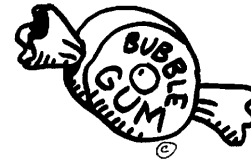


LAB: Chewing Gum & Scientific Methodologies

Introduction: Doublemint, Juicy Fruit, Big Red, and Bubblicious...there are so many choices when it comes to selecting a chewing gum. Have you ever wondered which gum is the best? Why does gum lose its flavor? Why does it toughen as you chew it? In this lab you will discover the answers to these age-old questions.



Research Question: *Why does gum lose its flavor as you chew it?*

In this lab you will follow directions and compare the starting and ending mass for each of the 3 flavors of gum in order to find the “best” gum.

Purpose: (in your own words, what are you trying to do in this lab?) _____

Hypothesis: (should be stated as: “If..., then...”) _____

Materials:

- 1 piece of 2-4 brands of gum
- weighing boat
- graph paper
- electronic balance



*******Read the lab first and then answer the following pre-lab questions*******

Pre-Lab Questions: (These must be answered before you can start the lab)

- 1) How many sticks of each brand of gum do you need?
- 2) What units of measurement are being used in this lab?
- 3) With what frequency do you find the mass of the gum?
- 4) What does “to tare” mean?
- 5) What does T_0 mean? T_2 ?
- 6) Why do you want the gum to be dry?
- 7) How do you calculate change in mass? % change in mass?

*******When finished with the pre-lab questions, have your instructor initial (or stamp) this line:** _____.

Procedure:

1. Obtain one piece of 2-4 different brands of gum from your teacher. Each partner is responsible for one brand
2. Use the gum’s wrapper as a weighing boat so it doesn’t touch the scale
3. Unwrap your sticks of gum. Indicate the gum brand name in the data table
4. Place the wrapper on the electronic balance and push the “Zero” or “Tare” button. The reading on the scale should read “0.00g”.
 - You will need to do this **each time** you weigh your gum
5. Place your piece of unwrapped gum on the wrapper and record the mass in the data table at T_0 (include units).
6. Remove the gum and wrapper from the balance.
7. Place gum in your mouth and chew for **TWO** minutes
8. When the 2 minutes is up, place the gum between your teeth and suck it dry. (Again, think about why you want the gum to be dry?)
9. Repeat steps 4-6 in order to determine its new mass
10. Repeat until you have made **11 observations**
 - If you count the T_0 , this means it goes till the 20 minutes mark
11. **Mark down which time period the gum lost its flavor during**
12. Please throw gum wrapper away after your last observation
13. Make sure to record the masses of your other group members
14. Find the change in mass and the percentage of the change in mass.
15. Create 2 graphs
16. Answer questions from Google Classroom

*******Clean up: Throw gum and wrapper into the trash can.**

Data Table / Results:

Table 1: Mass of 3 brands of gum after 2 minute intervals of chewing.

Time	Brand 1: _____ Mass (g)	Brand 2: _____ Mass (g)	Brand 3: _____ Mass (g)
T ₀			
T _{2 min}			
T _{4 min}			
T _{6 min}			
T _{8 min}			
T _{10 min}			
T _{12 min}			
T _{14 min}			
T _{16 min}			
T _{18 min}			
T _{20 min}			
End Mass (grams)			
Change in Mass (see below)			
% Change in Mass (see below)			

Sample Calculations:

For each stick of gum, determine the **change in mass** by subtracting the end mass (T_n) from the initial mass (T₀). For example, if the initial mass was 3.6g and the end mass was 2.7g, then the change in mass is:

$$3.6g - 2.7g = 0.9g$$

To determine the **% change in mass**, divide the change in mass by the initial mass. Then multiply your answer by 100.

For this example,

$$0.9g / 3.6g \times 100 = 25.0\%$$

Data Analysis/Graphs:

For each graph, make to sure to include: label the x-axis (horizontal) and y-axis (vertical), units for each axis, legend, and a descriptive title of the graph. (Think IV and DV). Get graph paper from your instructor.

- 1) Create a **BAR GRAPH** comparing the “before” and “after” mass for each brand of gum.
- 2) Make a **LINE GRAPH** to show the change in the gums’ mass over the time chewed. Put all 3 brands of gum on the same graph. Use a different color for each line.