Grade Level	Content Area	Course Title *(For 9-12 Samples Only)*	Unit Title
7th grade	Mathematics		Proportional Relationship

Length of Unit	Time of Year Taught	Expected Prior Knowledge
2.5 weeks	Fall	- Fractions are parts of a whole - Geometric shapes, (squares and triangles) - Definition and knowledge of congruent and similar figures geometrically

Unit Description
The unit will focus on the use of unit rates in the real world. The instructor will provide situations and problems for the students to apply the concepts and different forms of unit rates. The activities will range from sales tax, measurements, and discounts.

Standards: See instructions on page 15.	Ratios of Proportional Relationships (RP) Analyze proportional relationships and use them to solve real-world and mathematical problems. 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.
Summative Assessment *In addition to the description, include a copy of the summative assessment in the application package.*	Assessment will be based on student's ability to solve problems in a written exam. Students will be given 6 problems in which they will use their knowledge of ratios and proportional relationships in the real world. A copy of the summative assessment/answer key (scoring rubric) is attached.
Scoring for Summative Assessment *In addition to the description, include a copy of the answer key and scoring rubric (if applicable) for the summative assessment in the application package.*	Mastery = 16/20 or higher. A copy of the answer key/scoring rubric is attached. Remediation students given more time.
Materials/Resources Needed *Include all items for the entire unit.*	- *Student interactive notebook* - *Mathematical manipulative Foam Shapes* - *Mathematical manipulative money*

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Instruction and Timeline	Teacher will ask students to take out their interactive student notebooks to start their unit on ratios and proportions. Teacher will then start Cornell style notes with students starting with vocabulary of the unit. Teacher will now begin with an example of ratios of cooking. She will show a list of examples and measurements such as 1 cup is 48 teaspoons. Then show students that 5 cups has 240 teaspoons. Teacher will then ask students to figure out what would 4 cups be in teaspoons. Then teacher will show unit rates of distances. For example, 3 ft for 1 yard, then ask how many feet in 10 yards? Teacher will then show unit rates in	Teacher will begin lesson by showing a bag full of two different colors of marbles. She will tell students that in the bag the ratio is 3 to 1 and explain each way 3:1 can be shown. Teacher will express that this relationship can be shown on a graph. Teacher will draw graph on board and show how the dots of the graph will be a straight linear line. Students will have a bag of shapes on their desk. Teacher will show how they can make a ratio of 2 triangles to every 5 squares. Teacher will ask to make the ratio with 20 squares, and to place the right amount of triangles. Teacher will then ask students to make a different scenario with a similar ratio. Teacher will ask students to create a ratio that involves a 4:3 relationship. Teacher will walk around to make sure everyone understands. Teacher will ask students to add to the ratio but keep the ratio similar. Teacher again will move around room to assist and praise	Teacher will have the percent formula on the board to have students place it in their notes. isof= %100 Then explain what the formula means, is = part of the whole, of = the whole, %100= the fractional way to write a percent. (For example, 40% = 40100. Teacher will then give an example of the formula by saying I received 15 out of 20 on a test what is my percent? Teacher will then give a guided practice problem much like the example. Teacher will ask students to then create their own problem and solve. Teacher will monitor and assess individual progress. Teacher will then show how to use the formula to solve for a part of the whole. Teacher will ask 25% of the oranges were eaten, if we started with 40 how many oranges were eaten? Teacher will show the formula but then show visually in boxes how to represent. Teacher will put a box on the board then draw a line horizontally cutting the box in half. In the top half of the box writes “40 oranges” to	Teacher will have a box filled with forty different numbers. On these numbers are amounts of money to represent how much money each student will have in the activity. Teacher will have around the room pieces of paper that have different items on them that are on sale. The teacher will have an original price and a percentage off. Some items have the sale price and some items need the percentage off. Teacher tells students they must buy as much as they possibly can with the amount of money they have. Teacher explains to students that they need to pick at least 2 items that you need to find the percent, at least 2 items that you need to find the sale price and 2 items that you need to find the original price. Teacher will give an example of if I had $40 I could buy the cheetos at 33%, the movie tickets at 40%	Teacher will have a local restaurants menu on the board. Teacher will also have a box filled with forty numbers representing how much percentage of tips the student will give. Teacher will explain that there is a 6% tax on every bill in this restaurant and that you have to add the percentage of tip to the pre-tax price. Teacher will explain that they are going to dinner with their family and to order what you think every member of your family would like. Teacher will explain that they will need to justify their answer using symbols and words. Students will need to show their tip amount, tax amount and total amount. Teacher will give students 30 minutes to finish project. Teacher will allow students to explain how they found their total amount to their group. Teacher will ask students to journal how they can figure a 15% tip without multiplying by .15 or by using the percent

