

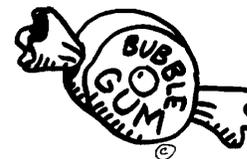
Name: \_\_\_\_\_

Date: \_\_\_\_\_

Period: \_\_\_\_\_

## 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:

- 2 pieces of the same brand of gum
- 2 pieces of another brand of gum
- weighing boat
- electronic balance
- graph paper



\*\*\*\*\*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 2 pieces of 2 different brands of gum from your teacher. Each partner is responsible for one brand.
- 2) Obtain a weighing boat from the lab counter.
- 3) Unwrap your two sticks of gum (make sure you wash your hands first before touching the gum). Indicate the gum brand name in the data table.
- 4) Place the weighing boat on the electronic balance and push the “Zero” or “Tare” button. The reading on the scale should read “0.00g”. (*make sure the scale is set to indicate grams*)
- 5) Place both pieces of unwrapped gum on the weighing boat and record the mass in the data table (*include units*).
- 6) Remove the gum and weighing boat from the balance.
- 7) Place **BOTH PIECES** of gum in your mouth and chew for 2 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) Continue steps 7-9 until your gum has lost ALL of its flavor, or until the data table is used up.
- 11) Once the gum has lost its flavor record the final mass as you did in steps 8 and 9.
- 12) Repeat all steps for the remaining two brands of gum.

\*\*\*\*\*Clean up: Throw gum and weighing boat into the trash can. Have your teacher initial this line: \_\_\_\_\_

**Data Table / Results:**

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

<b>Time</b>	<b>Brand 1: _____ Mass (g)</b>	<b>Brand 2: _____ Mass (g)</b>	<b>Brand 3: _____ Mass (g)</b>
T <sub>0</sub>			
T <sub>2 min</sub>			
T <sub>4 min</sub>			
T <sub>6 min</sub>			
T <sub>8 min</sub>			
T <sub>10 min</sub>			
T <sub>12 min</sub>			
T <sub>14 min</sub>			
T <sub>16 min</sub>			
T <sub>18 min</sub>			
T <sub>20 min</sub>			
T <sub>22 min</sub>			
T <sub>24 min</sub>			
T <sub>26 min</sub>			
<b>End Mass (grams)</b>			
<b>Change in Mass (see below)</b>			
<b>% Change in Mass (see below)</b>			

**Sample Calculations:**

For each stick of gum, determine the **change in mass** by subtracting the end mass (T<sub>n</sub>) from the initial mass (T<sub>0</sub>). 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.

**Questions:**

- 1) Restate the purpose of the lab: \_\_\_\_\_
- 2) Which brand had the longest lasting flavor? Why do you think it did?
- 3) Which brand had the least flavor (or shortest duration)? Why do you think it did?
- 4) Did the data support your hypothesis? Why or why not?
- 5) Why is the gum losing mass as you chew the gum?
- 6) What were some errors with this lab?
- 7) What do you think would happen to the mass of the gum if you kept chewing the gum for a few hours?
- 8) What other information would you need to know to perform a more complete analysis of each gum?

**Conclusion:**

In the space below, write a 1-2 paragraph conclusion for the lab activity. Be sure that you address the important parts of a good conclusion as discussed in class.

