Unit 3: Ratios and Proportional Reasoning
6th Grade Honors Mathematics

17 Class Meetings

Revised January 2026

Essential Questions

- How are ratios used to compare two quantities or values?
- How can ratios and proportional reasoning be used to solve real-world mathematical problems?

Enduring Understandings with Unit Goals

EU 1: Ratios are used to show a comparison of two quantities.
- Describe situations using ratio language
- Generate equivalent ratios through multiplication by in comparing numbers in multiple situations
- Identify and compare situations involving equivalent ratios using a variety of strategies including double number lines.
- Solve ratio problems and compare ratios using ratio tables and tape diagrams.

EU 2: Ratio and rate problems can be solved using a variety of strategies, tools, and representations.
- Calculate unit price, constant speed, and measurement conversations
- Use ratio and rate reasoning to solve problems
- Understand that unit conversions are applications of ratio and rate problems

EU 3: Percent Problems can be solved using a variety of strategies and representations
- Calculate percent of a whole using a tape diagram.
- Calculate the whole when given the percent and the part.
- Convert between fractions, decimals and percent.
- Apply strategies used to solve rate problems to solve percent problems.

Standards

Common Core State Standards:
- **6.RP.A.1:** Understand the concept of a ratio and use ratio language to describe a ratio relationship between two quantities.
- **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:** 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.
- **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.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.

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- **6.RP.A.3.D:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

ISAAC Vision of the Graduate Competencies

Competency 1: Write effectively for a variety of purposes.
Competency 2: Speak to diverse audiences in an accountable manner.
Competency 3: Develop the behaviors needed to interact and contribute with others on a team.
Competency 4: Analyze and solve problems independently and collaboratively.
Competency 5: Be responsible, creative, and empathetic members of the community.

Unit Content Overview

1. **Understanding and Describing Ratios**

- Define ratios
- Use ratio language to describe associations between two quantities
- Use discrete drawing to represent a ratio
- Vocabulary-ratio, part to part ratio, part to whole ratio

- **Equivalent Ratios**
- Define and find equivalent ratios
- Determine if two ratios are equivalent
- Represent ratios and solve ratio problems using double number line diagrams
- Find equivalent ratios using ratios with "per 1" unit.
- Vocabulary-equivalent ratio, double number line, multiplicative relationship

- **Measurement Unit Conversions**
- Solve measurement unit conversion problems
- Vocabulary-rate, unit rate, equivalent ratio, convert, customary system, metric system,

- **Ratio Tables**
- Represent ratios in tables
- Understand the structure of and use tables to solve ratio problems
- Compare ratios using tables
- Vocabulary-ratio table, multiplicative relationship

- **Tape Diagrams**
- Solve part: part ratios problems using tape diagrams
- Solve part: whole ratio problems using tape diagrams
- Vocabulary- ratio, part to part ratio, part to whole ratio, tape diagram

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- **Rates**
- Find rates and unit rates in real world situations and use them to solve problems
- Compare situations using unit rates including speed, price, and work problems
- Vocabulary-rate, unit rate, equivalent ratio, per

- **Percentages**
- Define percent and find percentages of 100 and 1
- Solve percent problems using benchmark fractions and percentages
- Convert between fractions, decimals, and percentages
- Solve percent problems
- Vocabulary- rate, unit rate, equivalent ratio, convert, percent/percentage

Interdisciplinary Connection:

- Language Arts – Reading strategies for solving Word Problems; vocabulary; CER writing strategies
- Humanities:
  - Unit 1: Many Faces, Many Places
- Science –
  - Unit 1: Weather Patterns
  - Unit 2: Earth and Universe
  - Unit 3: Inside the Earth

Daily Learning Objectives with *TWPS*

Students will be able to…

- Identify and apply ratio language to describe associations between two quantities
  - *TWPS: Which Number does not Belong? (1/20, 20/25, 2/3 or 5/4) Explain your mathematical thinking.*
- Create discrete drawings, diagrams, and models to represent a ratio
  - *TWPS- Explain how to find the ratio of consonants to vowels in the word MATHEMATICS. Write the ratios in three different ways.*
- Generate and determine equivalent ratios
  - *TWPS- The ratio of graph paper to lined paper used in a math class is 1:6. If Hilary uses 8 sheets of graph paper, how many sheets of lined paper does she use? Explain your mathematical thinking.*
- Apply the additive and multiplicative structure of ratio tables to solve ratio problems
  - *TWPS- SBAC: In art class, Marvin painted tiles to use for a project. For every 5 tiles he painted blue, he painted 8 tiles green. Identify the equivalent ratio(s) of blue tiles to green tiles. Select all that apply. A. 20:23 B. 20:25 C. 50: 800 D 60:96 Explain your mathematical thinking.*
- Convert between units of measure
  - *TWPS- SBAC: A restaurant worker used 5 loaves of wheat bread and 2 loaves of rye bread to make sandwiches for an event. Write a ratio that compares the number of loaves*

of rye bread to the number of loaves of wheat bread. Describe what the ratio 7:2 means in terms of the loaves of bread used for the event.

