Unit 2: Ratios and Proportional Relationships

Content Area: **Mathematics**
Course(s): **Math 3, Math 4, Math 5, Math 6**
Time Period: **Quarter 1**
Length: **11 weeks**
Status: **Published**

Unit Summary

The goal for this unit is to develop students' understanding of ratio concepts, rate and proportion reasoning, conversions between measurement units, and their applications to real life problem solving. Students will use their prior understanding of multiplication and division to solve ratio and rate problems about quantities. Students will discover the connection between ratios and fractions. In addition, students will be able to represent and analyze quantitative relationships between dependent and independent variables. Students working in the resource setting, will work on grade level objectives with modifications.

Standards

MA.6.RP.A	Understand ratio concepts and use ratio reasoning to solve problems.
MA.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MA.6.RP.A.2	Understand the concept of a unit rate a/b associated with a ratio $a:b$ with $b \neq 0$, and use rate language in the context of a ratio relationship.
MA.6.RP.A.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.
MA.6.RP.A.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.
MA.6.RP.A.3b	Solve unit rate problems including those involving unit pricing and constant speed.
MA.6.RP.A.3c	Find a percent of a quantity as a rate per 100 (e.g., 30% of a quantity means 30/100 times the quantity); solve problems involving finding the whole, given a part and the percent.
MA.6.RP.A.3d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
MA.6.EE.B.6	Use variables to represent numbers and write expressions when solving a real-world or mathematical problem; understand that a variable can represent an unknown number, or, depending on the purpose at hand, any number in a specified set.
MA.6.EE.C.9	Use variables to represent two quantities in a real-world problem that change in relationship to one another; write an equation to express one quantity, thought of as the dependent variable, in terms of the other quantity, thought of as the independent variable. Analyze the relationship between the dependent and independent variables using graphs and tables, and relate these to the equation.
PFL.9.1.8.B.3	Justify the concept of “paying yourself first” as a financial savings strategy.
CAEP.9.2.8.B.3	Evaluate communication, collaboration, and leadership skills that can be developed through school, home, work, and extracurricular activities for use in a career.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.2	Create a document (e.g., newsletter, reports, personalized learning plan, business letters or flyers) using one or more digital applications to be critiqued by professionals for

	usability.
TECH.8.1.8.A.3	Use and/or develop a simulation that provides an environment to solve a real world problem or theory.
TECH.8.1.8.A.4	Graph and calculate data within a spreadsheet and present a summary of the results.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.C.1	Collaborate to develop and publish work that provides perspectives on a global problem for discussions with learners from other countries.
TECH.8.1.8.C.CS1	Interact, collaborate, and publish with peers, experts, or others by employing a variety of digital environments and media.
TECH.8.1.8.C.CS2	Communicate information and ideas to multiple audiences using a variety of media and formats.
TECH.8.1.8.C.CS3	Develop cultural understanding and global awareness by engaging with learners of other cultures.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.8.D.1	Understand and model appropriate online behaviors related to cyber safety, cyber bullying, cyber security, and cyber ethics including appropriate use of social media.
TECH.8.1.8.D.2	Demonstrate the application of appropriate citations to digital content.
TECH.8.1.8.D.5	Understand appropriate uses for social media and the negative consequences of misuse.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.

Student Learning Objectives

- Students will learn to identify basic ratios and equivalent ratios.
- Students will learn a basic ratio can be determined by simplifying using Greatest Common Factor (simplifying fraction).
- Students will learn the qualities of a rate.
- Students will learn to use proportions, tables, and equations to solve real world problems involving rates and ratios.
- Students will learn the format and use of a coordinate plane.

Essential Questions

- How does comparing quantities describe their relationship?
- How can we represent relationships between quantities using the different numerical representations (decimals and fractions)?
- How can we represent relationships between quantities graphically?
- How are ratios connected to fractions, decimals, multiplication, and division?

Enduring Understandings

- Students will understand that proportional relationships express how quantities change in relationship to each other.
- Students will understand that a ratio is a relationship between two quantities of the same unit.
- Students will understand that a rate is a special ratio using different units.
- Students will understand that functions describe a proportional relationship.

Application

- Students will be able to independently use their learning to solve ratio and rate problems about quantities.
- Students will be able to independently use their learning to make rate tables and describe relationships between quantities.
- Students will be able to independently use their learning to determine prices for the Teacher Snack Shop. This is an activity in which students work with other students to create and maintain a snack shop for teachers.
- Students will be able to independently use their learning to complete the Car Transportation PBL (Adapted from Reading A to Z).

Skills

Students will be skilled at:

- Describing a ratio relationship between two quantities.
- Simplifying ratios to basic ratios.
- Utilizing fraction notation for ratios.
- Identifying rate situations.
- Graphing rate tables.
- Solving for unit rate (constant increase).
- Graphing an unit rate triangle.
- Completing a rate table using constant difference.
- Finding missing values in rate tables.
- Identifying proportions as made up of equivalent ratios.
- Solving proportions and unit rate using cross- multiplication.
- use rate and ratio reasoning to solve real world and mathematical problems.
- use proportions and unit rate equations to convert different measurement units.
- complete function tables for missing quantity and plot on coordinate plane (distance/time).
- Utilizing a data table to generate formulas representing relationships.
- Graphing values from rate table on coordinate plane and determining the constant rate.
- Determining the unit rate from the linear graph.
- Formulating an equation of problem situations (linear relationships).