ACC: Unit 3: Ratios, Rates, and Proportions

Content Area: **Mathematics**
Course(s): **Math 6 Accelerated**
Time Period: **November**
Length: **4 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. They will discover the connection between ratios and fractions.

Standards

MA.K-12.1	Make sense of problems and persevere in solving them.
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.7.RP.A.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units.
MA.K-12.2	Reason abstractly and quantitatively.
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.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.
MA.7.RP.A.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.
MA.K-12.4	Model with mathematics.
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.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.
MA.7.G.A.1	Solve problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
MA.6.EE.A.4	Identify when two expressions are equivalent (i.e., when the two expressions name the same number regardless of which value is substituted into them).
MA.6.EE.B.5	Understand solving an equation or inequality as a process of answering a question: which

	values from a specified set, if any, make the equation or inequality true? Use substitution to determine whether a given number in a specified set makes an equation or inequality true.
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.B.7	Solve real-world and mathematical problems by writing and solving equations of the form $x + p = q$ and $px = q$ for cases in which p, q and x are all nonnegative rational numbers.
MA.6.4.5.6 F	Technology
MA.6.4.5.6 F.1	Use technology to gather, analyze, and communicate mathematical information.
MA.6.4.5.6 F.2	Use computer spreadsheets, software, and graphing utilities to organize and display quantitative information.
MA.6.4.5.6 F.4	Use calculators as problem-solving tools (e.g., to explore patterns, to validate solutions).
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	Educational Technology: All students will use digital tools to access, manage, evaluate, and synthesize information in order to solve problems individually and collaborate and to create and communicate knowledge.
TECH.8.1.8.A	Technology Operations and Concepts: Students demonstrate a sound understanding of technology concepts, systems and operations.
TECH.8.1.8.A.1	Demonstrate knowledge of a real world problem using digital tools.
TECH.8.1.8.A.CS1	Understand and use technology systems.
TECH.8.1.8.A.CS2	Select and use applications effectively and productively.
TECH.8.1.8.B.CS2	Create original works as a means of personal or group expression.
TECH.8.1.8.C	Communication and Collaboration: Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
TECH.8.1.8.C.CS4	Contribute to project teams to produce original works or solve problems.
TECH.8.1.8.D	Digital Citizenship: Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.
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.CS1	Advocate and practice safe, legal, and responsible use of information and technology.
TECH.8.1.8.D.CS2	Demonstrate personal responsibility for lifelong learning.
TECH.8.1.8.D.CS3	Exhibit leadership for digital citizenship.
TECH.8.1.8.E	Research and Information Fluency: Students apply digital tools to gather, evaluate, and use information.
TECH.8.1.8.E.1	Effectively use a variety of search tools and filters in professional public databases to find information to solve a real world problem.
TECH.8.1.8.F	Critical thinking, problem solving, and decision making: Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
TECH.8.1.8.F.CS2	Plan and manage activities to develop a solution or complete a project.
TECH.8.2.8.D.CS2	Use and maintain technological products and systems.

Student Learning Objectives

- Students will learn the meaning of basic and equivalent ratios.
- Students will learn that a basic ratio can be determine by using greatest common factor to simplify(simplifying fraction).
- Students will learn the process of solving problems with ratios, rates, and proportions.
- Students will learn that ratios, rates, unit rates, and proportions are mathematical real world problems.

Essential Questions

- How does comparing quantities describe their relationship?
- How can we use proportions and algebra to solve real world problems?

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.

Application

- Students will be able to independently use their learning to solve ratio, rate, and proportion problems.
- Students will be able to independently use their learning to make rate tables and describe relationships between quantities.

Skills

Students will be skilled at:

- Describing a ratio relationship between two quantities.
- Simplifying ratios to basic ratios.
- Solving for unit rate (constant increase).
- Identifying rate situations.
- Establishing rate tables.
- Completing a rate table using constant difference.

- Determining a missing values in rate tables.
- Utilizing indirect measurement to problem solve.
- Determining the relationship between similar triangles.
- Identifying proportions as made up of equivalent ratios.
- Utilizing fraction notation for ratios.
- Solving proportions and unit rate using cross- multiplication.
- Utilizing rate and ratio reasoning to solve real world and mathematical problems.
- Utilizing proportions and unit rate equations to convert different measurement units.