

Unit 3: Ratios, Proportions, and Percentages

Algebra Prep

8 Class Meetings

Created July 2020

Essential Questions

- How can ratios and rates be used to relate and compare numbers?
- What kinds of relationships can proportions represent in real-world situations?

Enduring Understandings with Unit Goals

EU 1: Ratios compare two numbers and rates divide a ratio.

- Write and simplify ratios using the three different forms.
- Compare rates by calculating the unit rate.

EU 2: The units of rates can be converted when the conversion factor is known.

- Use conversion factors to convert unit rates to a given unit

EU 3: A proportion is an equation that states that two ratios are equal.

- Derive and solve proportions using real-world information.

EU 4: A percent is a ratio out of one hundred.

- Create proportions to solve percentage problems in the real-world including percent change.

Standards

Common Core State Standards/College and Career Readiness Anchor Standards:

- **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.
- **7.RP.A.2:** Recognize and represent proportional relationships between quantities.
- **7.RP.A.3:** Use proportional relationships to solve multistep ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease, percent error.
- **6.RP.A.3.D:** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.

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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. Ratios/Unit Rates

- Write and Simplifying Ratios
- Comparing Unit Rates

2. Conversions

- Write and Simplify Expressions to Convert Units

3. Proportions

- Solve Proportions
- Solve a Multi-Step Proportion
- Use Proportions to Solve Problems

4. Percentages

- Solve for a part, whole, or percent using proportions
- Use proportions to solve real-world percentage problems

5. Change Expressed as a Percent

- Find a Percent Decrease
- Find a Percent Increase

Interdisciplinary Connections

- Language Arts- Accountable Talk, Word Problems

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Daily Learning Objectives with *Do Now Activities*

Students will be able to...

- Compare and contrast numbers using ratios
- Write ratios as fractions and calculate the unit rates
- Analyze and justify unit rates to determine which is a better buy
- Convert unit rates into other given units by applying the properties of real numbers
 - *What do you remember about converting metric units and what are some metric units?*
- Calculate unknown values in a proportion and apply to real-world situations.
- Solve problems involving percentages using proportions
 - *How do you know whether you are finding the part, the whole, or the percent?*
- Apply a proportion to find the percent of change in real-world situations.
 - *How could you use a proportion to solve for a missing value?*

Instructional Strategies/Differentiated Instruction

- Whole-group instruction
- Graphic organizers
- Creating authentic connections for students
- Rephrasing and restatement of information and concepts
- Guided notes
- Student-led instruction
- Small group instruction
- Independent problem-solving
- Collaborative problem-solving
- Cross-curricular problem solving (independent and collaborative)
- Accountable Talk
- Manipulatives
- Word walls with visuals
- Homework

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Assessments

FORMATIVE ASSESSMENTS:

- Accountable Talk Discussions
- Daily Think-Write-Pair Share (TWPS)
- Warm ups (SBAC prep)
- ABCD Cards
- Whiteboards
- Mid-class check-ins
- Exit Slips
- Student-led instruction
- Homework
- Performance Task - Pizza Recipe

Future Rubric Assessment in 2021-2022

SUMMATIVE ASSESSMENTS:

- Quiz – EU 1, 2, 3
- Unit 3 Test – IAB: Proportional Relationships, Lines, and Linear Equations
- Performance Task - Pizza Recipe

Unit Task

Unit Task Name: Pizza Recipe

Description: Students will use information learned in this unit about how ratios and rates are used to compare quantities (EU 1) and how to convert rates into different units (EU 2) in order to create a recipe for a pizza they will propose to the school cafeteria as a new menu item. Students will use unit rates to calculate the unit price for each of their chosen ingredients. They will then use the unit price to determine how much the cafeteria would have to spend to buy the ingredients to make enough pizza for 12 students, 60 students and enough pizza for 240 students. Then students will use the conversion factor they find online to determine what the cost of 1 pizza would be in Euros in order to appeal to an international market. They will write a proposal to convince the cafeteria manager to use their recipe. The proposal will include a description of all of the mathematics used to determine the prices as well as a convincing argument as to why the cafeteria should choose their pizza as a new menu item.

Evaluation: Summative Assessment and Future Rubric in 2021-2022 school year

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Unit Resources

- Flipped Google Classroom Videos
- Worksheets
- Calculator
- Laptops
- SBAC Prep Online
- Kahn Academy
- Match Fishtank
- Map.Mathshell.org
- Online resources