Density Lab

Prelab Questions:

1. What is density?
2. Which is heavier, a pound of lead or a pound of feathers?
3. Which is denser, lead or feathers?
4. Are your answers to questions 2 and 3 the same? Why or why not?.

Purpose: Find and compare the density of various materials.

General instructions: since density is the ratio of mass to volume for an object, your task in each part of this laboratory is to first determine the mass of the given material, then its volume. Afterwards you can easily find the density of the each material.

Part A: Blocks.

Use a balance to find the mass of a block of unknown material.

Since your block has a regular geometric shape, you can determine its volume simply by measuring its length, width, and height. The volume will be the product of those three numbers.

Repeat this process for a second block.

Part B: Water.

How can you find the mass of water? Find the mass of an empty graduated cylinder, then add water until the cylinder is over half-full and find the mass of the cylinder plus the water. Subtract to find just the mass of the water.

To find the volume of water used, just read the graduated cylinder.

Determine the density of water.

Repeat this with a second graduated cylinder.

Part C: Glass marbles.

Use a balance to find the mass of two or three marbles.

How can you find the volume of the marbles? You could use calipers or a micrometer to find the diameter of each marble and then apply the mathematical formula for the volume of a sphere and add the volumes of the marbles you used. Perhaps an easier method would be to use water displacement. Partially fill a graduated cylinder with water and note the water level. Add the marbles to the water without splashing and note the new water level. The difference is the volume of the marbles.

Part D: Mystery Material

Obtain an object from you instructor. Figure out how you can determine its density. Record and explain your method and your data.

Questions:

5. Compare the densities of the two blocks. Are they the same (or very nearly the same) or different?

6. Answer question 5 for the two samples of water.

7. A certain piece of wood has the same mass and weight as a certain glass marble. Explain what happens to each object when they are placed into a tub of water. Explain the behavior of each object.

8. Why do Helium balloons float in air?

9. How can you tell if a gold ring is pure gold or has had some cheaper metal added to it without destroying or damaging the ring.

You will write a formal report for this experiment. The data tables on the back page are just a guide to help you figure out how to design tables in the future. You may write on them today but you will not turn in this actual paper.

Density Lab Data Tables

Part A: Blocks.

1) Mass of first block _____ g

2) Length of first block _____ cm

3) Width of first block _____ cm

4) Height of first block _____ cm

5)Calculated volume of first block _____ cm^3

6) Density of first block _____ g/cm^3

7) Mass of second block _____ g

8) Length of second block _____ cm

9) Width of second block _____ cm

10) Height of second block _____ cm

11)Calculated volume of second block _____ cm^3

12) Density of second block _____ g/cm^3

Part B: Water

13) Mass of empty graduated cylinder#1 _____ g

14) Mass of clyinder + water#1 _____ g

15) Calculated mass of water#1 _____ g

16) Volume of water#1 _____ mL

17) Density of water#1 _____ g/mL

18) Mass of empty graduated cylinder#2 _____ g

19) Mass of clyinder + water#2 _____ g

20) Calculated mass of water#2 _____ g

21) Volume of water#2 _____ mL

22) Density of water#2 _____ g/mL

Part C: Glass marbles

23) Mass of marbles _____ g

24) Volume of water _____ mL

25) Volume of water + marbles _____ mL

26) Calculated volume of marbles _____ mL

27) Density of marbles _____ g/mL

Part D: Mystery Material

(Create your own table here!)