Gases and Their Properties



STUDY LIST From Paul Groves

Measuring Pressure

- □ Know the pressure of the atmosphere at sea level measured in atm, kPa, mmHg, torr, psi
- \Box Convert one pressure unit into another
- □ Understand how to measure pressure using a U-tube manometer, open-end manometer, and a barometer

Recognizing Graphs

- Recognize from a graph whether two variables are directly or inversely proportional.
- □ Manipulate a curve graph to give a straightline graph
- □ Form a mathematical law from a straight-line graph

Boyle's Law

- \Box Sketch a P vs. V graph
- □ Manipulate P V data so a straight-line graph is obtained
- □ State Boyle's Law
- □ Recognize situations of Boyle's Law
- □ Do Boyle's Law problems

Charles' Law

- □ Sketch a V vs. T graph
- □ Graphically determine a value for absolute zero
- □ State Charles's Law
- \Box Explain why temperatures must be in K
- □ Recognize situations of Charles's Law
- \Box Do Charles's Law problems

Combined Gas Law

- \Box Know the Combined Gas Law (P,V&T)
- □ Show how each of the gas laws is a special case of the Combined Gas Law
- □ Know Avogadro's Law (V&n)

Ideal Gas Law

- $\hfill\square$ Know the Ideal Gas Law
- □ Given the molar volume of a gas (22.414 L at STP) determine values of R, the ideal gas constant, with different pressure units
- □ Do Ideal Gas Law problems

Twists on the Ideal Gas Law

- □ Derive the gas density equation from the Ideal Gas Law
- \Box Do gas density problems
- □ Calculate molar mass from P, V, and T data

Stoichiometry

□ Do Gas Laws and Stoichiometry problems by determining mass or moles of a substance

Dealing with Mixtures of Gases

- □ Know Dalton's Law of Partial Pressures
- \Box Do Partial Pressure problems
- \Box Apply this to gases collected over water

Explaining the Gas Laws

- □ Know the principal features of the Kinetic Molecular Theory of gases
- Be able to explain why each of the gas laws works in terms of the Kinetic Molecular Theory

Why Do All Gases Act The Same?

- Understand the significance of the Maxwell-Boltzmann distribution curves on pages 566-567
- □ Derive Graham's Law of Effusion from rms or KE of two gases
- □ Do Graham's Law problems

Real Gases vs. Ideal Gases

- □ Compare van der Waal's equations for Real gases with the Ideal Gas Law
- □ Know the correction factors that appear in the Real Gas Law