	weight such as 1 lb for every 16 ounces. Teacher will then ask I weigh 108 lbs how many ounces? Teacher will then show how unit rate and unit price can work for other situations like this. Teacher will then ask students to create three situations and solve for cooking, running a distance, and weights of objects. Teacher will then ask students to journal about how they can unit rates and unit prices for their everyday life.	students. Teacher will ask students to create their own ratio with the blocks and explain their ratio to their partner. Then teacher will ask the partner to add to the ratio to make it similar. Teacher will then ask students to make a graph of that ratio in their notebooks. Teacher will check for understanding by walking around and asking essential questions. Teacher will then assign students to create a trail mix with nuts and chocolate that would be good to take on a camping trip. Teacher will ask students to then create a table and graph for this relationship for up to 5 parts of each. Lastly, teacher will ask students to journal about how companies might use ratios and graphs to help create their product.	represent the whole. The bottom half of the box will represent the part of the whole, cut the bottom half vertical to show 25% and 75%. Write “25% of oranges were eaten” in the smaller box, in the bigger box write “75% of the oranges were not”. Teacher will explain both ways will work to solve this problem. Teacher will give another guided practice problem similar to above and ask students to solve both ways. Teacher will then ask students to give three sets of 2 problems each and to show their work using the formula and using the visual options. Students will need to create a problem solving for the %, part of the whole and the whole. Teacher will then ask students to journal about how they figure out sales prices at stores and if they can think of different representations on using sales prices.	and the apples at 10% off. Teacher will then allow every student pick an amount from the box. Teacher will give a 30 minute time period to obtain their items and explanation of what they bought. Teacher will then introduce that there is a 3% tax on the total amount of what they bought. Teacher will then ask students to journal about what went through their minds when they were looking at the items around the room. How and why did they make the decisions they did?	formula.

	Lesson 1	Lesson 2	Lesson 3	Lesson 4	Lesson 5
Student Activities and Timeline	Student will take out their interactive student notebooks and start to create notes about their new lesson on proportions and rations. Student will solve guided practice problems throughout the lesson and take notes on unit rate and unit price. Student will create 3 sets of 3 different problems involving distance, cooking and weights. Student will then create a journal entry involving how unit rate and unit price help them make decisions in their day to day life.	Student will begin by taking notes on how to write correct versions of ratios and what ratios mean. Students will then take manipulative foam shapes and create a ratio given by teacher. Student will have a bag of shapes on their desk. Student will make the ratio with 20 squares, and place the right amount of triangles. Student will make a different scenario with a similar ratio. Students will create a ratio that involves a 4:3 relationship with any of the shapes. Students will add to the ratio but keep the ratio similar. Student will create their own ratio with the blocks and explain their ratio to their partner. Then student will create another ratio for their partner to make it similar.	Student will write percent formula in notes and explanation of percent formula. Students will solve example problem in notes and perform guided practice in notes. Student will also be thinking about how they show information in a different manner. Student will then create own problem and solve. Student will then solve using formula for part of a whole from examples and guided practice Student will then show a ratio visually using boxes. Student will then solve a guided practice problem both using visual and equation. Student will give three sets of 2 problems each and show work using the formula and using the visual options. Student will create a problem solving for the %, part of the whole and the whole.	Student will listen to directions of the activity. Student will look around the room making sure to see all the different items. Student will pick a price from the box and write it down. Student will make sure to have at least 2 items that you need to find the percent, at least 2 items that you need to find the sale price and 2 items that you need to find the original price. Student will get a 30 minute time period to obtain their items and explain what they bought. Student will then find 3% tax on the total amount of what they bought. Then explain how that little amount affected the fact that they went over or under their limit.	Student will listen to the directions of the activity and then choose their amount for tip percentage. Student will pick out items that their family would like to eat then add the prices together and figure out the tip from that amount. Then figure out the 6% tax and add those numbers together to figure out the final total. Student will then justify answer by writing why they chose the items for the family and how they tipped the waiter. Student will then share what they did with their partner. Student will create a journal on how they can figure a 15% tip without multiplying by .15 or by using the percent formula.

		Student will make a graph of that ratio in their notebooks. Student will create a trail mix with nuts and chocolate that will be good to take on a camping trip. Student will create a table with 5 parts. For example, ratio 2:1 would be shown with nuts 2,4,6,8,10 and chocolate, 1,2,3,4,5. Then student will graph the nuts as an x-value and the chocolate as a y-value. Lastly, student will journal about how companies might use ratios and graphs to help create their product.	Student will create a journal about how they figure out sales prices at stores and create a different representation on using sales prices.	Student will journal about what went through their minds when they were looking at the items around the room. How and why did they make the decisions they did?	