- Construct tape diagrams to solve part: part and part: whole ratio problems*
  - *TWPS- SBAC: The table shows the relationship between the amounts of ginger ale and fruit juice needed to make punch. Fill in the missing values to complete the table. (See SBAC practice test) Explain your mathematical thinking/reasoning.*
  - *TWPS- In a swimming club, the ratio of the number of girls to the number of boys was 5:3. After 3 more girls and 5 more boys joined the club this spring, the ratio became 7:5. How many girls and how many boys were there before spring? Explain your mathematical thinking.*
- Evaluate and compare rates and unit rates in real world situations*
  - *TWPS- Kylie and Chen have 69 stickers. Kylie and Olivia have 95 stickers. The ratio of the number of stickers Olivia has to the number of stickers Chen has is 5:3. How many stickers does Kylie have? Explain your mathematical thinking.*
  - *TWPS- Would you rather bake pies at home or buy them from a bakery for Thanksgiving? If you bake at home, it costs $24 to make 3 pies (including all ingredients). If you buy from the bakery, it costs $40 for 5 pies. Which option gives you the better deal? Explain your mathematical thinking.*
- Convert between fractions, decimals, and percentages
  - *TWPS- Jaden's age is 1/8 of his mother's age. His mother will be 40 years old in 8 years. In how many years will Jaden's age be 3/7 of his mother's age? Explain your mathematical thinking.*
- Solve percent problems using a double number line model and proportional reasoning**
  - *TWPS- Walter and John leave in their cars at the same time. Walter drives 252 miles. John drives 10 miles per hour faster than Walter and travels 312 miles. If Walter and John arrive at their destinations at the same time, determine how fast Walter is driving. Explain your mathematical thinking.*
  - *TWPS- Mr. Ferguson bought a pair of sneakers that cost $2,500. How much did he pay for the sneakers if the sales tax rate was 7%? Explain your mathematical thinking.*
  - *TWPS- 20% of the spectators at a tennis match are grown women. 10% of them are young girls, 30% are young boys, and the remaining 3,600 spectators are grown men. Find the total number of spectators at the match. Explain your mathematical thinking.*
- Use percentages to solve real world problems
  - *TWPS- At the post office, the weight of the mail at 10AM was 80 pounds. Two hours later, the weight of the mail increased by 30%. Find the weight of the mail at noon. Explain your mathematical thinking.*
  - *TWPS: Which Number does not Belong? (5/40, 6/60, 10% or 0.1) Explain your mathematical thinking.*

Instructional Strategies/Differentiated Instruction

- Whole group instruction
- Guided notes
- Student-led instruction/discussions
- Independent problem-solving
- Collaborative problem-solving
- Graphic Organizer
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Homework
- Word walls with visuals
- Small group instruction
- Manipulatives
- Interactive Notebook
- Highlighted directions
- CER (Claim, Evidence, Reason)

EL DIFFERENTIATED INSTRUCTION:

- Word Walls with visuals
- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary
- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments
- Modified classwork and homework

Assessments

FORMATIVE ASSESSMENTS:

- Warm-ups
- TWPS
- CER
- Whiteboards
- Mid-class check-ins (Fist of 5; Thumbs up/mid/down)
- Exit Slips
- Accountable Talk Discussions
- Student-led instruction
- Classwork
- Homework

SUMMATIVE ASSESSMENTS:

- FIAB- Ratios and Proportional Relationships

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- Pear Assessment Quiz - EU 1
- Pear Assessment Quiz - EU 2
- Unit 3 Test: Pear Assessment: EU1, EU2, EU3
- Performance Task- Lemonade and Snack Mix (EU1, EU2, EU3)

Unit Task

Unit Task Name: Lemonade and Snack Mix

Description: Students will use ratio and proportional reasoning to determine how to make lemonade and snack mix. Students will be given the recipe for the snack mix and lemonade and use ratios to find the increase the recipes (EU1). They will use unit rates to determine the cost of the ingredients and find the better deal. (EU2). Students will be asked to calculate the percent off the total cost of the ingredients. (EU3).

Evaluation: Unit 3 Summative Performance Task Assessment Rubric

Unit Resources

- Pear Assessment
- Engageny
- Math in Focus
- Math Antics
- Match Fishtank
- Khan Academy
- SBAC Prep Online
- Two Truths and a Lie
- Education.com
- Commoncoresheets.com
- Maneuvering the Middle
- Individual White boards
- Interactive notebook