

Name _____
Lab # _____

Date _____



Lab: Density Sweet Density!

Problem: How does the density of a candy bar change when it is cut in half?

Introduction: Your group will have a Snickers and Milky Way candy bar in which to experiment characteristics of density. Density is a measure of the mass of an object or substance per unit of volume. It is how tightly the atoms are packed in the space the substance occupies. When we heat or cool the substance, we change the arrangement of the atoms by causing them to move closer or further apart. Likewise, if we add or remove pressure, we have caused a corresponding change in the closeness of the atoms. What would happen if we cut an object in half? Are we changing the internal arrangement of the atoms? Think about this when you design your hypothesis regarding the above problem. You may eat the candy bars after the experiment is completed. Make sure you have all your data first.

General Directions: Develop experimental procedures in which you compare the density of a whole candy bar to half or quarter of that same candy bar. Round all your calculations and measurements to the nearest tenths. Use complete sentences for all steps except tables, graphs, formulas and materials lists. You must calculate the density for both candy bars (Snickers, Milky Way) and compare them with the densities of half of the bars. Be careful because you need to precisely calculate the volume of your samples. Your completed lab report must include:

1. On a clean sheet of paper place your full heading, title, and problem for your lab.
2. Design a hypothesis that states your opinion about the problem.
3. Make a materials list of all the things that you need to solve the problem.
4. Make a list of **Procedures** that you will follow to do your investigation.
Note: write in complete sentences and in numbered sequence.
 - a. Include all steps used to measure the density of both sizes of the candy bars.
 - b. What formulas must you use to calculate density?
5. Make a data table for the data you will collect.
Note: Make sure you have the data for both candy bars.
6. Have your Hypothesis – Procedure checked by your teacher.
7. Do your experiment and collect your data.
8. Make a line graph of your data. Plot volume on the x-axis and mass on the y-axis.
Note: Be sure to make your scale to use as much of the graph paper as possible.
9. Write a paragraph **conclusion** based on your data. Did your conclusion support your hypothesis? Why or why not? What is the relationship between the variables? Why do you believe this relationship exists?
10. Answer analysis and conclusion questions.

Include all measurements and conversions from millimeters to centimeters. Show all math work!

Analysis and Conclusions

1. According to the experiment you just did, what would happen to the volume, mass, and density of the candy when you cut it in half?
2. The density of aluminum is 2.7 g/cm^3 . What would happen to the density of a piece of aluminum if it were cut in half?
3. What would happen to the density of aluminum if it were heated to just below its melting temperature?
4. The density of liquid water is 1 g/cm^3 . What would happen to the candy bars if placed in a tub of water? Why?
5. If you took a textbook and found the Mass to be 1800 grams and the length = 15 cm, width = 5 cm, and height = 20 cm, what would the density of the book be? Be sure to show all work and formulas.
6. If you cut the book in half, what would its density be? How do you know?
7. If the book were then placed in liquid water would the book float or sink? Why?
8. Which candy bar turned out to be most dense?
9. Why do you believe one candy bar was denser than the other?
10. Which candy bar acts most like the density of our bodies? Why?