

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 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 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 conversions
- 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.

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 2026

- **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

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 2026

- **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 - Word Problems
- 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: What are three ways to write a ratio?*
- Generate and determine equivalent ratios
 - *TWPS: Ratio Scavenger Hunt*
- Apply the additive and multiplicative structure of ratio tables to solve ratio problems
 - *TWPS: How are these three ratio tables different? Explain your mathematical thinking.*
- Convert between units of measure
 - *TWPS: Max walked 1 mile Saturday morning. Carlos ran 600 inches on Sunday. Erica rode her bike 30 feet on Friday. Who traveled the shortest distance and how do you know? *HINT* Check your units *HINT* Explain your answer using Claim, Evidence and Reason in the box below.*
- Construct tape diagrams to solve part: part and part: whole ratio problems*
 - *TWPS: Which of the three statements below is a lie? Explain your mathematical reasoning. Two Truths and a Lie, GR6 #3*
 - *TWPS: Represent the following ratio word problems using one of the three ways to write a ratio and with a picture.*
- Convert between fractions, decimals, and percentages
 - *TWPS: Write a ratio and a percent that describes the shaded portion.*

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 2026

- *TWPS: Fill in missing fraction, percent of decimal in the chart*
- Solve percent problems using a double number line model and proportional reasoning**
 - TWPS: Identify the whole, the part and the percent in the problem
 - TWPS: Solve each percent problem using a double number line method or proportional relationship. Explain your mathematical thinking for each.
- Use percentages to solve real world problems
 - *Write at least 3 ways you see percentages in your everyday life. What do these percentages represent? Explain your thinking.*
 - *A gym class at ISAAC has 40 students in it. 25% of the students want to play dodgeball today. How many students want to play dodgeball today?*
 - *ISAAC School has 400 students in all grades. If there are 60 students in 6th grade, what percentage of the school is 6th graders?*
- Evaluate and compare rates and unit rates in real world situations*
 - *TWPS: Which is the better buy? (flowers) Explain your mathematical thinking.*
 - *TWPS: Which is the better buy? (notebooks) Explain your mathematical thinking.*
 - *TWPS: Xander, Linda and Jamir all ran a 10-mile race over the weekend. John finished in 1 hour. Linda took 1 ½ hours and Jamir tripped and fell and took 2 hours. Who finished first? What was each runner's mile time? What did you do to determine your answer? 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:

- TWPS (Think, Write, Pair, Share)
- Pre-reading strategies
- Culturally responsive teaching
- Explicit Modeling
- Key Vocabulary

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 2026

- Graphic Organizers
- Strategic Grouping
- Non-verbal Assessments
- Modified classwork and homework

Assessments

FORMATIVE ASSESSMENTS:

- Warm-ups
- TWPS
- 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
- Pear Assessment Quiz - EU 1
- Pear Assessment Quiz - EU 2
- Unit 4 Test: Pear Assessment: EU1, EU2, EU3
- Performance Task- Aquarium Design (EU1, EU2, EU3)

Unit Task

Unit Task Name: Underwater Adventure Performance Task

Description: Students will design their own aquarium exhibit using their knowledge of ratios, rates and percentages. Students will be given ratios of differing fish and elements of an aquatic habitat to make equivalent ratios to build their own habitat. (EU1) They will use a given pricing of fish to determine other quantities using unit rates and rates. (EU2) Lastly, they will calculate the percentage of fish in their tank to the total number of fish using their predetermined equivalent ratios. (EU3)

Evaluation: Summative Assessment and Summative Performance Task Assessment Rubric

Unit Resources

- Pear Assessment
- Engageny
- Math in Focus
- Math Antics

Unit 4: Ratios and Proportional Reasoning

6th Grade Mathematics

19 Class Meetings

Revised May 2026

- Match Fishtank
- Khan Academy
- Dan Meyers 3 Act Tasks
- www.map.mathshell.org
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Two Truths and a Lie
- Education.com
- Jeopardy Labs