Accelerated Grade 6/7 Mathematics

Unit title	UNIT 4: Investigating Rate, Ratio and Proportional Reasoning	MYP year	1	Unit duration (hrs)	30 hours total

Mastering Content and Skills through INQUIRY (Establishing the purpose of the Unit): *What will students learn?*

GA DoE Standards

Standards

6.NR.4: Solve a variety of contextual problems involving ratios, unit rates, equivalent ratios, percentages, and conversions within measurement systems using proportional reasoning.
7.PAR.4.1: Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units presented in realistic problems.
7.PAR.4.2: Determine the unit rate (constant of proportionality) in tables, graphs (1, r), equations, diagrams, and verbal descriptions of proportional relationships to solve realistic problems.
7.PAR.4.3: Determine whether two quantities presented in authentic problems are in a proportional relationship.
7.PAR.4.4: Identify, represent, and use proportional relationships.
7.PAR.4.6: Solve everyday problems involving scale drawings of geometric figures, including computing actual lengths and areas from a scale drawing and reproducing a scale drawing at a different scale.
7.PAR.4.9: Use proportional relationships to solve multi-step ratio and percent problems presented in applicable situations.
6.MP: Display perseverance and patience in problem-solving. Demonstrate skills and strategies needed to succeed in mathematics, including critical thinking, reasoning, and effective collaboration and expression. Seek help and apply feedback. Set and monitor goals.
MCS.Gifted.S4C. Establish a common goal utilizing strengths of each group member.
MCS.Gifted.S4B. Recognize and examine the value of others strengths, thoughts, ideas, and feelings during collaboration.
MCS.Gifted.S3C   Use a variety of strategies for solving authentic, complex, real world problems through evaluative thinking and the engineering design processes.
MCS.Gifted.S4D   Respectfully collaborate and effectively communicate exchanges of constructive/critical feedback.
MCS.Gifted.S6   Students will become self-directed, independent learners.

Concepts/Skills to be Mastered by Students

	Expectations	Evidence of Student Learning (not all inclusive; see Grade Level Overview for more details)			
6.NR.4.1	Explain the concept of a ratio, represent ratios, and use ratio language to describe a relationship between two quantities.	**Strategies and Methods** • Students should be able to solve problems involving ratios found in everyday situations. • Students should be given the opportunity to represent and explain the concept of a ratio and the relationship between two quantities using concrete materials, drawings, tape diagrams (bar models), double number line diagrams, equations, and standard fractional notation.	**Fundamentals** • Students should be able to explain the concept of a ratio, such as using part-to-part or part-to-whole. • Students should be able to fluently use ratio language to describe a ratio relationship between two quantities. • Students should be able to identify standard fractional notation to compare.	**Example** • The ratio of wings to beaks in the bird house at the zoo was 2:1, because for every 2 wings there was 1 beak. • For every vote candidate A received, candidate C received nearly three votes.	
6.NR.4.2	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.	**Strategies and Methods** • Students should be able to solve problems involving ratios found in realistic situations.			
6.NR.4.3	Solve problems involving proportions using a variety of student-selected strategies.	**Strategies and Methods** • Students should be given opportunities to utilize student-selected strategies to solve applicable, mathematical problems involving proportions. • Students should be given the opportunity to use concrete materials, drawings, tables of equivalent ratios, tape diagrams (bar models), double number line diagrams, and equations when solving problems. • Students can choose a strategy from a variety of strategies developed to solve a specific problem depending on the situation presented in the problem.			
6.NR.4.4	Describe the concept of rates and unit rate in the context of a ratio relationship.	**Strategies and Methods** • Students should create a table of values displaying the ratio relationships to graph ordered pairs of distances and times. • Students should write equations to represent	**Fundamentals** • When asked practical, mathematical questions, students should demonstrate an understanding of	**Terminology** • Students should understand a unit rate as a relationship of a:b where b = 1 ($\frac{a}{b}$ associated	**Examples** • We paid $75 for 15 hamburgers, which is a rate of $5 per one hamburger? • In a problem involving motion at a constant speed, list and graph	

