

## CHAPTER 12 LEARNING OBJECTIVES

To satisfy the minimum requirements for this course, you should master the following learning objectives.

Be able to identify the six types of solutions.

Understand what is meant by the terms; saturated, unsaturated and supersaturated.

Be able to describe the energy changes that occur in the solution process in terms of the solute-solute, solvent-solvent, and solute-solvent attractive forces.

Define percent by mass, mole fraction, molarity, and molality, and

- calculate concentrations in any of these concentration units.
- convert concentration in one concentration unit into any other unit.

Understand to what degree temperature affects the solubility of solids and gases in liquid phase solutions.

Understand how pressure affects the solubility of solids, liquids and gases in liquid phase solutions.

Use Henry's Law to calculate either the solubility of a gas or the partial pressure above a given liquid.

Discuss the concept of colligative properties and be able to

- describe the effects of solute concentration on the vapor pressure (Raoult's Law), boiling point, freezing point, and osmotic pressure of a solution.
- explain deviations from Raoult's Law in terms of intermolecular forces.
- calculate the vapor pressure of any volatile component in a solution.
- calculate the boiling point, freezing point, and osmotic pressure of a solution containing a non-volatile solute in a volatile solvent.
- determine the concentration and molar mass of a nonvolatile nonelectrolyte from its effect on the colligative properties of a solution.
- explain the difference between the magnitude of changes in colligative properties caused by electrolytes compared to those caused by nonelectrolytes.

Understand the meaning of the Key Words on page 545.