Unit 3: Ratio & Proportional Relationships

Content Area: **Template**
Course(s):
Time Period: **Full Year**
Length: **Full Year**
Status: **Published**

UNIT RATIONALE

The purpose of this unit is to expand student knowledge of ratio and proportion in order to solve real-world problems including percent scenarios, rate of change between two data points, and scale drawings.

ESSENTIAL QUESTIONS

- How can we compare two quantities using ratios, rates, and unit rates?

- How can we create and solve a proportion in order to compare two sets of quantities?

- What are the different representations we can use to compare real-world rates and ratios?

- How are percents related to proportional reasoning and how can they be applied to solving real-world problems?

- Why is it important to use proportional reasoning when enlarging or reducing a figure to create an appropriately sized scale drawing/model?

STANDARDS

NEW JERSEY STUDENT LEARNING STANDARDS: CONTENT AREA

New Jersey (NJSLS) - Grade 7 - Mathematics (2020)

MA.7.RP	Ratios and Proportional Relationships
MA.7.RP.A	Analyze proportional relationships and use them to solve real-world and mathematical problems.
MA.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.
MA.7.RP.A.2	Recognize and represent proportional relationships between quantities.

MA.7.RP.A.2a	Decide whether two quantities are in a proportional relationship, e.g., by testing for equivalent ratios in a table or graphing on a coordinate plane and observing whether the graph is a straight line through the origin.
MA.7.RP.A.2b	Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships.
MA.7.RP.A.2c	Represent proportional relationships by equations.
MA.7.RP.A.2d	Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points $(0, 0)$ and $(1, r)$ where r is the unit rate.
MA.7.RP.A.3	Use proportional relationships to solve multistep ratio and percent problems.

New Jersey (NJSLS) - K-12 - Math Practice Standards (2020)

MA.K-12.1	Make sense of problems and persevere in solving them.
MA.K-12.2	Reason abstractly and quantitatively.
MA.K-12.3	Construct viable arguments and critique the reasoning of others.
MA.K-12.4	Model with mathematics.
MA.K-12.5	Use appropriate tools strategically.
MA.K-12.6	Attend to precision.
MA.K-12.7	Look for and make use of structure.
MA.K-12.8	Look for and express regularity in repeated reasoning.

NEW JERSEY STUDENT LEARNING STANDARDS: CAREER READINESS, LIFE LITERACIES AND KEY SKILLS

PFL.9.1.8.CP.1	Compare prices for the same goods or services.
PFL.9.1.8.CP.2	Analyze how spending habits affect one's ability to save.
PFL.9.1.8.EG.1	Explain how taxes affect disposable income and the difference between net and gross income.
PFL.9.1.8.EG.3	Explain the concept and forms of taxation and evaluate how local, state and federal governments use taxes to fund public activities and initiatives.
PFL.9.1.8.FI.4	Analyze the interest rates and fees associated with financial products.
PFL.9.1.8.FP.1	Describe the impact of personal values on various financial scenarios.
PFL.9.1.8.FP.2	Evaluate the role of emotions, attitudes, and behavior (rational and irrational) in making financial decisions.
PFL.9.1.8.FP.3	Explain how self-regulation is important to managing money (e.g., delayed gratification, impulse buying, peer pressure, etc.).
PFL.9.1.8.FP.4	Analyze how familial and cultural values influence savings rates, spending, and other financial decisions.
TECH.9.4.2.TL.1	Identify the basic features of a digital tool and explain the purpose of the tool (e.g., 8.2.2.ED.1).
TECH.9.4.2.TL.3	Enter information into a spreadsheet and sort the information.
TECH.9.4.2.TL.5	Describe the difference between real and virtual experiences.
TECH.9.4.2.TL.6	Illustrate and communicate ideas and stories using multiple digital tools (e.g., SL.2.5.).

NEW JERSEY STUDENT LEARNING STANDARDS: COMPUTER SCIENCE AND DESIGN THINKING

CS.6-8.8.2.8.ED.2   Identify the steps in the design process that could be used to solve a problem.

PRE-ASSESSMENTS

None given for this unit.

INSTRUCTIONAL PLAN

Simplifying ratios and finding unit rates are an important skill for describing and analyzing situations in the real world, such as comparative shopping for the better value (unit price).

MODULE 1

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to calculate unit rates so that we can make informed decisions in consumer applications.
Student Learning Strategies	-Peardeck Lesson on Ratios and Rates -IXL Lessons J.1 through J.8
Success Criteria	I can find the unit rate given a rate with different units. I can compare and contrast the better value when given two or more rates for comparison.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

[Ratios & Rates](#)

MODULE 2

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to determine if two ratios are equivalent, or proportional, so that we can apply these to real world situations, such as following a recipe.
Student Learning Strategies	-Peardeck Lesson on Equivalent Ratios. -IXL Lessons J.9 and J.10
Success Criteria	-I can determine if two ratios are equivalent by using patterns and by cross products.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

Proportions

MODULE 3

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to solve proportions so that can apply proportional relationships to real-world problems.
Student Learning Strategies	-Peardeck Lesson on Solving Proportions -IXL Lessons J.11 through J.13
Success Criteria	I can solve a proportion by using cross multiplication. I can write a proportion for a word problem and solve it to answer that problem.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems.

