AP Chemistry

Dr. Wilhelm

**Chapter Eleven Reading Guide: Gases**

*On a separate piece of paper, write a response to the following reading prompts while reviewing chapter eleven of your textbook.*

**Pressure & Gas Laws**:

1. How is pressure defined and relate the units used to measure pressure.
2. What is a barometer and how is it used to measure atmospheric pressure. What is a monometer and why is that useful in chemistry? Read A Closer Look: Measuring Gas Pressure.
3. What relationship is compared in **Boyle’s Law** and how are they related? Be sure to include an equation in your discussion (view interactive example 11.2).
4. What relationship is compared in **Charle’s Law** and how are they related? Be sure to include an equation in your discussion (view sample interactive example 11.3).
5. The interrelationship of pressure, volume and temperature is described by the combined gas law. Write down this relationship and be comfortable with calculations that use this equation (interactive 11.4).
6. What relationships are compared in **Avogadro’s law**? How can this be described mathematically?
7. What is the universal gas constant (R) and how does it apply to the ideal gas law which relates the units of pressure, volume, temperature and moles? Include the numerical constant and equation in your response.
8. Several other constants are mentioned in relationship to the ideal gas law. Define the parameters of **STP** and of **standard molar volume**.
9. Identify the equation used to describe gas density and review how it is derived from the ideal gas law. Explain why gas density is directly proportional to molar mass (M) and pressure (P) but inversely proportional to temperature.
10. Review interactive 11.8 to understand how molar mass can be calculated from gas density. Complete Review & Check for section 11.3.

**Gas Laws and Chemical Reactions**

1. Since mole quantities can be related to gases using the ideal gas law, stoichiometry relationship can be determined for chemical reactions involving gases. Reviews the flow chart described in figure 11.9 and apply this process in the check & review problems for section 11.4.
2. What is meant by the term partial pressure and was is Dalton’s law of partial pressure? Include an equation in your response.
3. Examine how figure 11.10 supports the concept of Daton’s law.
4. Define mole fraction and explain how it is applied to Dalton’s law of partial pressure. Refer to the figure 11.10 again and see if you can work the diagram backwards to determine the partial pressure of the nitrogen and oxygen gas.
5. Identify the three postulates of Kinetic Molecular Theory (KMT) as they relate to an ideal gas.
6. Review the relationship of molecular speed and kinetic energy. Define the term root mean square speed and include an equation that supports this definition.
7. What is meant by the terms diffusion and effusion? How is effusion explained in Graham’s law?
8. Under what conditions do real gases exhibit behavior closest to ideal gases? How did van der Waals account for this deviation?

\*Case Study: What to do with all the CO2? Worth the read! Please take a moment and do so.