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

**H. Chemistry**

**Ch. 12.1-12.4 Lecture Guide**

* Review
  + Characteristics of a gas
* 12.1 Pressure
  + Pressure has several commonly used units of measurement.
  + Converting from one unit to another.
  + Practice Problems
    - The pressure of the air in a tire is measured to be 28 psi. Represent this pressure in atm, torr, and Pa.
* 12.2 Pressure and Volume: Boyle’s Law
  + Robert Boyle (1627-1691)
    - Experiment:
  + Boyle’s Law
    - So…
  + Calculating **volume** using Boyle’s Law.
    - Consider a 1.5-L sample of gaseous Freon-12, CCl2F2, at a pressure of 56 torr. If pressure is changed to 150 torr at a constant temperature, will the volume of the gas increase or decrease? What will be the new volume of the gas?
  + Calculate **pressure** using Boyle’s Law
    - In an automobile engine the gaseous fuel-air mixture enters the cylinder and is compressed by a moving piston before it is ignited. In a certain engine, the initial cylinder volume is 0.725 L. After the piston moves up, the volume is 0.075 L. The fuel-air mixture initially has a pressure of 1.00 atm. Calculate the pressure of the compressed fuel-air mixture, assuming that both the temperature and the amount of gas remain constant.
* 12.3: Volume and Temperature: Charles’s Law
  + Jacques Charles (1746-1823)
    - Experiment:
    - Absolute zero:
  + Charles’s Law
    - So…
  + Calculating **volume** using Charles’s Law
    - A sample of gas at 15 °C (at 1 atm) has a volume of 2.58 L. The temperature is then raised to 38 °C (at 1 atm). Does the volume of gas increase or decrease? Calculate the new volume.
  + Calculating **temperature** using Charles’s Law
    - Consider a gas that has a volume of 0.675 L at 35 °C and 1 atm pressure. What is the temperature (in units of °C) of a room where this gas has a volume of 0.535 L at 1 atm pressure?
* 12.4 Volume and Moles: Avagadro’s Law
  + Amadeo Avagadro
    - Experiment:
  + Avagadro’s Law
    - So…
  + Using Avagadro’s Law in calculations
    - Suppose we have a 12.2-L sample containing .50 mol of oxygen gas, O2, at a pressure of 1 atm and a temperature of 25 °C. If all of this O2 is converted to ozone, O3, at the same temperature and pressure, what will be the volume of the ozone formed?