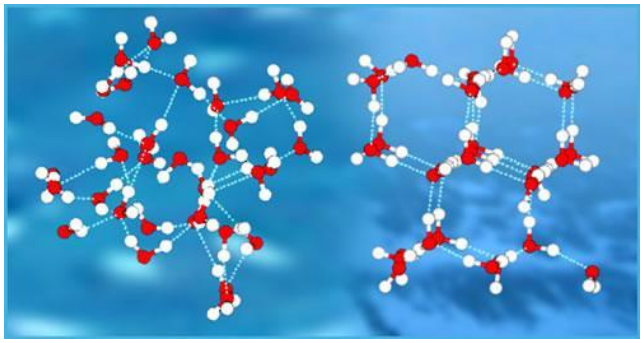
Chapter 15 Outline
Water and Aqueous Systems

Section 15.1 – Water and Its Properties

- A water molecule has a _____ because the oxygen is much more _____ than the hydrogens.
- This strong _____ causes water molecules to have strong _____ for each other. These attractions are called _____.
- _____ describes many of the properties of water such as _____.
- _____ is one of the few substances in which the solid state is _____ than the liquid state.
- This is the reason that ice _____ in water.
- The structure of _____ is a regular _____ framework of water molecules arranged like a _____.



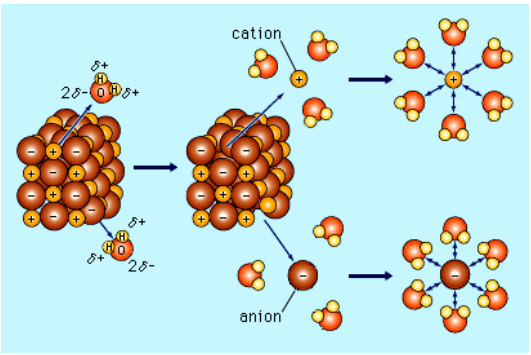
- When ice _____, the framework _____ and the water molecules pack close together, making the liquid _____ than the ice.

Section 15.1 Assessment

1. What causes the high surface tension and low vapor pressure of water?

2. How would you describe the structure of ice?

Section 15.2 – Homogeneous Aqueous Systems

- An _____ is water that contains _____ substances.
- In a _____, the dissolving medium is the _____, and the dissolved particles are the _____.
- A _____ dissolves a _____.
- As individual solute _____ break away from a _____, the negatively and positively charged _____ become surrounded by _____ molecules and the ionic crystal _____.
- As 

a rule, _____ solvents such a _____ dissolve _____ solutes such as _____.
- As a rule, _____ solvents such a _____ dissolve _____ solutes such as ____.
- This relationship can be summed up in the expression "_____ _____."
- An _____ is a compound that conducts an _____ when it is in an aqueous solution or in the molten state.
- All _____ compounds are electrolytes because they dissolve into _____.
- A _____ electrolyte _____ breaks into _____.
- A _____ electrolyte only _____ breaks into _____.
- A substance that does not conduct electricity is a _____.

- Some _____ compounds are nonelectrolytes in a _____ but become electrolytes when _____ in water.
- A compound that contains _____ is called a _____.
- In writing the formula of a hydrate, use a _____ to connect the _____ of the compound and the _____ of water molecules per formula unit.
- Example:

Section 15.2 Assessment

1. In the formation of a solution, how does the solvent differ from the solute?

2. Describe what happens to the solute and the solvent when an ionic compounds dissolves in water.

3. Why are all ionic compounds electrolytes?

4. How do you write the formula for a hydrate?

5. Which of the following substances dissolve to a significant extent in water?

   a. CH_4 b. KCl c. He

   d. $MgSO_4$ e. HCl f. $NaHCO_3$

Section 15.3 – Heterogeneous Aqueous Systems

- A _____ is a mixture from which particles _____ upon standing because the solute particles are very _____.
- An example is _____.

- A _____ is a heterogeneous mixture containing particles that are _____ than a _____ but larger than a _____.
- A colloid's particles do not _____ with time.
- A colloid's particles are _____ to be separated by _____.
- Examples include _____.

Section 15.3 Assessment

1. How does a suspension differ from a solution?

2. What distinguishes a colloid from a suspension and a solution?

3. Could you separate a colloid by filtering?