**Name:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date:\_\_\_\_\_\_\_**

**H. Chemistry**

**Ch. 12.8-12.10 Lecture Guide**

* **The Kinetic Molecular Theory of Gases**
  + **Postulates of the Kinetic Molecular Theory of Gases**
  + **Demo Notes**
  + **Kinetic Energy**
    - **Equation:**
  + **Implications**
    - The Meaning of Temperature
    - The Relationship Between Pressure and Temperature
    - The Relationship Between Volume and Temperature
  + **Demo Notes**
* **Gas Stoichiometry**
  + If we know that n = PV/RT, then we can perform stoichiometric calculations for reactions involving gases!
  + **Calculating Volume**
    - Calculate the volume of oxygen gas produced at 1.00 atm and 25°C by the complete decomposition of 10.5 g of potassium chlorate.

2KClO3 (s) 2KCl (s) + 3 O2 (g)

* Step 1: Convert from grams of KClO3 to moles of O2 using stoichiometry.
* Step 2: Use Ideal Gas Law to find volume of O2.
  + - Calculate the volume of hydrogen produced at 1.50 atm and 19°C by the reaction of 26.5 g of zinc with excess hydrochloric acid according to the balanced equation below:
      * + Zn (s) + 2HCl (aq) ZnCl2 (aq) + H2 (g)
* **STP**
  + Temperature:
  + Pressure:
  + Number of moles:
  + Volume:
  + **Calculations Involving Gases at STP**
    - A sample of nitrogen gas has a volume of 1.75 L at STP. How many moles of N2 are present?
    - Ammonia is commonly used as fertilizer to provide a source of nitrogen for plants. A sample of NH­3 (g) occupies a volume of 5.00 L at 25°C and 15.0 atm. What volume would this sample occupy at STP?
    - Quicklime, CaO, is produced by heating calcium carbonate, CaCO3. Calculate the volume of CO2 produced at STP from the decomposition of 152 g of CaCO3 according to the reaction
      * + CaCO3 (s) CaO (s) + CO2 (g)