	-Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

[Solving Proportions](#)

MODULE 4

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to plot points in the coordina plane so that we can find slope of lines and grap proportional relationships.
Student Learning Strategies	-Peardeck Lesson on The Coordinate Plane. -IXL Lessons P.1 through P.4
Success Criteria	I can identify the parts of the coordinate plane. I can locate a point on the coordinate plane giver ordered pair. I can write the coordinates of a point in the coordinate plane.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

[The Coordinate Plane](#)

MODULE 5

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning about slope of a line so that we graphically demonstrate proportional relationship and rates of change.

Student Learning Strategies	-Peardeck Lesson on Slope of a Line -IXL Lessons V.1, V.2, V.5, J.14, J.15, & J.16
Success Criteria	I can find the slope of a line by graphs. I can find the slope of a line given two coordinate I can represent slope as a rate of change with lat
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

[Slope](#)

MODULE 6

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to graph proportional relationships so that we can represent real-world situations involving two quantities.
Student Learning Strategies	-Peardeck Lesson on Direct Variation. -IXL Lessons K.1 through K.11
Success Criteria	I can graph a proportional relationship given an equation or a table of values. I can write an equation in the form y = kx given the graph of a proportional relationship or its corresponding table. I can interpret the slope of the line as the rate of change in a proportional relationship.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.

Suggested Modifications	Students can work in groups.

MODULE 7

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to convert percents, decimals, and fractions so that we can represent percentages in other rational number forms.
Student Learning Strategies	-Peardeck Lesson on Percents. -IXL Lessons L.1 through L.3
Success Criteria	I can write percents as decimals or fractions. I can write decimals and fractions as percents. I can compare and order percents, decimals, and fractions.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 8

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to solve problems involving percentages so that we can apply percentages to real-world applications such as consumer math applications.
Student Learning Strategies	-Peardeck Lesson on Percent Problems. -IXL Lessons L.4 through L.9
Success Criteria	I can solve a percent problem by writing and solving a proportion. I can solve a percent problem by writing and solving

	an equation.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 9

Student Learning Intentions (SLI) WALT: (We are learning to…)	We are learning how to find percent of increase or decrease so that we can solve real-world problems that involve quantities changing, such as population change or discounts and markups.
Student Learning Strategies	-Peardeck Lesson on Percent of Change. -IXL Lessons L.10 through L.13; M.6 through M.11
Success Criteria	I can find the percent of change given the original and new amount. I can find the original or new amount given the percent of increase or decrease.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

MODULE 10

Student Learning Intentions (SLI) WALT: (We	We are learning how to calculate simple interest so

are learning to…)	that we can understand the benefits of saving money and to understand how to increase savings.
Student Learning Strategies	-Peardeck Lesson on Simple Interest. -IXL Lesson M.12
Success Criteria	I can define the terms principal, rate, and interest. I can use the formula I = Prt to find the simple interest earned given the principal, rate, and time. I can use the formula I = Prt to find the principal, rate, or time given the interest earned.
Formative Assessment (drives instructional decisions)	-Peardeck lesson interaction & feedback. -Quizizz, Kahoot!, or Blooket results. -Whiteboard practice problems. -Exit ticket.
Activities and Resources	Interactive notebooks.
Suggested Modifications	Students can work in groups.

REFLECTIONS

This unit went fairly well. One suggestion is to definitely do a review of plotting points prior to getting into the topic of slope as the students did not seem to have a background knowledge of the coordinate plane.

INTERDISCIPLINARY CONNECTIONS: NEW JERSEY STUDENT LEARNING STANDARDS FOR ELA, SOCIAL STUDIES, SCIENCE AND/OR MATHEMATICS

LA.K-12.NJSLSA.W1	Write arguments to support claims in an analysis of substantive topics or texts, using valid reasoning and relevant and sufficient evidence.
LA.RI.7.4	Determine the meaning of words and phrases as they are used in a text, including figurative, connotative, and technical meanings; analyze the impact of a specific word choice on meaning and tone.
LA.K-12.NJSLSA.W2	Write informative/explanatory texts to examine and convey complex ideas and information clearly and accurately through the effective selection, organization, and analysis of content.
LA.W.7.1	Write arguments to support claims with clear reasons and relevant evidence.
LA.W.7.2.D	Use precise language and domain-specific vocabulary to inform about or explain the topic.