**UNIT: SOLUTIONS**

1. A **solution** is a **homogeneous mixture** composed of two parts:
    - Solute - what is being dissolved
    - Solvent - what is doing the dissolving
    - **Remember the solute is soluble in the solvent.**

2. Water is the universal solvent, and solutions made with water are called aqueous solutions (aq).

3. **Solubility of a solute** in water information is provided on **TABLE F.** This table identifies if a solute is soluble or insoluble by following solubility guidelines.

4. Solubility of the solute in water depends on temperature. Solubility curve **(CHART G)** shows how much solute can dissolve in 100 grams of water as the solvent at various temperatures.
    - The solubility of **solids in liquids** usually increases as temperature increases.
    - The solubility of **gases in liquids** usually decreases as temperature increases.

5. Solubility information: **(CHART G)**
    - **Saturated solution**: holds maximum solute (lies on the curve)*** **Equilibrium condition**
    - **Unsaturated solution**: holds less solute than the maximum (point lies under the curve)
    - **Supersaturated solution**: holds more solute than the maximum (point lies above the curve)

6. **LIKE DISSOLVES LIKE**… Ionic or polar substances tend to dissolve in a polar solvent. Non-polar solutes dissolve in a non-polar solvent. This explains why oil (non-polar) and water (polar) don't mix.

7. **Dilute/Weak** solutions contain a small amount of solute dissolved in the solvent.
   **Concentrated/Strong** solutions contain a large amount of solute dissolved in the solvent.

8. The strength of a solution can be measured in different ways: Molarity or Parts per Million,

9. Molarity (M) - moles of solute per liter of solution

$$\mathbf{M = \frac{Moles}{liter}}$$ **Found on Reference Table T**

10. Parts per Million (ppm) = $\frac{\text{grams of solute}}{\text{Total grams of solution}} \times 10^6$ **Found on Reference Table T**

11. When solute particles dissolve in water, the boiling point is raised above the normal boiling point of water (**boiling point elevation**), and the freezing point is lowered by (**freezing point depression**). The change in temperature is based on the number of solute particles in solution. The more particles… the bigger the change.

14. **Ionic compounds** ionize/**dissociate in water**, breaking apart, causing greater changes in boiling points and freezing points of water then covalent compounds. NaCl dissolved in water causes a larger temperature change versus $C_6H_{12}O_6$