1. Heating curve for water (Figure 13.7)
   (a) Meaning of sloped and straight parts of the graph. Label axis.
   (b) Freezing point, Melting point, Boiling point
   (c) Heat of Fusion: Energy required to convert 1 gram of ice at 0 ℃ to water at 100 ℃. Water = 335 J/g
   (d) Heat of Vaporization: Energy required to convert 1 gram of water at 100 ℃ to steam at 100 ℃. Water = 2.26 kJ/g
   (e) Phase transitions:
      i. Solid $\underset{\text{Freezing}}{\overset{\text{Melting}}{\rightleftharpoons}}$ Liquid
      ii. Liquid $\underset{\text{Condensation}}{\overset{\text{Evaporation}}{\rightleftharpoons}}$ Gas
      iii. Solid $\underset{\text{Deposition}}{\overset{\text{Sublimation}}{\rightleftharpoons}}$ Gas
2. Calculate energy required to move from one state of matter to another and to change temperatures (Ex 13.1 and 13.2)
   (a) Energy required to heat an object: q = msΔT or heat = (mass)(specific heat)(change in temp)
   (b) Energy required to change phase. q = mΔH or heat = (mass)(Heat of Fusion or Vaporization)
3. Intermolecular Forces:
   (a) General Properties
      i. Intermolecular vs Intramolecular
      ii. Attractive force between molecules
      iii. Weak compared to covalent bonds (41 kJ/mol to vaporize vs. 400 kJ/mol to break all OH bonds))
      iv. Effect on physical properties (Boiling point, Melting point, Vapor Pressure)
   (a) London Dispersion Forces:
      i. Attractive force between all molecueles
      ii. Proportional to the size/mass of a molecule
      iii. Due to instantaneous polarization and formation of dipoles in nonpolar molecules
      iv. Relative Strength: ¡ 1-10 kJ/mol (weakest IMF)
      v. Be able to draw an example
   (b) Dipole-Dipole:
      i. Occurs between polar molecules
      ii. Attraction due to seperation of partial charges (electrostatic)
      iii. Relative Strength: 3-4 kJ/mol
      iv. Be able to draw an example
   (c) Hydrogen bonding (definition and effect on physical properties of compounds)
      i. Requirements (H bonded to N, O, F and polar molecules)
      ii. Effect of hydrogen bonding on physical properties
      iii. Relative Strength: 10-40 kJ/mol
      iv. Be able to draw an example
   (d) Ionic:
      i. Between full positive and negative charges (ie electrons were gained or lost)
      ii. Metal-Nonmetal

   iii. Electrostatic
   iv. Relative Strength: 10-50 kJ/mol(strongest IMF)
   v. Be able to draw an example

4. Vapor Pressure and Boiling Point - Know trends and explainations for them
   (a) Relationship between vapor pressure, boiling point, and atmospheric pressure
   (b) Figure 13.6.
   (c) Vapor Pressure
      i. VP $\propto$ Temperature
      ii. VP $\propto$ 1/Boiling Point
      iii. VP $\propto$ 1/IMF
      iv. VP is independent of volume of liquid or container
   (d) Boiling Point
      i. BP $\propto$ IMF
      ii. BP $\propto$ 1/VP
      iii. BP $\propto$ Atmospheric Pressure
      iv. BP $\propto$ 1/Elevation
5. Know the following items not covered in lecture:
   (a) Surface tension
   (b) Capillary action
   (c) Meniscus
6. The chapter review in the book is useful