Unit 3: Ratio and Proportional Reasoning

Content Area: **Mathematics**
Course(s):
Time Period: **Trimester 1**
Length: **23 days**
Status: **Published**

Brief Summary of Unit

In this unit, students will develop an understanding of ratio concepts and use ratio reasoning to solve problems. This unit provides an understanding of ratios and various ways to represent their relationships. Tape diagrams, double number lines, and ratio tables will be explored as ways to see these relationships. Students use reasoning about multiplication and division to solve real world ratio and rate problems about quantities. The unit also investigates percent as a ratio and applications of percent problem solving.

Revised Date: June 2024

Standards

MATH.K-12.1	Make sense of problems and persevere in solving them
MATH.K-12.2	Reason abstractly and quantitatively
MATH.6.RP.A.1	Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
MATH.K-12.3	Construct viable arguments and critique the reasoning of others
MATH.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.
MATH.K-12.4	Model with mathematics
MATH.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.
MATH.K-12.5	Use appropriate tools strategically
ELA.L.KL.6.2	Use knowledge of language and its conventions when writing, speaking, reading, or listening.
MATH.6.RP.A.3.a	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.
MATH.6.RP.A.3.b	Solve unit rate problems including those involving unit pricing and constant speed.
MATH.K-12.6	Attend to precision
MATH.6.RP.A.3.c	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.
MATH.6.RP.A.3.d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

MATH.K-12.7	Look for and make use of structure
ELA.L.VL.6.3	Determine or clarify the meaning of unknown and multiple-meaning words and phrases based on grade 6 reading and content, including technical meanings, choosing flexibly from a range of strategies.
MATH.K-12.8	Look for and express regularity in repeated reasoning
ELA.SL	Speaking and Listening
WRK.K-12.P.5	Utilize critical thinking to make sense of problems and persevere in solving them.
WRK.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.8	Use technology to enhance productivity increase collaboration and communicate effectively.
TECH.K-12.P.9	Work productively in teams while using cultural/global competence.

Essential Questions

- How are percentages used in real-world situations, such as discounts, taxes, and tips?
- How are ratios used to convert units of measure?
- How can we analyze and interpret data presented in tables, graphs, and word problems involving ratios, percentages, and unit rates?
- How do ratios help us compare quantities and understand proportional relationships?
- What is a unit rate, and how does it allow us to compare quantities with different units?

Enduring Understandings

- Conversions between fractions, decimals, and percentages enable us to represent quantities in different forms and solve a variety of mathematical problems.
- Proportional relationships underlie many real-world scenarios, allowing us to analyze data, make predictions, and solve problems efficiently.
- Ratios and percentages are fundamental tools for comparing quantities and understanding relationships between them.
- Unit rates provide a standardized way to compare quantities with different units of measurement, aiding in accurate comparisons and decision-making.

Students Will Know

- A ratio is a comparison of two or more quantities.
- A unit rate is a ratio always expressed as a comparison to 1. How to find a unit rate.
- Percent is a comparison always expressed as a comparison to 100.
- Problems involving ratios and proportions can be solved using ratio tables, double number lines and coordinate graphs.

Students Will Be Skilled At

- Converting units of measure
- Explaining math processes using correct mathematical vocabulary
- Finding unit rates
- Graphing equivalent ratios and creating straight lines from those points.
- How to read tape diagrams and double number lines to solve problems involving ratios and rates.
- How to use tables to find equivalent ratios and rates and make predictions based on those tables.
- Identifying common equivalent percents, decimals and fractions.
- Solving discount, tax and tip problems
- Solving proportions.
- Using percent proportions to find the part or the whole.
- Writing percents as decimals and fractions.
- Writing ratios different ways

Evidence/Performance Tasks

Assessments

- Formative: Daily assessments using examples from class notes, iReady MyPath, Big Ideas Math online platform problems, and NJSLA test bank problems
- Summative: Teacher-created assessments, NJSLA test bank problems, Big Ideas Math online platform problems, Big Ideas Math unit assessments
- Benchmark: iReady diagnostic assessments and district placement assessments in addition to unit assessments from Big Ideas Math
- Alternative Assessments: Student-centered activities such as scavenger hunts, various projects involving real world applications, and adaptive learning tasks in iReady, Khan Academy, and Big Ideas Math

Learning Plan

Day 1-3: Introduction to Ratios

- Define ratios and explain their purpose in comparing quantities.

- Teach how to write ratios in fraction, colon, and word form.
- Provide examples and practice exercises for creating and simplifying ratios and writing equivalent ratios..

Day 4-6: Proportional Relationships

- Explain proportional relationships and their connection to ratios.
- Provide examples and guide students in identifying proportional relationships.
- Include ratio tables and tape diagrams to demonstrate proportional relationships.

Day 7 Quiz on Ratios and Proportional Relationships

Day 8-9: Understanding and Calculating Unit Rates

- Define unit rates and their importance in comparing quantities with different units.
- Teach strategies for calculating unit rates and provide examples.
- Use unit rates to compare ratios with different units of measurement.

Day 10-11: Ratios on Coordinate Grid

Day 12-13: Review and Quiz on Unit Rates and Ratios on Coordinate Grid

Day 14-15: Converting Units of Measurement

- Review converting within metric system
- Use ratio and proportion reasoning to convert units of measurement. Use NJ grade 6 reference sheet for conversions.

Day 16: Converting Fractions, Decimals, and Percentages

- Introduce methods for converting between fractions, decimals, and percentages.
- Demonstrate real-life applications of these conversions.\

Day 17: Review and Quiz on Converting Units of Measurement and Converting Fractions, Decimals and Percents.

Day 18: Simple Percentage problems

- Find % of a number given the percentage and whole
- Find the whole number given the percentage and the part.

Day 19-20: Percentages in Real-World Contexts

- Explore how percentages are used in scenarios like discounts, taxes, and tips.

- Teach calculating percentages and applying them to solve problems.
- Assign practice problems for calculating and interpreting percentages.

Day 21-22: Review and Preparation for Unit Test

- Review key concepts, formulas, and strategies covered in the unit.
- Conduct review sessions, practice quizzes, and interactive activities.
- Provide additional support and clarification for challenging topics.

Day 23: Unit Test - Ratios, Percentages, and Unit Rates

- Administer a comprehensive unit test covering all topics from the unit.

Total number of days: 23

Materials

Core Instructional Materials: Core Book List including Big Ideas Math Modeling Real Life Online Textbook, Big Ideas Student Journal Workbook

Supplemental Instructional Materials: Khan Academy, iReady, IXL (for intervention)

Suggested Strategies for Modifications

Suggested Strategies for Modifications for Grade 6