Unit 8: Gas Chemistry

Learning Targets

1. Provide atomic and molecular explanations and graphic representations for pressure-volume-temperature relationships in gases.
    - I can recognize a graph of volume vs. temperature
    - I can recognize a graph of pressure vs. temperature
    - I can recognize a graph of volume vs. pressure

2. Explain changes in pressure, volume, and temperature for gases using the kinetic molecular model (ie, motions of molecules).
    - I can use the combined gas law ($\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$) to calculate changing pressures, volumes, or temperatures.
    - I can explain the origin of absolute zero and the Kelvin temperature scale.

3. Calculate the moles of gas present given the temperature, volume, and pressure using the ideal gas law: PV = nRT
    - I can state the value of R = 8.31 $\frac{\text{kPa·L}}{\text{mol·K}}$
    - I know that n = number of moles

4. Use the ideal gas law to find the molar volume of a gas.
    - I can explain why n=1 for molar volume
    - I can use MVP=mRT to find mass and molar mass of a gas.

5. Explain how to collect gas over water.
    - I can use a standard vapor pressure table to correct for water vapor.
    - I can use corrected "dry" pressures in the gas law equations.

6. Use stoichiometry to predict volumes of product gases during chemical equations at the same temperature and pressure.
    - Given the volumes of reactants, I can calculate the volume of products.
    - I can convert between grams of reactants/products and liters.

7. Use Graham's Law of Diffusion to calculate speeds of gas molecules.
    - When given the speed of one gas, I can find the speed of a 2nd one.

8. Explain the differences between "ideal" gases and "real" ones.
    - I can state that "ideal" gases are when we ignore intermolecular forces.
    - I can explain under what conditions ignoring the intermolecular forces is not valid.