

Mind Stretch



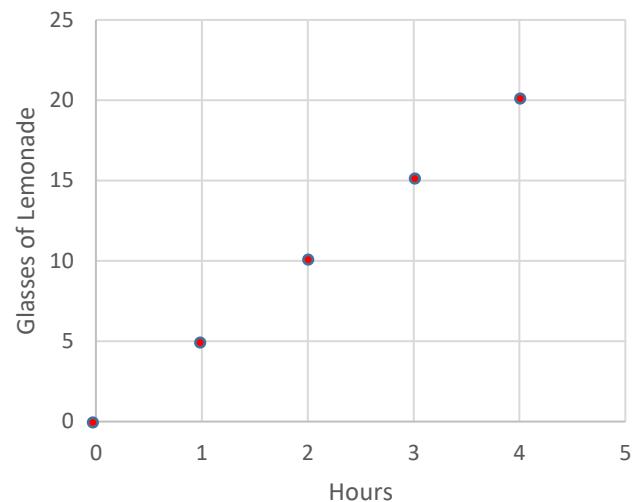
Munching on Math

- Fill in the following table, then graph, complete the tape diagram, and write the sentence.


a. Table:

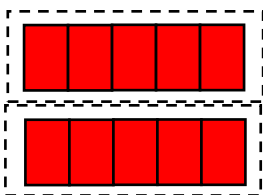
Hours	Glasses of Lemonade
0	0
1	5
2	10
3	15
4	20
x	5x

b. Graph the data in your **completed** table



c. Tape Diagram **one line** of **your table**

 = 1 glass of Lemonade



This example shows two hours of lemonade sales (10 glasses in 2 hours).

d. Describe **your tape diagram** by completing the following sentence:

If Cosmo's Café sells 5 lemonades per hour, then... **they will sell 10 in two hours, 15 in three hours, etc. They won't sell any at zero hours (i.e., when they just open).**

¹ Inspiration for this task: Textbook introduction to EE5, particularly Ready for Proportional Relationships (p. 72) found in California Go Math! Middle School Grade 8 (Houghton Mifflin/Harcourt), Problem of the Month – Movin' n Groovin, downloaded from Inside Mathematics, developed by Noyce Foundation. Munching Challenge adapted from Paying Attention to Proportional Reasoning: Support Document for Paying Attention to Mathematical Education. (2012). ServiceOntario, Ontario, Canada.

2. Complete the following sentences in your own words.

a. Unit rate means....

The unit rate is how much of something there is per 1 unit of another thing.

b. An example of this is....

The unit rate in the above situation is that Cosmo's sells **5** glasses of lemonade **per 1** hour .

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Workout

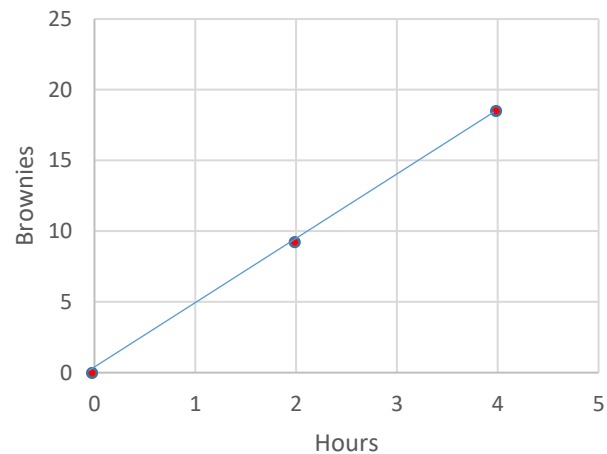


Munching on Math

Cosmo's Cafe sold 9 brownies in 2 hours. Assume that Cosmo's Cafe sells brownies at the same rate each hour

1. Complete the table and the graph.

Hours	Brownies
0	0
1	4.5
2	9
3	13.5
4	18
x	$4.5x$ or $\frac{9}{2}x$



2. How many brownies did Cosmo sell in 1 hour? (NOTE: This is the **unit rate** for the number of brownies sold by hour).

Cosmo would sell 4.5 brownies in 1 hour if they sold 9 brownies in 2 hours and sold at the same rate every hour.

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3. Where do you see the unit rate in the graph? Explain.




The unit rate is equal to the slope of the line representing brownies sold by time. The slope is 4.5. You can see this in the graph because the line travels from (0,0) to (2,9), the rise/run is $9/2 = 4.5$.

