Unit 2 - *"Are We Related?" Ratios, Proportions, Rates, Percents*

Overview

In this unit, students solve problems that involve ratio - a comparison of two quantities. Students will learn to write, identify, and use ratios and rates to compare given quantities including those involved in converting measurements. Students will use the relationships between fractions, decimals, percents, and ratios to explore how to calculate the percent of a number. While grade 5 students have not formally worked with ratios or worked with proportions, students have experience with: ratio tables, converting among different-sized standard measurement units within a given measurement system, and using these conversions in solving multi-step, real world problems and renaming fractions.

Students move between different representations of the same quantity (or relationship) in order to:
- solve problems and make predictions in scenarios that involve ratios.
- to convert within the customary and metric systems.
- find unit rates and compare situations using unit rates.
- fluently convert among fractions, decimals, and percents in both receiving and sharing information.

In the next unit students will continue working with fractions and decimals to connect ratio and rate to whole number multiplication and division. They will be extending the notion of a number to the system of rational numbers.

21st Century Capacities: Synthesizing and Analyzing

Stage 1 - Desired Results

ESTABLISHED GOALS/ STANDARDS	
MP 2 Reason abstractly and quantitatively MP3 Construct viable arguments and critique the reasoning of others MP 4 Model with mathematics MP 7 Look for and make use of structure MP 8 Look for and express regularity in repeated reasoning CC.6.NS.9 Convert between expressions for positive rational numbers, including	***Transfer:***
	Students will be able to independently use their learning in new situations to... 1. Choose among various strategies to accurately and efficiently conceptualize and solve problems. (Analyzing / Synthesizing) 2. Fluently move between different representations of numbers to make sense of information. (Synthesizing)
	Meaning:
	UNDERSTANDINGS: Students will understand: 1. The connection between the various ways to communicate the same value/relationship. 2. That mathematicians examine relationships to discern	**ESSENTIAL QUESTIONS: Students will explore & address these recurring questions:** A. Is one measuring system better than another? B. What is another way to represent this

fractions, decimals, and percents. CC.6.RP.1 Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities. CC.6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0 (b not equal to zero), and use rate language in the context of a ratio relationship. CC.6.RP.3 Use ratio and rate reasoning to solve real-world and mathematical problems, e.g., by reasoning about tables of equivalent ratios, tape diagrams, double number line diagrams, or equations. CC.6.RP.3a Make tables of equivalent ratios relating quantities with whole-number measurements, find missing values in the tables, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. CC.6.RP.3b Solve unit rate problems includ ing those involving unit pricing and constant speed. CC.6.RP.3c Find a percentage of a quantity as a rate per 100 ; solve problems involving finding the whole given a part and the percentage. CC.6.RP.3d Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	a pattern, generalizations, or structure.	number? C. How do different parts of a whole relate to one another? D. What is the smartest buy? E. What is the most efficient way to solve this?

Acquisition:		

Students will know…		Students will be skilled at…
1. How ratios, fractions, decimals, proportions, and percents are related. 2. That a unit rate is a ratio in which the first quantity is compared to one unit of the second quantity. 3. The meanings of the prefixes kilo-, centi-, milli- 4. The meanings of the base units in the metric system (grams, liters, meters) 5. Benchmarks for common measurements 6. Basic customary system relationships 7. That percent means out of 100 8. The format for a correctly written proportion 9. 12 in = 1 ft 10. 3 ft = 1 yd 11. 5280 ft = 1 mile 12. Cups, pints,quarts and gallons relations (gallon boy or the big G) 13. 8 oz = 1 c 14. 16 oz = 1 lb 15. 2000 lb = 1 ton 16. 1000 m - 1 kilometer 17. 100 cm = 1 m 18. 10 mm = 1 cm 19. Prefixes and their meaning (kilo = 1000, centi = 1/100, milli = 1/1000) 20. Vocabulary: ratio, rate, unit rate, proportion, equivalence, percent, metric, customary		1. Using ratio language to describe a relationship in 3 ways using: the word "to" (5 to 3); a colon ":" (5:3); or as a fraction ($\frac{5}{3}$) 2. Calculating unit rate to compare ratios and make informed decisions 3. Using proportions to represent equivalence and to solve word problems 4. Using a graphic to recall unit relationships 5. Converting within the metric and customary measurement systems 6. Using benchmarks to evaluate solutions 7. Using benchmarks to find percent of a number (use 50% to find 25%) 8. Using equivalent fractions to find percent of a number 9. Converting between fractions, decimals, and percents 10. Assessing whether a solution is a prediction or an exact answer. 11. How to use a basic four function calculator