Ratios and Proportional Relationships

1. A runner can run a ½ mile in 3 minutes. How long will it take the runner to run 8 miles?

2. A student is making valentines. Create a graph to determine if the quantities of chocolate and jelly beans are proportional for each serving size listed in the table. If the quantities are proportional, what is the constant of proportionality or unit rate that defines the relationship? Explain how you determined the constant of proportionality and how it relates to both the table and graph.

Serving Size	**1**	**2**	**3**	**4**
Ounces of Chocolate (x)	2	3	4	5
Ounces of Jelly Beans (y)	6	9	12	15

3. Gas prices are projected to increase 167% by September 2017. A gallon of gas currently costs $3.47. What is the projected cost of a gallon of gas for September 2017?

4. A pair of shoes is marked down 25%. Its original price was $25.50. What is the price of the pair of shoes before sales tax?

5. At a store, 32 shovels were sold in June. The manager at the store wants to encourage the sales team to sell more shovels and is going to give all the sales team members a bonus if the number of shovels sold increases by 40% in July. How many shovels must the sales team sell in July to receive the bonus? Justify your solution.

6. After eating at a restaurant, your bill before tax is $72.60 The sales tax rate is 5%. You decide to leave a 15% tip for the waiter based on the pre-tax amount. How much is the tip you leave for the waiter? How much will the total bill be, including tax and tip? Express your solution as a multiple of the bill.

Ratios and Proportional Relationships

1. A runner can run a ½ mile in 3 minutes. How long will it take the runner to run 8 miles? (2 points)

.5 miles = 3 minutes ; 1 mile = 6 minutes ; 6 minutes * 8 miles = 48 minutes to run 8 miles

2. A student is making valentines. Create a graph to determine if the quantities of chocolate and jelly beans are proportional for each serving size listed in the table. If the quantities are proportional, what is the constant of proportionality or unit rate that defines the relationship? Explain how you determined the constant of proportionality and how it relates to both the table and graph. (3 points

Serving Size	**1**	**2**	**3**	**4**
Ounces of Chocolate (x)	2	3	4	5
Ounces of Jelly Beans (y)	6	9	12	15

The relationship is proportional. For each of the other serving sizes there are 3 ounces of fruit for every 1 1 ounce of chocolate (3:1).

3. Gas prices are projected to increase 167% by September 2017. A gallon of gas currently costs $3.47. What is the projected cost of a gallon of gas for September 2017? (3 points)

3.47 + 3.47 + (.67 * 3.47) = 2.67 * 3.47

Or $x3.47 = 167100$; **100x = 167 * 3.47 ;** **100x = 579.49;** $100x100 = 579.49100$;

X = $5.79

4. A pair of shoes is marked down 25%. Its original price was $25.50. What is the price of the pair of shoes before sales tax? (4 points)

The discount is 25% times 25.50. The sale price of the pair of shoes is the original price minus the discount or 75% of the original price of the pair of shoes, or Sale Price = 0.75x Original Price.

5. At a store, 32 shovels were sold in June. The manager at the store wants to encourage the sales team to sell more shovels and is going to give all the sales team members a bonus if the number of shovels sold increases by 40% in July. How many shovels must the sales team sell in July to receive the bonus? Justify your solution. (4 points)

32 shovels * .4 = amount of shovels more ; 32 + amount of shovels more = amount they must sell ; 32 *.4 = 12.8 ; 12.8 + 32 = 44.8

The team needs to sell 45 shovels because you can not sell 4/5 of a shovel.

6. After eating at a restaurant, your bill before tax is $72.60 The sales tax rate is 5%. You decide to leave a 15% tip for the waiter based on the pre-tax amount. How much is the tip you leave for the waiter? How much will the total bill be, including tax and tip? Express your solution as a multiple of the bill. (4 points)

Tip = 0.15 x $72.60 = 10.89 Tax = 0.05 x $72.60 = 3.63

Tip + Tax + Bill = = 0.15 x $72.60 + 0.05 x $72.60 = 87.93 The amount paid = 0.15 x $72.60 + 0.05 x $72.60 = 0.20 x $72.60

Summative Assessment

Assessment will be based on student's ability to solve problems in a written exam. Students will be given 6 problems in which they will use their knowledge of ratios and proportional relationships in the real world. A copy of the summative assessment/answer key (scoring rubric) is attached