Check Your Pulse

Compare your answers with a partner. Discuss where you agree or disagree.

1. In a few words, explain what part(s) were difficult for you?

Circle the thumb that best describes how you are feeling:

	<p>I have lots of questions, I need help.</p> 	<p>Almost got it, but need practice.</p> 	<p>Got it. I can explain this to a classmate.</p> 
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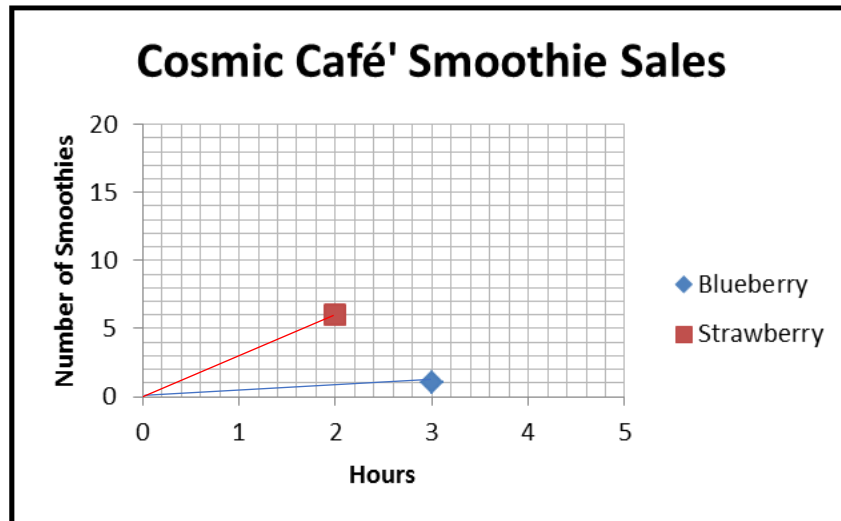
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Final Lift



Munching on Math

Cosmo's Café graphed their sales of fruit smoothies.



1. How many **blueberry** smoothies do you think Cosmo sold in **zero hours**? Why?

Cosmo didn't sell any blueberry smoothies in zero hours (that is why the graph goes through the point (0,0)).

2. Based on your reasoning above, how many **strawberry** smoothies do you think Cosmo sold in **zero hours**?

Cosmo didn't sell any strawberry smoothies in zero hours (that is why the graph goes through the point (0,0)).

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3. According to the graph, how many **strawberry** smoothies did the cafe sell each hour? Assume that Cosmo's sells smoothies at the same rate each hour.

Cosmo's Café sold 6 strawberry smoothies in 2 hours, which is a rate of 3 strawberry smoothies each hour.

4. Compare the rate of sales of strawberry smoothies to blueberry smoothies.

Strawberry smoothies were sold at a rate of 3 per hour, compared to blueberry smoothies at a rate of $\frac{1}{3}$ per hour or approximately one every three hours. The rate of sales of strawberry smoothies was 9 times the rate of sales of blueberry smoothies.

5. At these rates, will Cosmo's Café ever sell the same number of blueberry smoothies as strawberry smoothies in the same number of hours? Why or why not? Use tables, graphs, words, and/or equations to explain your thinking.

The number sold at zero hours will be the same (zero blueberry and zero strawberry smoothies). If these rates hold steady, strawberry smoothies will be sold at a rate 9 times the rate of sales of blueberry smoothies and Cosmo's Café will never sell the same amount of blueberry smoothies as strawberry smoothies in a given number of hours more than zero.

6. Cosmo's Café is growing their own fruit. Over one month:

- A lemon tree grew from 100 to 112 centimeters in height.
- A strawberry plant grew from 10 to 20 centimeters in height.

Cosmo says that the lemon tree grew more than the strawberry plant, but his gardener disagreed.

To support his thinking Cosmo said the lemon tree grew 12 centimeters ($112 - 100$) and the strawberry plant grew 10 centimeters ($20 - 10$)

The gardener observed that the lemon tree grew 12% ($\frac{112-100}{100}$) but the strawberry plant grew 100% ($\frac{20-10}{10}$).

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Who do you think is right? Explain your thinking.

The strawberry plant grew 100% (it doubled in size!), while the lemon tree only grew by 12%, so the strawberry plant grew more, proportionate to its original size. In this case the gardener is correct.

In terms of absolute growth, the lemon tree grew slightly more. In this case Cosmo is correct.

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