

DENSITY of SOLUTIONS

PRE-LAB DISCUSSION:

The density of solutions increases with the concentration of dissolved solids in the solution. You will use this fact to determine relative concentrations of salt solutions.

Chemistry is the study of matter, which is usually defined as anything that has mass and volume. You already have some experience determining mass and volume in the lab. In this experiment, you will measure volumes of solutions directly, and mass by difference. You will also use the relationship between the mass and volume of a substance to find its density.

Volumes of liquids are measured directly in a graduated cylinder. Liquid quantities dealt with in the laboratory are usually expressed in milliliters (mL), although larger quantities may be expressed in liters (L).

$$\text{Density} = \frac{\text{mass}}{\text{volume}} \quad \text{or} \quad D = \frac{M}{V}$$

PURPOSE:

The purpose of the lab is to determine the relative concentrations of salt in three solutions containing sodium chloride (table salt).

PROCEDURE:

1. Clean and dry your 10 mL graduated cylinder.
2. Weigh the cylinder carefully and record its mass to the nearest thousandth of a gram (**3rd decimal place**) in every space in your data table under the heading "Mass of **empty** graduated cylinder".
3. Take the cylinder to the back table and measure out EXACTLY 10.00 ml of a salt solution. Record this volume on your data sheet, being certain to record it next to the correct solution label.
4. Go back to your lab station and reweigh the cylinder and contents and record the mass to the nearest thousandth.
5. Repeat steps 1 - 4 for the other two solutions.
6. Clean and dry your graduated cylinder and return it to the drawer.
7. Clean up your lab station. Be sure to put the scale away in the cupboard.

RESULTS:

Observations and Data

<u>Liquids</u>	Mass of Graduated Cylinder and Contents	Mass of empty graduated cylinder	Volume
Solution "A"			10.00 mL
Solution "B"			10.00 mL
Solution "C"			10.00 mL

Calculations

For each of the solutions:

1. Calculate the mass of the solution

Mass of Graduated Cylinder and Contents - Mass of **empty** graduated cylinder = Mass of Solution

2. Calculate the DENSITY of the solution

Mass of solution ÷ 10.00 mL = Density (units should be $\frac{\text{grams}}{\text{mL}}$)

In your abstract, be sure to conclude which solution is MOST concentrated and which is LEAST concentrated and state HOW YOU KNOW THIS.