

Name:

Partners' name(s):

Laboratory 2: Density

Density/Study of Matter (Theory-Test cycle)

- Objects to measure mass and volume: blocks of wood, Styrofoam, rubber stoppers, rocks.
- String, rulers, graduated 1000 ml beakers, balances, 500 ml plastic graduated cylinders
- Butcher paper and pens

1. Safety Quiz
2. Lab Quiz 1
3. Locker check-out

Lecture Notes:

Record your observations from the demonstration into the space below and draw a diagram in the empty space.

Explain why a substance sinks or does not sink in another substance.

Explain the difference between Coke® and Diet Coke®.

What is density? What are the units of density?

Can two items of different size have the same density? Give an example.

How is density calculated?

- 1. What is the density of a block that has a mass of 252 grams and a volume of 328 ml?**

- 2. What is the volume of a liquid that has a density of 1.45 g/cc and a mass of 28 grams?**

- 3. What is the mass of a rock that has a volume of 48 cm³ and a density of 2.68 g/cm³?**

Scientific Method Data/Test loop

What is the scientific method?

Finding Density

Purpose: Come up with your own objective for this lab

Procedure and Observations and Data:

1. In this lab you will work in groups of three. A) Make a visual inspection of the four objects given to your group. Then, make a hypothesis by ranking the four objects from most dense to least dense. Record this hypothesis below. B) Pick up the four objects given to your group. Then, make a hypothesis by ranking the four objects from most dense to least dense. Record this hypothesis below.

Hypothesis: After Visual inspection

1.
2.
3.
4.

Hypothesis: After Holding

1.
2.
3.
4.

2. Measure the mass of each object and record in a data table that has a title and shows the units.

Table 1: Create your own data table below for recording each of the objects' masses.

3. Determine the best way to measure the volume of the objects using the materials given. (String, rulers, beakers, graduated cylinders, and water). Write how you measured each object below. Show your calculation for each of the volumes. Record this data into another table.

Procedure for finding volume

- a. Rock

Volume Calculation:

- b. Styrofoam ball

Volume Calculation:

- c. Wooden block

Volume Calculation:

d. Rubber stoppers

Volume Calculation:

Table 2: Volume

Create your own data table below for recording each of the objects' volumes.

Calculations

Using the measured masses and volumes, calculate the densities of each object. Show the setup for one of the following four calculations in your lab journal. Record all of the results of the four calculations in a table.

Density of rock:

Density of rubber stopper:

Density of wooden block:

Density of styrofoam ball:

Questions and Answers:

1. Rank the 4 objects in order of the densities you calculated

1.
2.
3.
4.

2. How is the new rank different from your original hypothesis?

3. Explain your theory of why one substance is more dense than another. What causes a substance to have more mass in a certain volume? You might want to answer question 4 to help answer this question.

4. Because atoms and molecules are so small we cannot see them. Even with the best microscopes, we are given a very limited view of molecules. Density is one way of “probing” at matter. Now you can come up with a model that helps yourself and others see what causes an object to have density. Use your imagination to draw a diagram of what it might look like at the smallest particle level of each of these objects. Draw “Black Box” diagrams (as explained in the notes at the beginning of the journal) on butcher paper and copy your diagram into the space below.

Rock	Rubber stopper
Wooden block	Styrofoam

Conclusions and Reflections

What did you learn about density that you did not know before?

What is something from the lab today that helped you understand density a little better?

Can you say you really understand density if you memorize the definition? Explain.

Do you think there is a difference between what a concept is and what a fact is? If so, what is the difference? Can you think of examples of each from this lab?
