My Notes

Learning Targets:

- Solve unit rate problems.
- Convert units within a measurement system, including the use of proportions and unit rates.

SUGGESTED LEARNING STRATEGIES: Marking the Text, Interactive Word Wall, Visualization, Identify a Subtask, Create a Plan

MATH TERMS

When a problem involves working with money, the unit rate is called the **unit price**. The unit price tells you the cost of one item, in this case the price of 1 bottle.

Another Science Olympiad event is Bottle Rockets. To compete in this event, a team must have a large supply of plastic bottles. The coaches and students decide to take advantage of specials on bottled drinks at two local stores. They will drink the contents of the bottles at their practices and meetings and use the bottles themselves to make the rockets.

Kroker's Market:

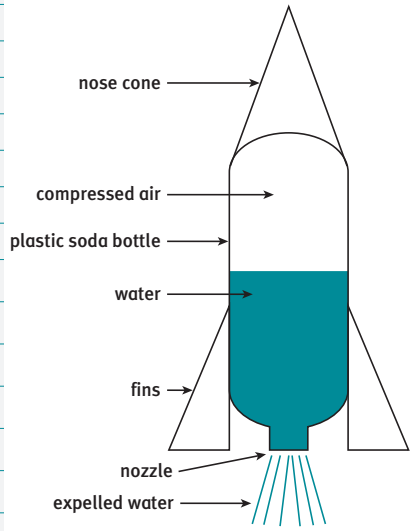
2 bottles for $2.98

$1.59 each

Slann's Superstore:

3 bottles for $4.35

$1.59 each



1. From the advertisements above, predict which store has the less expensive bottled drinks.

2. How can finding the unit rate for the drinks help you to determine which store to order the bottled drinks from?

3. Use the price chart for Kroker's Market.
   a. Determine the unit price per bottle if you buy the drinks using Kroker's 2-bottle deal.

   b. How much do the students save by using the 2-bottle deal instead of buying 2 bottled drinks at the regular price?

4. Use the price chart for Slann's Superstore.
   a. Determine the unit price per bottle if you buy the drinks using Slann's 3-bottle deal.

   b. How much do the students save by using the 3-bottle deal instead of buying 3 bottled drinks at the regular price?

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5. **Reason quantitatively.** To decide where they will get the better deal, the students cannot simply compare unit rates. Since they need a specific number of bottled drinks, the better deal may depend on how many bottled drinks they are buying.
   a. Determine how much it would cost to buy 7 bottles from Kroker's Market. (*Hint: The students can use the deal for every 2 bottled drinks they buy, but the seventh bottle will be at regular price.*) Show your work.

   b. Determine how much it would cost to buy 7 bottled drinks from Slann's Superstore. Show your work.

   c. Where should the students buy their drinks if they want to buy 7 bottles? Explain.

The students now have all of the bottles that they need. They have just a few more supplies to purchase.

One needed supply is $\frac{1}{2}$-inch PVC pipe to build bottle launchers for practice and competition. They do not need a specific amount of pipe, because they will use the extra pipe in the future. They want to find the best deals on this pipe by the foot.

READING MATH

Symbols are sometimes used to represent units in a measurement. For example, ″ is used for inches, i.e., 9″ = 9 inches. Similarly, ′ is used for feet, i.e., 8′ = 8 feet.

6. The table shows rates for the cost of $\frac{1}{2}$-inch PVC pipe at three different wholesalers.

Big S Supplies	Build It Again, Sam	Building Stuff
$1.45/2 feet	$3.98/5 feet	$1.77/2 feet
$28.77/50 feet		

   a. Find the unit rate for each of the prices at each of the suppliers above. Show all of your work.

Big S Supplies	Build It Again, Sam	Building Stuff

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b. Where should the PVC pipe be purchased? Explain why.

c. Explain why the numbers in the table make it easier to use unit rates to compare prices than using equivalent ratios.

MATH TERMS

Proportions are two ratios that are equal to each other.

$\frac{3}{5} = \frac{9}{15}$ is a proportion because the two ratios are equal.

Now, look at just the two pipe prices at Big S Supplies. When trying to decide which PVC pipe to buy at Big S Supplies, a **proportion** can also be used.

In this case, let c represent the unknown cost of the pipe for 50 feet.

$$\frac{\$1.45}{2 \text{ feet}} = \frac{c}{50 \text{ feet}}$$

To determine a rule that can be used to solve for c, think about what you already know about solving equations.

7. Write the steps you would use in solving this proportion.

$$\frac{\$1.45}{2 \text{ feet}} = \frac{c}{50 \text{ feet}}$$

8. Construct viable arguments. How can you use this proportion to determine which is the less expensive PVC pipe at Big S Supplies? Explain your reasoning.

9. The length of a car measures 20 feet. What is the length of a model of the car if the scale factor is 1 inch:2.5 feet?

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Check Your Understanding

10. The table shows rates for the cost of buying toy rocket packages. The packages cannot be broken up. What is the unit rate for each of the prices shown?

ABC Toys	Z Science Supply	K Museum Store
$49.95/5 rockets	$29.99/2 rockets	$34.95/3 rockets

11. Where should the teacher buy the toy rockets? Explain why.

12. Suppose the teacher wanted to buy exactly 6 toy rockets. Where should she buy them? Explain.

13. Explain why unit rates may be used to compare prices.

LESSON 19-2 PRACTICE

14. Gordon read 18 pages of a book about rockets in 40 minutes. What was the unit rate per minute? Per hour?

15. Renaldo earned $45 organizing the science section of the library. If he worked for 6 hours, what was his hourly rate of pay?

16. **Make sense of problems.** The price of jet fuel in North America during the last week of 2012 was recorded as $3,062 for 1,000 gallons. What was the unit price of the jet fuel?