

Foundations of Algebra Module 3 Unit Rate Teacher Notes

Part 1: Finding and Interpreting the Unit Rate

In each problem, record both possible rates, use an appropriate strategy to find the unit rates, and then write a short sentence explaining each unit rate.

a. 6 bags of flour weigh 30 pounds.

<u>Rate 1:</u> $\frac{6 \text{ bags}}{30 \text{ lbs}}$	<u>Unit rate 1:</u> $\frac{.2 \text{ bags}}{\text{lb}}$
Interpretation: <i>There are $\frac{2}{10}$ of a bag for each pound of flour.</i>	

<u>Rate 2:</u> $\frac{30 \text{ lbs}}{6 \text{ bags}}$	<u>Unit rate 2:</u> $\frac{5 \text{ lbs}}{\text{bag}}$
Interpretation: <i>There are 5 pounds of flour per bag.</i>	

b. 9 tennis balls come in 3 cans.

<u>Rate 1:</u> $\frac{9 \text{ tennis balls}}{3 \text{ cans}}$	<u>Unit rate 1:</u> $\frac{3 \text{ tennis balls}}{\text{can}}$
Interpretation: <i>Each can contains 3 tennis balls.</i>	

<u>Rate 2:</u> $\frac{3 \text{ cans}}{9 \text{ tennis balls}}$	<u>Unit rate 2:</u> $\frac{.33 \text{ cans}}{\text{tennis ball}}$
Interpretation: <i>1 tennis ball makes up $\frac{1}{3}$ of a can.</i>	

c. 5 gallons of gas cost \$6.50.

<u>Rate 1:</u> $\frac{5 \text{ gallons of gas}}{\$6.50}$	<u>Unit rate 1:</u> $\frac{.77 \text{ gallons of gas}}{\$1}$
Interpretation: <i>One dollar will buy .77 gallons of gas.</i>	

<u>Rate 2:</u> $\frac{\$6.50}{5 \text{ gallons of gas}}$	<u>Unit rate 2:</u> $\frac{\$1.30}{\text{gallon of gas}}$
Interpretation: <i>\$1.30 will buy 1 gallon of gas.</i>	

Part 2: Selecting the Appropriate Unit Rate

At Ralph's fruit stand 3 apples cost \$.90. You want to buy 7 apples. How much will they cost?

a. What are the two possible rates for this problem?

$$\frac{3 \text{ apples}}{$.90} \text{ or } \frac{$.90}{3 \text{ apples}}$$

b. Show each rate as a unit rate.

$$\frac{3.33 \text{ apples}}{\$1} \text{ or } \frac{$.30}{\text{apple}}$$

c. What does each unit rate tell you?

3.33 apples can be purchased for \$1 or 1 apple can be purchased for \$.30.

d. Which unit rate will help you solve the problem?

$$\frac{$.30}{\text{apple}}$$

e. Complete the table in order to determine the cost of seven apples. Then, describe the pattern you see.

As the number of apples increases by one, the cost increases by \$.30.

Number of apples, n	Cost, C (in dollars)
1	.30
2	.60
3	.90
4	1.20
5	1.50
6	1.80
7	2.10

f. Since you know the unit price, write a number sentence for the cost of seven apples. Write an equation for the cost of **any number** of apples using the variables in the table above.

$$7 \text{ apples} \times \frac{$.30}{\text{apple}} = \$2.10$$

$$C = .30n$$

Part 3: Applying the Unit Rate

In each problem, record the rate appropriate for the question asked, find the corresponding unit rate, write a short sentence interpreting the unit rate, and use this rate to find the solution to the problem.

a. Anne is painting her house light blue. To make the color she wants, she must add 3 cans of white paint to every 2 cans of blue paint. How many cans of white paint will she need to mix with 6 cans of blue?

Rate needed: $\frac{3 \text{ cans of white}}{2 \text{ cans of blue}}$

Unit rate: $\frac{1.5 \text{ cans of white}}{1 \text{ can of blue}}$

Interpretation of unit rate: Anne needs 1.5 cans of white paint for every can of blue paint.

Solution: $1.5 \times 6 = 9$ cans of blue paint

b. Ryan is making a fruit drink. The directions say to mix 5 cups of water with 2 scoops of powdered fruit mix. How many cups of water should he use with 9 scoops of fruit mix?

Rate needed: $\frac{5 \text{ cups of water}}{2 \text{ scoops of fruit mix}}$

Unit rate: $\frac{2.5 \text{ cups of water}}{1 \text{ scoop of fruit mix}}$

Interpretation of unit rate: Ryan needs 2.5 cups of water for every scoop of fruit mix.

Solution: $2.5 \times 9 = 22.5$ scoops of fruit mix

c. Donna is running around a track. It takes her 10 minutes to run 6 laps. If she keeps running at the same speed, how long will it take her to run 5 laps?

Rate needed: $\frac{10 \text{ minutes}}{6 \text{ laps}}$

Unit rate: $\frac{1.67 \text{ minutes}}{1 \text{ lap}}$

Interpretation of unit rate: Donna can run 1 lap in 1.67 minutes.

Solution: $1.67 \times 5 = 8.35$ minutes (Approximately 8 minutes and 20 seconds)

d. Carla is cleaning her classroom but decides to first help out her friends, Liz and Melissa, by cleaning both of their classrooms. It takes Carla $3\frac{1}{3}$ hours to clean both Liz and Melissa's classrooms. How long will she be working to clean all three classrooms?

Rate needed: $\frac{3\frac{1}{3} \text{ hours}}{2 \text{ classrooms}}$

Unit rate: $\frac{1\frac{2}{3} \text{ hours}}{1 \text{ classroom}}$

Interpretation of unit rate: *Carla can clean 1 classroom in $1\frac{2}{3}$ hours.*

Solution: $1\frac{2}{3} \times 3 \text{ classrooms} = 5 \text{ hours}$