SD Common Core State Standards Disaggregated Math Template

Domain:	Ratios and Proportional Relationships	**Cluster Heading:**	Analyze proportional relationships and use them to solve real-world and mathematical problems.	**Grade level:**	7

Correlating Standard in Previous Year	Number Sequence & Standard	Correlating Standard in Following Year
6.RP.2 Understand the concept of a unit rate a/b associated with a ratio a:b with b ≠ 0, and use rate language in the context of a ratio relationship. 6.RP3 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. b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed n 35 hours? At what rate were lawns being mowed?*	7.RP.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas and other quantities measured in like or different units. *For example, if a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2/1/4 miles per hour, equivalently 2 miles per hour.*	8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed

Student Friendly Language:

Given a real world situation, I can compute/calculate unit rates when the measurements are given as fractions.

I can simplify complex fractions.

I can convert quantities to units of the same measure and determine a reasonable solution.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Unit rate apply to fractions • Unit conversion using like or different units • Complex fraction	The process of calculating a unit rate involves division. Unit conversions may be needed to solve unit rates. Unit rates are used for comparison.	Use division to compute unit rate. Explain how the two units are related in a unit rate. Compute unit rates using fractions in real life situations. Convert different unit measures relating to length, time and other quantities.

Key Vocabulary:

ratio	unit rate	fraction	equivalent fractions	simplify
complex fraction	per	relationship	measurement	improper fractions
units	unit conversions	reciprocal	mixed numbers	

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

Comparison shopping: Determine the best buy between two brands or two sizes of a single brand. Cost per square foot of living area when purchasing a home.

Mileage comparison of different vehicles.

Rates: Cost per student on a field trip.

Salary/wages: dollars/hour

Caring for animals: feed/pound, medicine/pound

Farming: cost/acre or profit/acre

If Lucy can run 150 feet in 1/3 of a minute. What is her unit rate in feet per minute?

A snail can crawl 6 feet 8 inches in 1 ½ hour. What is the snail's unit rate?

A group of construction workers can pave ¾ of a mile of the interstate in 6 ¾ hours. What is their unit rate for paving the interstate?

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6.RP.2-Understand the concept of a unit rate a/b associated with a ratio a:b with b not equal to 0, and use rate language in the context of a ratio relationship. For example, "This recipe has a ratio of 3 cups of flour to 4 cups of sugar, so there is ¾ cup of flour for each cup of sugar." "We paid $75 for 15 hamburgers, which is a rate of $5 per hamburger." 6.RP.3a-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, and plot the pairs of values on the coordinate plane. Use tables to compare ratios. 6.RP.3b-Solve unit rate problems including those involving unit pricing and constant speed. For 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?	7.RP.2 Recognize and represent proportional relationships between quantities. 7.RP.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. 7.RP.2b Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. 7.RP.2c Represent proportional relationships by equations. *For example, if 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 = pn.* 7.RP.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.	8.EE.5 Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. *For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.* 8.EE.6 Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

Student Friendly Language:

I can recognize and represent proportional relationships.
I can graph proportional relationships.
I can identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions.
I can graph an equivalent ratio.
I can observe that the graph of a proportional relationship represents a straight line through the origin.
I can represent proportional relationships as equations.
I can explain the points (0,0) and (1,r) mean where r is the unit rate on a coordinate graph.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Proportional Relationships • Constant of Proportionality (Unit Rate)	The graph of a proportional relationship is a straight line through the origin. The constant of proportionality is a unit rate. Proportional relationships can be represented by equations. Equivalent ratios can be used to show two quantities are proportional. In a graph of a proportional relationship, r is the unit rate in the coordinate (1, r).	Test using equivalent ratios to determine whether a relationship is proportional. Determine whether a relationship is proportional based on its graph. Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. Write equations to represent proportional relationships. Explain what a point (x, y) means in terms of a real world situation. Explain what a point (0, 0) and (1, r) mean in terms of a real world situation.

Key Vocabulary:

ratios proportion proportional relationships constant of proportionality equivalent ratios
unit rate quantities origin coordinate plane equivalent ratios

Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?

-Students will find equivalent ratios for various proportional shapes by creating scale models of buildings.
-Students will create tables and graphs to show unit rates of purchases of products for a grocery list and compare the results using tables or graphs.
-Students will figure out how many miles per gallon each student gets when driving different cars.

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6.RP3.b. Solve unit rate problems including those involving unit pricing and constant speed. *For example, if it took 7 hours to mow 4 lawns, then at that rate, how many lawns could be mowed in 35 hours?* 6.RP.3c. Find a percent of a quantity as a rate per 100; solve problems involving finding the whole, given a part and the percent.	7RP3: 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.*	8EE5. Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways. For example, compare a distance-time graph to a distance-time equation to determine which of two moving objects has greater speed.

Student Friendly Language:
I can use proportional relationships to solve real world problems. I can use estimation to determine if the answer makes sense.

Know (Factual)	Understand (Conceptual) The students will understand that:	Do (Procedural, Application, Extended Thinking)
• Proportional relationships represent real world situations.	Ratios and percent problems can be represented by proportional relationships. Multiple methods exist to solve ratio and percent problems.	-Analyze the solution to determine whether or not the answer is reasonable. -Explain the method used to solve the problem. -Use proportional relationships to solve multistep ratio and percent problems. -Label answers appropriately.

Key Vocabulary:
ratio proportional relationships simple interest tax markup markdown gratuity commission fees percent increase percent decrease percent error simplify proportion cross multiply
Relevance and Applications: How might the grade level expectation be applied at home, on the job or in a real-world, relevant context? Include at least one example stem for the conversation with students to answer the question "why do I have to learn this"?
Simple Interest: Determine the amount of interest you would pay on a house or a car. Tax: Determine amount you will pay in tax on food, clothes, and most other purchases as well as final cost. Gratuity: How much you need to give as a tip when you go out to eat? Markups and Discounts: How much will your final cost be on a good or service after the markup or discount? Commission: Determine extra income and total salary from a variety of sales jobs. Fee: Compare fees from Company A & Company B to determine the best plan for a given individual. Percent increase & decrease: Find percent of change for weight loss in 2 or more people. i.e. Biggest Loser,election results showing voter turnout.