

Density of Liquids

Recommended grades level(s) 10-12

Time Duration: - 2- 50 minutes lessons

Objective(s):

Students will determine the density of various amounts of different liquids related to intrinsic and extrinsic properties.

Materials and/or Resources:

Graduate cylinder

Triple beam

Various liquids

Background Information:

In this lab exercise you will determine the density of various amounts of different liquids in order to determine if the density is an intrinsic property (depends on the type of matter) or if density is an extrinsic property (dependent on the amount of matter). Density is the ratio of mass of an object to its volume and is generally reported in grams per cubic cm (g/cm³). You need to remember that an ml is the same as a cubic centimeter.

Procedures:

1. Write your hypothesis now on your own sheet of paper.
2. Read the following steps and construct a data table for the experiment
 - Determine the mass of a clean dry graduated cylinder – record in data table.
 - Measure out a given volume of one of the liquids (A,B,C) – record in data table.
 - Determine the mass of the graduated cylinder and the liquid together – record.
 - Subtract the mass of the cylinder from the mass of the liquid chosen above – this gives you the mass of the liquid alone – record
 - Calculate the density of the liquid by dividing the mass by the volume – record
 - Repeat the above steps for 2 different amounts of the same liquid.
 - Repeat the above steps for the other 2 liquids provided.
3. Graph the data you collected – construct a bar graph of density (y-axis) versus type of liquid (x-axis) and construct a line graph (all 3 liquids on the same graph) of volume (x axis) versus mass (y-axis).

Reproducible Materials:

Handout 1

Development Resources:

<http://www.achers.net/lessons/posts/367.html>.

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Write a conclusion that includes the following items:

- 1) Compare the three densities you calculated for each liquid (A1, A2, A3), and compare the average density of the three different liquids (A,B,C).
- 2) Discuss the two graphs – what does each show about density, what does the line graph show about the three liquids, does the line graph show anything that helps support or contradict your hypothesis?
- 3) How does the data support or contradict your hypothesis?
- 4) Make a final statement of whether density is intrinsic or extrinsic.
- 5) Discuss how this data could be used to determine the identity of these liquids if the labels fell off their bottles.