Review List–AP Chem Name_____
Chapter 5 - Gases

- **Ch. 5 Review Practice**
  - Text book Review WKS
  - Multiple Choice Review
  - Optional: In Study Guide: p. 96 # 4, 14, 15, 17, 19, 29, 30, 31 and p. 105 # 4, 13

Pressure of Gases

- Define and explain pressure as a force applied to an area $\left(P = \frac{Force}{Area} \right)$
- Explain the physical basis for gas pressure *(due to collisions of molecules)*
- Explain why there is atmospheric pressure
- Convert between different units of pressure *(Pa, atm and mm Hg)*
- Explain how to measure gas pressure (atmospheric and in the laboratory) and describe the equipment used (barometer and manometer) and how it works

The Gas Laws (Boyle's Law, Charles's Law, Avogadro's Law)

- Explain the relationship between any two gas properties: pressure, volume, temperature, and moles
- Use the gas laws to determine changes in one property given a change in one or more of the other properties
- Understand the concept that absolute zero is the temperature at which no molecular motion exists.
- Understand that one must use units of Kelvin for temperature when employing the gas laws.

The Ideal Gas Law and Gas Stoichiometry

- Explain the assumptions and properties of an ideal *gas (negligible molecular volume, elastic collisions, no attractions or repulsions between molecules)*
- Use the ideal gas law (PV= nRT) to determine P, V, n, or T when given or able to determine the other 3
- Make calculations using the molar mass-density form of the ideal gas equation ($P\mathcal{M} = DRT$) or be able to calculate molar masses or densities of gases using PV = nRT and $\mathcal{M}$ = mass/n).
- Perform stoichiometric calculations for reactions involving gas volumes using the Ideal Gas Law.
- You may convert using 22.4 L/mole if you have a gas at STP (STP conditions are 1 atm and 0℃)

Dalton's Law of Partial Pressures

State Dalton's Law of Partial Pressures and use it to find the total pressure or partial pressure of a gas ($P_A + P_B + P_C + \ldots = P_{Total}$)

- Calculate the mole fraction of a gas in a mixture and use the mole fraction to determine the partial pressure of a gas in a gas mixture (mole fraction A = $X_A = n_A / n_{total}$ and $P_A = X_A \cdot P_{Total}$)
- Explain how to perform a reaction in which a gas is collected over H_2O and determine the properties of the collected gas using the ideal gas equation.
- Realize that one can use the ideal gas law to convert between partial pressure of a gas in a mixture and its moles.
  ($P_A V = n_A RT$)

The Kinetic Molecular Theory of Gases

- State and explain the 4 assumptions of KMT and explain the behavior of an ideal gas in relationship to these assumptions
- Define kinetic energy in terms of the velocity of a particle (KE = ½ m u^2)
- Interpret graphs of the Maxwell distributions of molecular speeds and explain why the distributions vary according to molar mass of the gas and temperature as they do.
- Explain the dependence of root mean squared velocity of a gas on the temperature and its molar mass

  $u_{rms} = \sqrt{\frac{3RT}{\mathrm{M}}}$ (qualitative only)
- Define diffusion and effusion and explain relative rates in terms of relative molecular masses

Deviation from Ideal Behavior

- Explain why gases deviate from ideal behavior in terms of the two assumptions of KMT that are invalid
- Explain the conditions under which a gas behaves most ideally and under which it significantly deviates from ideal behavior.