

- I. Water
  - A. Bent molecule
  - B. Covalent bonds
  - C. Has polarity
    - 1. oxygen end is negative
    - 2. hydrogen 'end' is positive
  - D. dissolves ionic substances because dipole is favorable to the bond with its ionic mate
  - E. Unusual properties
    - 1. Depend on the polar nature of water molecule, and hydrogen bonding
    - 2. Solid state less dense than liquid state
    - 3. High specific heat (or heat capacity)
    - 4. High heat of vaporization
    - 5. Readily dissolves ionic substances
- II. Solid
  - A. Hydrogen bonds
    - 1. cause it to have rigid open structure
    - 2. greater volume than liquid phase
  - B. structure is a crystal with hexagonal symmetry
- III. Liquid
  - A. More dense than solid
    - 1. molecules fit together more closely
    - 2. solid floats on the liquid
  - B. high surface tension
    - 1. strength of surface allows it to
      - a. bulge above rim of container
      - b. climb inside walls of containers
      - c. support small objects like sewing pins and bugs
    - 2. due to hydrogen bonding
    - 3. non-polar substances tend to reduce the surface tension
  - C. high energy of vaporization
    - 1. takes large amount of energy to break the attraction of the hydrogen bonds
      - a. amount is increased at high pressure (boils at higher temperature)
      - b. amount is reduced at low pressure (boils at lower temperature)
    - 2. air can become saturated with water, so no more can evaporate
      - a. greater capacity to hold water at higher temperature
      - b. cooling air reduces its capacity, therefore condensation will occur
        - 1) dew point temperature is the temperature of 100% saturation for a given amount of water in air
        - 2) condensation releases some heat, so the local environment is slightly heated when condensation occurs:  
does not cool as quickly as it would without condensation