		the relationship between distance and time where the unit rate is the simple multiplicative relationship. • Students should be able to determine the independent and dependent relationship of rate relationships within authentic, mathematical situations.	simple multiplicative relationships involving unit rates.	with a ratio a: b with b ≠ 0 (b not equal to zero), and use rate language).	ordered pairs of distances and times, and write an equation such as d = 65t to represent the relationship between distance and time. In this example, 65 is the unit rate or simple multiplicative relationship.
6.NR.4.5	Solve unit rate problems including those involving unit pricing and constant speed.	*Example* • If it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?			
6.NR.4.6	Calculate a percent of a quantity as a rate per 100 and solve everyday problems given a percent.	*Strategies and Methods* • Students should be able to calculate the percentage of a number using proportional reasoning developed through working with ratios and rates. • Students should be able to solve contextual problems involving finding the whole given a part and the part given the whole. • Students should determine what percent one number is of another number to solve authentic, mathematical problems.		*Fundamentals* • Students should have opportunities to explore the concept of percentage and recognize the connection between fractions, decimal numbers, and percentages, such as, 25% of a quantity means $\frac{25}{100}$ or .25 times the quantity. • Students should be able to convert fractions with denominators of 2, 4, 5 and 10 to the decimal notation.	
6.NR.4.7	Use ratios to convert within measurement systems (customary and metric) to solve authentic problems that exist in everyday life.	*Strategies and Methods* • Students should be able to use flexible, strategic thinking to manipulate and transform units appropriately when multiplying or dividing quantities to solve practical, mathematical problems. • Students should be able to convert measurement units when given a conversion factor within one system of measurement and between two systems of measurement (customary and metric) using proportional reasoning developed through working with ratios and rates.		*Example* • Given 1 in. = 2.54 cm, how many centimeters are in 6 inches?	
7.PAR.4.1	Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units presented in realistic problems.	*Strategies and Methods* • Students should be able to solve problems involving unit rate presented in practical, everyday situations.		*Example* • If a person walks $\frac{1}{2}$ mile in each $\frac{1}{4}$ hour, compute the unit rate as the complex fraction $(\frac{1}{2})/(\frac{1}{4})$ miles per hour, equivalently 2 miles per hour.	

Published: 10, 2024 Resources, materials, assessments not linked to SGO or unit planner will be reviewed at the local school level.

Code	Standard	Strategies/Methods & Notes	Examples/Terminology
7.PAR.4.2	Determine the unit rate (constant of proportionality) in tables, graphs (1, r), equations, diagrams, and verbal descriptions of proportional relationships to solve realistic problems.	**Age/Developmentally Appropriate** • In seventh grade, students are expected to understand that unit rate and constant of proportionality are the same.	**Examples** • Jennifer rides on a train for 6 hours and travels 360 miles. How many miles per hour does she travel? • Mary deposits $115 into her bank account every month, represented by the equation d = 115m. Identify the unit rate from this situation.
7.PAR.4.3	Determine whether two quantities presented in authentic problems are in a proportional relationship.	**Strategies and Methods** • Students should be able to analyze and make decisions about relationships using proportional reasoning strategies, which may include but not limited to graphing on a coordinate plane and/or observing whether a graph is a straight line passing through the origin.	**Examples** • If Tina uses 2 eggs to make 6 pancakes and Allison uses 4 eggs to make 12 pancakes, is this proportional? • Jane runs 12 miles in 2.5 hours. Sarah runs 14 miles 3.5 hours. Are Jane and Sarah running at the same rate? Justify your answer.
7.PAR.4.4	Identify, represent, and use proportional relationships.	**Strategies and Methods** • Student should be able to identify, represent, and use proportional relationships between quantities using verbal descriptions, tables of values, equations, and graphs to model applicable, mathematical problems: translate from one representation to another. • Students should be able to model authentic, mathematical relationships involving constant rates where the initial condition starts at 0 using tables of values and graphs. • Students should be able to represent proportional relationships using equations.	**Example** • If the total cost, t, is proportional to the number, n, of items purchased at a constant price, p, the relationship between the total cost and the number of items can be expressed as t = np.
7.PAR.4.9	Use proportional relationships to solve multi-step ratio and percent problems presented in applicable situations.	**Strategies and Methods** • Students may use flexible strategies such as a + 0.05a = 1.05a with the understanding that adding a 5% tax to a total is the same as multiplying the total by 1.05.	**Terminology** • Simple interest – a quick and easy method of calculating the interest charge on a loan. Simple interest is determined by multiplying the daily interest rate by the principal by the number of days that elapse between payments. Simple Interest = (principal) * (rate) * (# of periods) • Tax – money that people must pay to the government • Markups and markdowns - increase and decrease in the amount of a quantity • Gratuities - a tip given to a waiter, taxicab driver, etc. • Commissions - a fee paid to an agent as compensation for completing a transaction

