Student Worksheet

Getting Squeezed

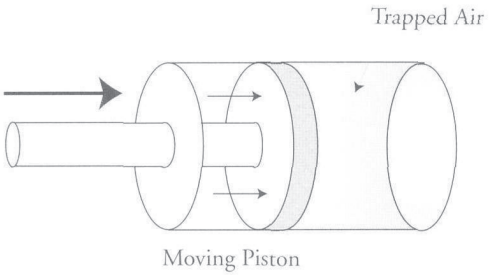
Name: _____
Period:_____ Date: _____

Purpose: This activity allows you to gain practice with calculations of gas pressure and volume.

A gas sample occupying a volume of 5.00 liters and at a pressure of 1 atm is contained in a cylinder with a movable piston. As the volume inside the piston is decreased, the pressure is measured. The pressures for several volumes of gas are given in the table below.

Complete the table:

Trial	Pressure (atm)	Volume (L)	P/V (atm per L)	PV L atm
1	1.00	5.00		
2	1.25	4.00		
3	2.00	2.50		
4	3.00	1.67		
5	4.00	1.25		
6	6.00	0.83		



Remember: 1 atm is equal to one atmosphere of pressure.

Answer the following questions:

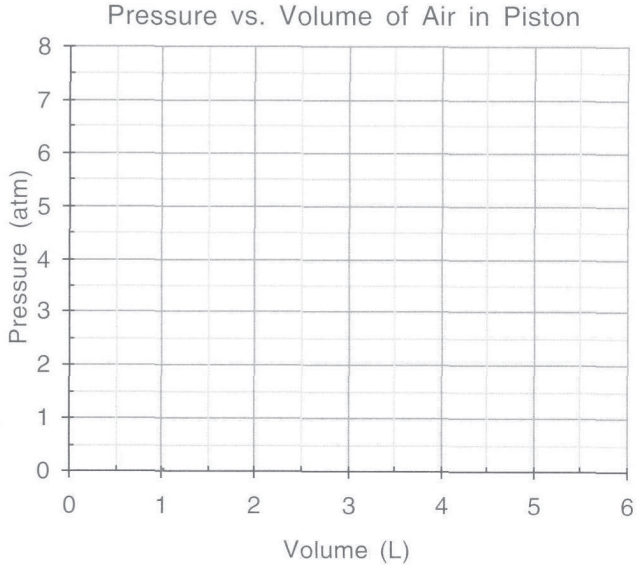
1. What do you notice about the product of PV (pressure times volume)?

2. What do you notice about the ratio P/V (pressure / volume)?

3. When the pressure doubles, what happens to the volume?

4. When the volume doubles, what happens to the pressure?

5. Plot the data on the graph and connect the points with a curve.



6. Use the graph to estimate the volume of the gas when the pressure is 1.50 atm.

7. It is clear from the data table that PV (pressure times volume) is always the same number. Use this information to help you calculate the volume of the gas in the piston if the pressure is 1.50 atm. Show your work.

8. What will the pressure be of the gas inside the piston if the volume was 2.00 L? (Use the same method you used for Problem #7.)

9. Imagine that you fill a balloon to 1.0 atm and a volume of 1.0 L. Suppose you take the balloon to the top of a mountain where the pressure is only 0.5 atm.
   a) Do you predict that the balloon will become bigger or smaller? Explain your reasoning.

   b) What will the volume of the balloon be at 0.5 atm? (Assume the temperature remains constant.)

Making sense:
Explain the best way to figure out the new volume of a gas if you know the following:
P_1 - beginning pressure V_1 - beginning volume P_2 - new pressure

If you finish early…
A 2.0 L plastic bottle full of air is sealed on top of a mountain where the pressure is 0.75 atm. Describe 3 different ways you can determine the volume of the bottle when you return to sea level where the air pressure is 1.0 atm.