Unit C - *Ratio, Percent, Proportion*

Overview

Students master the concept of rate of change and firmly establish the relationship between a graph, a table, an equation and a verbal description of a function that has a constant rate of change. In this unit students work with percents with the goal that students become fluent working with percents to get approximate answers mentally and exact answers.

21st Century Capacities: Synthesizing and Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS	
MP 1 Make sense sense of problems and persevere in solving them **MP4** Model with Mathematics **CC.8.EE** Understand the connections between proportional relationships, lines, and linear equations. **CC.8.EE.5** Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed. **CC.8.F.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. (Function notation is not required in Grade 8.) **CC.8.F.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. **CC.8.F.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 $A = s2$ giving the area of	

Transfer:	
Students will be able to independently use their learning in new situations to... 1. Model relationships among quantities. (Synthesizing) 2. Represent and interpret patterns in numbers, data and objects. (Analyzing) 3. Draw conclusions about graphs, shapes, equations, or objects. (Analyzing) 4. Demonstrate fluency with math facts, computation and concepts	
Meaning:	
UNDERSTANDINGS: *Students will understand that:* 1. Mathematicians apply the mathematics they know to solve problems occurring in everyday life. 2. Mathematicians use number sense to compute fluently and make reasonable estimates. 3. Mathematicians examine relationships to discern a pattern, generalizations, or structure.	ESSENTIAL QUESTIONS: *Students will explore & address these recurring questions:* A. How does estimation help me? B. How can I use what I know to help me find what is missing? C. How do I decide if my answer makes sense, and if not, what do I do? D. Have I used what I understand about numbers to make this easier? E. How can a variable/ expression / equation/graph be used to represent real life situations

	Acquisition:	
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. **CC.8.F.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. **CC.8.F.5** Describe qualitatively the functional relationship between two quantities by reading 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. **CC. 8.SP.3** Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. For example, in a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height. **CC. 8.SP.4** Understand that patterns of association can also be seen in bivariate categorical data by displaying frequencies and relative frequencies in a two-way table. Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible association between the two variables. For example, collect data from students in your class on whether or not they have a curfew on school nights and whether or not they have assigned chores at home. Is there evidence that those who have a curfew also tend to have chores?	*Students will know…* 1. A proportional relationship can be represented by a table, graph or equation 2. The fraction equivalents of multiples of 10% and 25% 3. Vocabulary: rate of change, proportional, slope, two way table,	*Students will be skilled at…* 1. Comparing the two different proportional relationships represented in different ways (table, graph, equation, words) including their rate of change 2. Fluently moving between decimals, percents and fractions 3. Finding percents without a calculator (multiples of 5%,10%,25%) 4. Using estimation to solve problems involving percents 5. Solving percent problems 6. Interpreting two way tables 7. Simple probability