**You Choose**

This activity contains several word problems. Decide which form of a linear equation you wish to use to model each situation and then answer the questions.

1. **Kicking the Habit**. Carlos has been in the habit of buying a 20-ounce bottle of water at a convenience store on his way home from school every day. Each bottle costs $1.29. One of his friends tells him that at the sporting goods store in the mall there is a sale on reusable stainless steel bottles. The regular price is $29.95 but he can get one for $19.95. He can fill the reusable bottle every day with tap water, which tastes just as good as bottled water, carry it in his backpack and enjoy a cool drink at the end of the school day. Carlos doesn’t mind the extra weight of carrying a full bottle with him and he believes he can save some serious money, so he goes ahead and buys the reusable bottle. He wonders how much he will actually save. For the advantages of stainless steel water bottles, visit <http://www.thegoodhuman.com/2008/03/17/choosing-a-safe-reusable-water-bottle/>
2. Let *d* represent the number of school days after buying the reusable bottle and *s* represent the amount of money saved. Write an equation for *s* as a function of *d*.
3. In your equation, what is the slope? What does it represent in the context of the problem?
4. In your equation, what is the *s*-intercept? What does it represent in the context of the problem?
5. How much will Carlos save at the end of six weeks?
6. On what day will Carlos break even?
7. **Brittany’s Hot Tub*.*** When draining her hot tub, the height of the water in Brittany’s hot tub decreases at a rate of 2 inches per minute. After 9 minutes there are 11 inches of water in the tub. Assume that the height is decreasing at a constant rate.
8. Write an equation for the height of water left in the tub (*h*) as a function of the number of the minutes (*t*) that have elapsed.
9. How high is the tub when it is full?
10. After how many minutes will the tub be empty?
11. What values of the domain, *t,* make sense? Why?

e. What values of the range, *h,* make sense? Why?

1. **The Water Cooler.** Ms. Robinson is a guidance counselor at North High School. She has a water cooler in her office so that when students visit they may help themselves to a drink. The water cooler uses large bottles that are delivered by a bottling service. The service delivers a new bottle every other Monday.

One Monday morning a newly filled water bottle is delivered to her office. On Tuesday morning Ms. Robinson measures the level of the water in the tank and finds that it is 12.7 inches high. Three days later, on Friday morning, the level is 8.2 inches high. She wonders whether she will run out of water before the next delivery. Assume that the number of days since the bottle was delivered is a linear function of the height of the water.

1. Find the slope of the line representing the height of the water as a function of the number of school days that pass since each delivery.
2. Define the variables and write an equation for the line.
3. Predict the level of the water on the following Tuesday morning.
4. When will there be only 1 inch of water left in the bottle?
5. How high was the water level when the bottle was delivered full?
6. The bottling service plans to deliver water bottles every two weeks. Will this plan meet the needs of Ms. Robinson and her students? Explain.
7. Water bottles for this cooler are cylindrical in shape. They are 10 inches in diameter and 15 inches high. What is the volume of the bottle in gallons? Use the fact that one gallon contains 231 cubic inches.
8. **Water Boy.** Steve Ballmer, the current CEO of Microsoft, used to be the manager of his college football team. Among his duties, he had to be sure the players were hydrated. When nearby construction forced a water shut off, Steve went to the Star Market to purchase bottles of water. He needed a total of 80 liters of water. Star Market sold water in two liter bottles and in half liter bottles. What possible combinations of the small and large bottles might he purchase in order to bring 80 liters to the football team?
9. Write an equation that models the possible combinations of half liter bottles and two liter bottles that would total 80 liters. (Be sure to define the variables.)
10. What is the *x-*intercept and what does it represent?
11. What is the *y*-intercept and what does it represent?
12. If the store only had 48 half-liter bottles, how many 2 liter bottles should Steve purchase?