

Chemistry CP

Name: _____

Lab: Percent Composition of Bubble Gum

Section: _____

When you make a new compound in the laboratory, you need to determine its formula. One of the first steps in doing this is to find the relative amounts of the elements in the compound. These relative amounts are expressed as the percent composition—the percent, by mass, of each element in a compound.

The percent by mass of an element in a compound is the number of grams of the element divided by the grams of the compound, multiplied by 100%:

$$\% \text{ mass of element E} = \frac{\text{grams of element E}}{\text{grams of compound}} \times 100\%$$

The percent composition of a compound has as many percent values as there are elements in the compound. These percentages must add up to 100%.

In this lab, you will determine the mass percent of sugar in a piece of bubble gum. The sugars and flavors in bubble gum are soluble and will dissolve completely in your saliva.

Problem

What is the percent of sugar, by mass, in chewing gum?

Objectives

- Use experimental data to calculate % composition
- Apply factor-label methods and unit conversions to solve problems

Materials

1 piece of bubble gum, with wrapper
paper towel
balance

Procedure

1. Read through the entire procedure carefully, and design an appropriate data table in your notebook.
2. For your hypothesis, make a prediction about what percent of chewing gum is sugar.
3. Mass the bubble gum in its wrapper. Save the wrapper. Remember to use significant figures when using the balance.
4. Unwrap the gum and place it in your mouth. Find the mass of the wrapper.
5. Calculate the mass of the unchewed gum.
6. Chew the gum until the flavor is gone. (Meanwhile, work on questions 3-5. Use your time wisely!)
7. After 20 minutes, carefully blot the gum dry with a paper towel. Avoid getting the gum stuck to the paper towel.
8. Mass the chewed gum in its original wrapper.
9. Calculate the mass of sugar in the gum. (The mass of the other flavorings is negligible.)
10. For reliable data, repeat the experiment. (Perhaps more than one group member could work on the procedure at a time?)

Analyze and Apply Questions

1. For each trial, calculate the percent of sugar in your gum. (Show all your work, use significant figures, and include units!)
2. What was the average percent of sugar in your gum? How did this compare with your classmates' data?
3. There are 4.1 nutritional Calories per gram of sugar. How many Calories did you get from chewing a piece of gum?
4. A 5 pound (2.26 kg) bag of sugar costs approximately \$2.00. How many pieces of gum could be produced from this amount of sugar?
5. If the bubble gum sells for 5 cents a piece, how much money would be generated by the sale of the gum produced from a 5 pound bag of sugar?
6. What other factors must be considered to determine if the bubble gum business is profitable?

Remember to include a conclusion in your lab report. A good conclusion restates your findings and discusses possible sources of error.

Going Further

Design an experiment to determine which brand of sugar-containing gum is least likely to promote tooth decay.