WORKSHOP 7:   NAME_____
Gas Laws
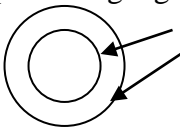
                                                   Section _____

<u>Introduction to Gases</u>
Show your work. Be careful to give answer in correct number of significant figures and in scientific notation if the answer is very large or very small.
1. The atmospheric pressure on Mars is about 2.00 torr, depending on the location.
    Express this pressure in atm , psi and kPa

2. A pressure gauge measures the difference in the pressures inside and outside a tire.
    The gauge pressure is 34.5 psi. The atmospheric pressure outside the tire is 14.7 psi.
    What is the actual air pressure inside the tire?

    If the tire goes flat, what is the gauge pressure? _____

    What is the actual air pressure inside the flat tire? _____

If you take an inflated tire which has a gauge pressure of 34.5 psi up the mountain to an altitude where the atmospheric pressure is 11.4 psi,what gauge pressure will you read? Explain.

3. What is the basic reason that gases exert pressure equally in all directions?
    (Think about what molecules of gas are doing.)

4. The pressure exerted by a gas inside a container is proportional to the number of molecules. If 4.00×10^{23} molecules of N_2 and 2.00×10^{23} molecules of O_2 are mixed in a container they exert a pressure of 1686 torr. What portion of that pressure (in torr units) is exerted by the N_2?

Empirical Gas Law problems

1. A sample of N_2 gas occupies a volume of 143 mL at 50.0°C and 2.00 atmospheres. What volume will it occupy when the pressure changes to 900.0 torr?

2. A sample of hydrogen gas occupies a volume of 7.00 liters at 50.0°C and 2.00 atm. What volume will it occupy when the temperature changes to 30.0°C?

3. A sample of oxygen gas occupies a volume of 12.0 mL at STP. What volume will it occupy at 45.0°C and 735 mmHg?

4. The atmosphere on the planet Venus exerts a pressure of 90.0 atm at the surface, at a temperature of 650°C. If an interplanetary vehicle goes to Venus and collects 1.00 L of this gas and brings it back to Earth, what volume would the gas occupy at STP?

5. Think about a hot air balloon. It is open at the bottom, so the pressure inside the balloon is constant. Why is the hot air balloon buoyant in air?