building and analyzing the appropriate expression, equation, or function. - Students will demonstrate the ability to analyze and summarize text and integrate knowledge to make meaning of discipline-specific materials. - Students will demonstrate the ability to produce coherent and supported writing in order to communicate effectively for a range of discipline-specific tasks, purposes, and audiences. - Students will demonstrate the ability to speak purposefully and effectively by strategically making decisions about content, language use, and discourse style. <u>Content Standards:</u> 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.1 8.F.A.2 - Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. 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. For example, the function $A = s^2$ giving the 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. 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. 8.F.B.5 - Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is	Transfer	
	Students will be able to independently use their learning to analyze relationships in order to make informed decisions.	
	Meaning	
	ENDURING UNDERSTANDINGS Students will understand that... - Information can be represented in a variety of ways and is dependent upon the information you are seeking. - A constant rate of change always results in a direct correlation between quantities.	ESSENTIAL QUESTIONS How do you make informed decisions involving unknowns?
	Acquisition	
	Students will know... - that x (domain, independent variable) is an input and y (range, dependent variable) is an output of a function. - what characteristics make a relation a function. - the similarities and differences between linear and nonlinear functions. - that unit rate or slope can be used to compare graphs, tables, and equations of proportional relationships. - that m represents slope and b represents the y-intercept in the equation $y = mx + b$. - that all the values of (x,y) that make the equation $y = mx + b$ true are the solutions to the equation and the infinite number of points that make the line. <u>vocabulary:</u> dependent variable, independent variable, domain, range, function, mapping diagram, relation, vertical-line test, linear function, non-linear function, slope, rate of change, y-intercept, constant of variation	Students will be skilled at... - identifying functions when given equations, graphs, or tables/ordered pairs.. - using function notation. - modeling relationships between functions. - compare functions by their rate of change or initial value. - constructing functions to model linear relationships between quantities. - using functions to model relationships between real world quantities - modeling relationships to make predictions. - analyzing and describing functional relationships in a variety of models. - representing functions algebraically, graphically, numerically in tables, and by verbal descriptions. - graphing a proportional relationship. - writing an equation for a proportional relationship. - analyzing and comparing proportional relationships. - finding constant of variation in a graph. - graphing a line from an equation. - graphing a line using slope.

increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally. 8.EE.B.6 - Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation $y = mx$ for a line through the origin and the equation $y = mx + b$ for a line intercepting the vertical axis at b. 8.EE.C.8 - Analyze and solve pairs of simultaneous linear equations. - Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously. - Solve systems of two linear equations in two variables algebraically, and estimate solutions by graphing the equations. - Solve real-world and mathematical problems leading to two linear equations in two variables. - MP1 Make sense of problems and persevere in solving them. - MP2 Reason abstractly and quantitatively. - MP4 Model with mathematics. - MP5 Use appropriate tools strategically. - MP7 Look for and make use of structure. - MP8 Look for and express regularity in repeated reasoning.	- identifying slope from two points, an equation, or a graph. - testing a solution (x,y) to a system of linear equations. - solving a system of equations by graphing. - determining the number of solutions to a system of linear equations. - solving a system of equations using substitution. - solving a system of equations using addition. - defining variables and using a system of equations to model real-world problems.
Content Area Literacy Standards	21st Century Skills
- RST.6-8.3 Follow precisely a multistep procedure when carrying out experiments, taking measurements, or performing technical tasks. - RST.6-8.4 Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to <i>grades 6-8 texts and topics</i>. - RST.6-8.7 Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually.	- reason effectively - use systems thinking - make judgments and decisions - solve problems

Stage 2 - Evidence	
Evaluative Criteria	Assessment Evidence
	PERFORMANCE TASK(S):
	OTHER EVIDENCE:

Stage 3 – Learning Plan
Summary of Key Learning Events and Instruction

<i>Language Arts Integration</i>	<i>Mathematics Integration</i>
• 1.OA.1 Use	• 1.OA.1 Use
<i>Technology Integration</i>	<i>District Materials</i>
• 1.OA.1 Use	