

Mass of Sugar in Bubble Gum Lab

FOR THE PRE-LAB WRITE UP, DO NOT JUST PRINT THIS OUT, YOU NEED TO EITHER WRITE IT OUT, OR RE-TYPE IT. REMEMBER WHAT GOES INTO A PRE-LAB WRITE UP!

Introduction

Gum has been in use by people around the world from thousands of years in various forms and flavors. It has been recorded by archaeologists that men and women thousands of year ago, chewed gum in the form of tree resin lumps, they enjoyed doing so.

Chewing gum was first sold commercially in 1848 when the Curtis brothers, residents of Maine, experimented on spruce tree resin and made a sticky, rubbery material, which they tried and chewed. They found that interesting to chew it and thought that it could make money for them. This was the first time in history when the chewing gum was sold commercially. Two years after their successful experiment with the spruce tree resin, which they converted into gum, they started with their first major gum manufacturing plant. They also added flavor to the gum and introduced paraffin in it to give extra soft and rubbery feel. The plant was named "Curtis Chewing Gum Factory".

Most of gum's mass is sugar, $C_{12}H_{22}O_{11}$. Sugar dissolves readily in water, and about equally well in saliva. Most of the flavor in gum is due to the sugar, which dissolves in saliva and is swallowed, never to be tasted again. You may have also noticed that the size of a wad of gum decreases considerably in the first 10 or 15 minutes of chewing. This change in volume is due to that same loss of sugar.

Objectives:

- Determine the percent of sugar in various pieces of bubble gum.
- Calculate number of grams, moles and molecules in various pieces of gum.

Materials:

- Electronic Balance (to the nearest 0.1 g)
- Double Mint Gum
- Juicy Fruit Gum
- Spearmint Gum
- Big Red Gum
- Calculator

Procedure:

- Each table will have 4 pieces of the same gum. Each student will determine the percentage of sugar in their piece of gum, then you will combine data and determine the average percentage for each type of gum.
- 1) Measure the mass of the wrapper and the gum, together on the balance scale. Record in your data table 1.
 - 2) Measure the mass of the wrapper ONLY. DO NOT THROW AWAY THE WRAPPER! Record in your data table 1.
 - 3) Determine the mass of the unchewed gum ONLY. Record in your data table.
 - 4) Chew your gum for 10 minutes.
 - 5) Place your wrapper on the balance and tare the balance. Place your gum on the wrapper and measure the mass of the gum. Record in your data table 1.
 - 6) Record how much sugar was in the gum in data table 1.
 - 7) Calculate the percentage of sugar lost after chewing. How will you do this?
 - 8) Record your lab partner's data in Table 1 and determine the average of each.
 - 9) Once you have finished finding the average at your table find a table that has a different type of gum than you and record their findings. Do this for each of the different types of gums.

Data:

Table 1

	Mass of Wrapper & unchewed Gum (g)	Mass of Wrapper (g)	Mass of unchewed Gum (g)	Mass of Chewed Gum	Mass lost after Chewing Gum	Mass of Sugar in Gum	Percentage of Sugar in Gum
Student 1							
Student 2							
Student 3							
Student 4							
Average							

Table 2

Type of Gum	Mass of Sugar in Gum (from different table)	Percentage of Sugar in Gum (from different table)

Calculations:

Questions:

1. Using your average data, calculate the number of moles in each type of gum, assuming you have 1 piece of gum. Remember the formula for sugar is $C_{12}H_{22}O_{11}$
2. Calculate the number of molecules of sugar in each type of gum, assuming you have 1 piece of gum.
3. Which type of gum contains the most sugar? How do you know?
4. What ingredient does sugar-free gum contain? How would you find the percentage of this in a piece of gum? You may need to do some research in order to find the answer.
5. What is a possible source of error for this lab?