Vocabulary:

[K-12 Mathematics Glossary](#)

Percent	Ratio	Proportion	Rational Number	Quantity	Tape Diagram

Rate	Unit Rate	Constant of Proportionality	Equivalent Fractions	Fraction	Slope

Key concept	Related concept(s)	Global context
Relationships The connections and associations between properties, objects, people and ideas.	**Pattern, Model, System**	**Personal and Cultural Expressions**

Statement of inquiry
By examining relationships and patterns, we can make predictions in real world situations.

Inquiry questions

Factual

- What information do ratios tell us about two quantities?
- What is a ratio?
- What is a rate?
- What is the difference between a rate and a unit rate?
- What kind of problems can I solve with ratios?
- What are percentages?
- What is meant by a proportional relationship?

Conceptual

- How are unit rates used to solve problems?
- How can we communicate proportional relationships using graphs, tables, and equations?
- How are percentages used in the real world?

Debatable

- What is the best way to understand ratio relationships?
- What would be the most useful method for communicating proportional reasoning in a real world situation?

MYP Objectives	Assessment Tasks	
*What specific MYP **objectives** will be addressed during this unit?*	***Relationship** between summative assessment task(s) and statement of inquiry:*	*List of common formative and summative assessments.*
Criteria B (Investigating Patterns) Criteria C (Communication)	Assessments will involve students in solving real-world style problems based on the relationships found in a situation.	**Formative Assessment(s):** Formative Assessment **Summative Assessment(s):** Unit 4 Summative Unit 4 CSA

Approaches to learning (ATL)
Category: Social **Cluster:** Collaboration Skills **Skill Indicator:** Give and receive meaningful feedback. **Category:** Thinking **Cluster:** Critical Thinking, Creative Thinking & Transfer **Skill Indicator:** Use models and simulations to explore complex systems and issues

Learning Experiences

Add additional rows below as needed.

Objective or Content	Learning Experiences	Personalized Learning and Differentiation
6.NR.4.4 Describe the concept of rates and unit rate in the context of a ratio relationship. 6.NR.4.5 Solve unit rate problems including those involving unit pricing and constant speed.	**Ticket Booth Trouble** Students examine a real-world scenario and determine the impact that a pricing strategy has on the unit price of tickets. They will learn the concept of a "better deal" and relate it to the unit rate. They will find unit rates and use them to evaluate a given pricing strategy. They will then propose a new pricing strategy using unit rates that they determine.	Students will be supported through intentional planning and implementation using the 5 Practices. Teachers will support through assessing and advancing questions and aggressive monitoring of students through the task. Peer review of work can be given as an option.

Content Resources

6-11 Savvas Correlation to 2021 standards

GaDoe Intervention Table of Tasks/Activities

Additional Resources

- **Savvas**
- **Desmos**
- **Hands-On Math**
- **https://mathigon.org/polypad**
-