Unit D - *Ratios, Proportions and Percents*

Overview

Students extend their understanding of ratios and develop understanding of proportionality to solve single- and multi-step problems. Students use their understanding of ratios and proportionality to solve a wide variety of percent problems, including those involving discounts, interest, taxes, tips, and percent increase or decrease. Students solve problems about scale drawings by relating corresponding lengths between the objects or by using the fact that relationships of lengths within an object are preserved in similar objects. They determine if a relationship is proportional. In Pre-Algebra students will graph proportional relationships and understand the unit rate informally as a measure of the steepness of the related line, called the slope.

21st Century Capacities: Analyzing, Synthesizing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS

MP 1 Make sense sense of problems and persevere in solving them
MP4 Model with Mathematics
MP6 Attend to precision
MP7 Look for and make use of structure
MP8 Look for and express regularity in repeated reasoning.

Analyze proportional relationships and use them to solve real-world and mathematical problems
CC.7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. For example, If a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction

Transfer:

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

1. Make sense of a problem, initiate a plan, execute it, and evaluate the reasonableness of the solution. (Analyzing)
2. Apply familiar mathematical concepts to a new problem or apply a new concept to rework a familiar problem. (Synthesizing)

Meaning:

UNDERSTANDINGS: *Students will understand that:*

1. Mathematicians apply the mathematics they know to solve problems arising in everyday life.
2. Mathematicians examine mathematical relationships to discern a pattern or structure.
3. Math can be used to model real world situations.

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

A. Is there more than one way to describe a relationship?
B. What is another efficient way that this problem could be solved?
C. How do I decide if my answer makes sense, and if not, what do I do?
D. How can you determine when two quantities are in a proportional relationship?

(1/2)/(1/4) miles per hour, equivalently 2 miles per hour. **CC.7.RP.2** Analyze proportional relationships and use them to solve real-world and mathematical problems. Recognize and represent proportional relationships between quantities. **CC.7.RP.2a** Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin **CC.7.RP.2b** Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships **CC.7.RP.2c** Represent proportional relationships by equations. For example, if total cost *t* is proportional to the number *n* of items purchased at a constant price *p*, the relationship between the total cost and the number of items can be expressed as $t = pn$. **CC.7.RP.2d** Explain what a point (*x*, *y*) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (*1*, *r*) where r is the unit rate. **CC.7.RP.3** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.	***Acquisition:***	
	Students will know… 1. That percent means out of 100 2. A number can be represented in several forms 3. Vocabulary: ratio, complex fraction, rate, unit rate, unit price, better buy, population density, percent change, percent error, simple interest, proportional,	*Students will be skilled at…* 1. Writing ratios 3 ways 2. Using unit rates to compare 3. Identifying and finding proportional ratios 4. Converting within the customary system 5. Converting between fractions, decimals, and percents 6. Use a proportion to solve problems 7. Finding the part, whole, and percent of a number 8. Finding tax, tip, markup, and discount 9. Finding percent change and percent error 10. Finding simple interest