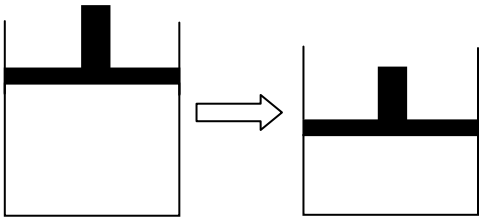
Name _____Period____

P.S. Chemistry Chapter 16 Using Science Skills: Applying Concepts

Behavior of Gases

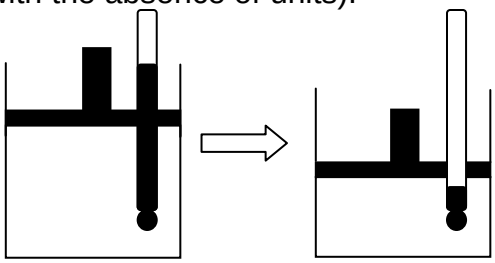
Using Boyle's Law and Charles' Law, fill in the blanks in each of the pairs of diagrams. Then calculate the missing value (do not be concerned with the absence of units).



$P_1 = 10$ $P_2 = 20$

$V_1 = 100$ $V_2 =$ _____

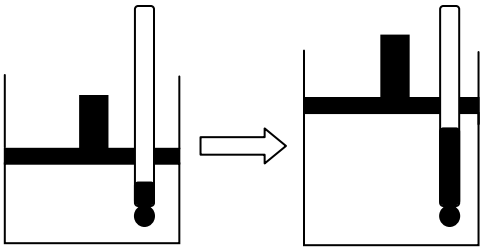
1. _____ Law



$T_1 = 40$ $T_2 = 10$

$V_1 = 120$ $V_2 =$ _____

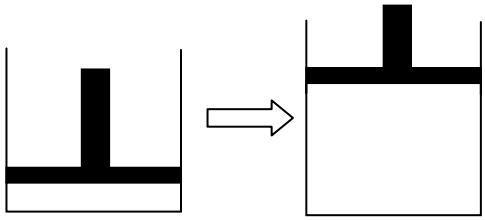
2. _____ Law



$T_1 = 15$ $T_2 = 30$

$V_1 = 70$ $V_2 =$ _____

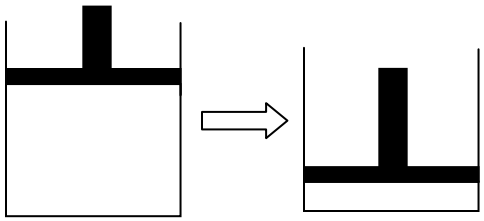
3. _____ Law



$P_1 = 25$ $P_2 = 5$

$V_1 = 6$ $V_2 =$ _____

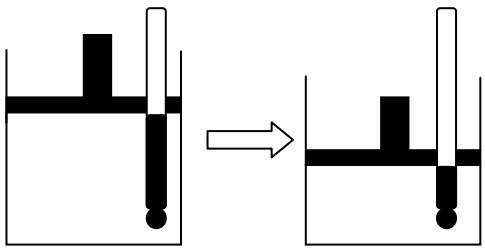
4. _____ Law



$P_1 = 3$ $P_1 = 9$

$V_1 = 90$ $V_2 =$ _____

5. _____ Law



$T_1 = 40$ $T_2 = 20$

$V_1 = 100$ $V_2 =$ _____

6. _____ Law

Boyle's Law

Boyle's Law involves initial pressure (P_1) and initial volume (V_1), as well as final pressure (P_2) and final volume (V_2) at constant temperature.

Apply this concept to the following problems.

1. A liter (1000 cm3) of gas is under a pressure of 80.00 cm3 of mercury. What pressure is needed in order to reduce the original volume of the gas to 600 cm3?

2. 5.6 liters of a gas is in a piston at a pressure of 1.5 atm and compressed until the new volume is 4.8 L, what will the new pressure be inside the piston?

3. I have added 15 L of air to a balloon at sea level (1.0 atm). If I take the balloon with me to Denver, where the air pressure is 0.85 atm, what will the new volume of the balloon be?

4. I've got a car with an internal volume of 12,000 L. If I drive my car into the river and it implodes, what will be the volume of the gas when the pressure goes from 1.0 atm to 1.4atm?

Charles' Law

Charles' Law involves initial volume (V_1) and initial temperature (T_1), as well as final volume (V_2) and final temperature (T_2) at constant pressure. Temperature must be expressed in Kelvin (K).

Apply this concept to the following problems.

1. At 275 K, an air filled balloon has a volume of 200 liters. If the pressure of the air remains constant, what will its volume be at 300k?

2. 45 liters of helium are used to fill a balloon at 298 K. The temperature of the balloon is increased to 328 K, what will the new volume of the balloon be?

3. A piston holds 130 liters of gas at a temperature of 523 K. If the gas is cooled until the volume decreases to 85 liters, what will temperature of the gas be?

4. A tube has a gas with a volume equal to 250 liters at a temperature of 300 K. If the pressure of the gas is kept constant, what will the temperature be if the gas volume is increased by 50 liters?