

- 1) Describe the characteristics of a solution and identify the various combinations of solid, liquid, and gas that can combine to form a solution.
All solutions are homogeneous mixtures containing two or more substances. Solutions may be solid, liquid, or gas, and can consist of any combination of the three except gas + solid.
- 2) What are the two components of a solution? List the properties of each:
 - a. **Solvent:** the major component; frequently the liquid (H₂O); thought of as the “active” component—acts to dissolve the solute.
 - b. **Solute:** the minor component; we will see solids, liquids & gases; thought of as the component that gets dissolved by the solvent.
- 3) What does it mean for a material to be soluble? What predicts the solubility of a material?
Soluble means that a substance will dissolve in a given solvent. Materials of similar polarity will be soluble (“Like dissolves like”).
- 4) What is it called when two liquids are soluble? When two liquids are insoluble?
Soluble liquids are **miscible**; insoluble liquids are **immiscible**.
- 5) What kinds of materials (polarity) can dissolve in polar solvents like H₂O? What intermolecular forces are responsible in each case?
 - a. **Ionic solutes** dissolve in polar solvents by ion-dipole forces.
 - b. **Polar solutes** dissolve in polar solvents by dipole-dipole forces.
 - c. **Nonpolar solutes** are slightly soluble in polar solvents by dipole-induced dipole forces (another kind of dispersion force).
- 6) Why do two nonpolar materials mix?
Two nonpolar materials have no strong cohesive forces to prevent the natural mixing (disorder/entropy).
- 7) What is solvation? What factors affect the rate of solvation?
Solvation is the process in which the solvent and solute interact during dissolving. Agitation (stirring) speeds up solvation; Increased temperature (higher KE) speeds up solvation; Smaller particle size—increased surface area—increases rate of solvation.
- 8) What is the role of intermolecular forces in solvation?
The attractive forces between solute and solvent particles overcome the forces holding the solute particles together, thus pulling the solute particles apart.