Unit 3: Ratios and Rates

Content Area: **Math**
Course(s):
Time Period: **November**
Length: **4-5 Weeks**
Status: **Published**

Unit Overview

In this unit, students will learn about the following topics:

- Ratios (What are they? How can they be represented? How do we find them given a data set?)

- Using tape diagrams to solve real-world problems

- Using ratio tables to solve real-world problems

- Using ratio tables to create equivalent ratios

- Graphing ratio relationships in a coordinate plane with each axis representing a different column of the ratio table

- Using rates to compare data

- Utilizing unit rates to solve real-world problems

- Converting Measures involving customary and metric units using unit analysis

Enduring Understandings

SWBAT:

- Understand the concepts of ratios and equivalent ratios

- Use tape diagrams to model and solve ratio problems

- Use ratio tables to represent equivalent ratios and solve ratio problems

- Represent ratio relationships in a coordinate plane

- Understand the concept of a unit rate and solve rate problems

- Use ratio reasoning and unit analysis to convert units of measure

Essential Questions

- How can we:

- represent ratios in different ways?
- find a ratio, given a data set?
- find the value of a ratio?
- interpret the value of a ratio?
- determine whether two ratios are equivalent?

- How can we:

- draw a tape diagram representing a ratio relationship?
- interpret a tape diagram representing a ratio relationship?
- use tape diagrams to solve real-world ratio problems?

- How can we:

- model ratio relationships in ratio tables?
- utilize ratio tables when solving real-world and multi-step problems?
- complete a ratio table with at least one ratio already entered?
- identify equivalent ratios in a ratio table?
- relate a ratio table to a double number line?
- Use multiple ratio tables to organize data and solve a multi-step problem?

- How can we:

- represent ratio relationships in a coordinate plane?
    - Each of the 2 topics in the table represent the labels on each axis.
    - Equivalent ratios plotted as points that can be connected to form a line extended indefinitely in the positive direction.
- relate ratios in ratio tables to ordered pairs on a coordinate plane?
- draw a coordinate plane with consistent axes?
- label a coordinate plane correctly?
- Use a graph of a ratio relationship to solve a real-world problem?

- How can we:

- find unit rates?
- represent unit rates in the correct format? (____ feet per second)
- use unit rates to compare two entities?
- use ratio tables to find unit rates?
- use unit rates to solve real-world problems?

- How can we:

- convert units of measure using unit analysis (dimensional analysis)?
- convert rates using unit analysis (dimensional analysis)?
- convert rates using ratio tables?
- convert between customary and metric units?
- convert units of measure to compare two rates?
- find a conversion factor on a formula sheet?
- convert more than one measure at a time, utilizing unit analysis (dimensional analysis)?

Instructional Strategies & Learning Activities

- Guided Practice
- Daily Do Now
- Extra Practice & Puzzle Time (Resources)
- Scavenger Hunts
- Coloring Activities
- Task Cards (Around the World)
- Maze Activities
- Quizizz Online Assignments
- Kahoot! Online Games
- GimKit Online Games

Integration of 21st Century Themes and Skills

9.4.8.CT.2	Develop multiple solutions to a problem and evaluate short- and long-term effects to determine the most plausible option (e.g., MS-ETS1-4, 6.1.8.CivicsDP.1).
9.4.8.IML.4	Ask insightful questions to organize different types of data and create meaningful visualizations.
9.4.8.TL.5	Compare the process and effectiveness of synchronous collaboration and asynchronous collaboration.
CRP.K-12.CRP1.1	Career-ready individuals understand the obligations and responsibilities of being a member of a community, and they demonstrate this understanding every day through their interactions with others. They are conscientious of the impacts of their decisions on others and the environment around them. They think about the near-term and long-term consequences of their actions and seek to act in ways that contribute to the betterment of their teams, families, community and workplace. They are reliable and consistent in going beyond the minimum expectation and in participating in activities that serve the greater good.
CRP.K-12.CRP2.1	Career-ready individuals readily access and use the knowledge and skills acquired through experience and education to be more productive. They make connections between abstract concepts with real-world applications, and they make correct insights about when it is appropriate to apply the use of an academic skill in a workplace situation.

Technology & Design Integration

8.2.8.NT.1	Examine a malfunctioning tool, product, or system and propose solutions to the problem.
8.2.8.EC.1	Explain ethical issues that may arise from the use of new technologies.
TECH.8.1.8.A.CS1	Understand and use technology systems.

TECH.8.1.8.B.CS1	Apply existing knowledge to generate new ideas, products, or processes.
TECH.8.1.8.D.4	Assess the credibility and accuracy of digital content.
TECH.8.1.8.E.CS1	Plan strategies to guide inquiry.

Interdisciplinary Connections

L.KL.6.2.B	Gather vocabulary knowledge when considering a word or phrase important to comprehension or expression.
L.VL.6.3.A	Use context (e.g., the overall meaning of a sentence or paragraph; a word's position or function in a sentence) as a clue to the meaning of a word or phrase.
SL.PE.6.1.C	Pose and respond to specific questions with elaboration and detail by making comments that contribute to the topic, text, or issue under discussion.
	Proportional relationships (e.g., speed as the ratio of distance traveled to time taken) among different types of quantities provide information about the magnitude of properties and processes.

Differentiation

Definitions of Differentiation Components:

- Content – the specific information that is to be taught in the lesson/unit/course of instruction.
- Process – how the student will acquire the content information.
- Product – how the student will demonstrate understanding of the content.
- Learning Environment – the environment where learning is taking place including physical location and/or student grouping

Differentiation occurring in this unit:

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.

- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
- Limit number/difficulty of problems for low-achieving students to demonstrate mastery.
- Narrow down problem choice to core concepts for low-achieving students.
- Leveled group-based activities, determined by formative assessment.

Modifications & Accommodations

- High-achieving students will assist low-achieving students in mixed ability groupings for games and activities.

- High-achieving students can complete sudoku puzzles and logic puzzles as extension activities.
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- Narrow down problem choice to core concepts for low-achieving students.

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Benchmark Assessments

Schoolwide Benchmark assessments:

- Linkit Benchmarks (Form A in September, Form B in January, Form C in June): Linked to NJSLA standards

Additional Benchmarks used in this unit:

- IXL Diagnostic + continued practice during IXL periods

Formative Assessments

Formative Assessments used in this unit:

- Kahoot! Games

- Quizizz Games

- Homework

- Q & A

- Scavenger Hunts

- Coloring Activities

- Task Cards

- Partner Activities

- Mystery of the Rogue Runner Activity to review (3.1-3.5)

Summative Assessments

Summative assessments for this unit:

- Chapter Test
- Quizzes

Instructional Materials

1. Big Ideas Math: Math & You 6th Grade Textbook
2. Quizizz
3. Kahoot!
4. Scavenger Hunts
5. Task Cards
6. Coloring Activities
7. GimKit
8. Mystery of the Rogue Runner Activity

Standards

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.
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.
6.RP.A.3.b	Solve unit rate problems including those involving unit pricing and constant speed.
6.RP.A.3.d	Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.