B. Density of Pure Liquids

Clean and dry a 25-mL graduated cylinder (a rolled-up paper towel should be used). Weigh the dry graduated cylinder to the nearest mg (0.001 g).

Add distilled water to the cylinder so that the water level is above the 20-mL mark but below the 25-mL mark. Use a thermometer (caution!) to determine the temperature of the water in the cylinder to the nearest degree.

Reweigh the cylinder to the nearest milligram.

Record the exact volume of water in the cylinder, to the level of precision permitted by the calibration marks on the barrel of the cylinder.

Calculate the density of the water. Compare the measured density of the water with the value listed in the handbook for the temperature of your experiment.

Clean and dry the graduated cylinder.

Obtain an unknown liquid and record its identification number. Determine the density of the unknown liquid, using the method just described for water.

C. Density of Solutions

The concentration of solutions is often conveniently described in terms of the solutions' *percentage composition* on a weight basis. For example, a 5% sodium chloride solution contains 5 g of sodium chloride in every 100 g of solution (which corresponds to 5 g of sodium chloride for every 95 g of water present).

Prepare solutions of sodium chloride in distilled water consisting of the following percentages by weight: 5%, 10%, 15%, 20%, 25%. Prepare 25 mL of each solution (you do *not* have to prepare 100 g of each solution to be able to use the percentage composition). Make the weight determinations of solute and solvent to the nearest milligram.

Using the method described earlier for samples of *pure* liquids, determine the density of each of your sodium chloride solutions. Record the temperature of each solution while determining its density.

Construct a graph of the **density** of your solutions *versus* the **percentage of NaCl** the solution contains. What sort of relationship exists between density and composition?

Use a handbook of chemical data to determine the true density of each of the solutions you prepared. Calculate the error in each of the densities you determined.