

# Gas Laws WS

## Boyle's Law #1

Name: \_\_\_\_\_

Period: \_\_\_\_\_ Date: \_\_\_\_\_

- 1) **Boyle's Law** states that with a constant amount of gas and at a constant temperature, there is a relationship between the \_\_\_\_\_ and \_\_\_\_\_ of a gas. The two quantities are \_\_\_\_\_ proportional, which means that as one of them gets bigger, the other one gets \_\_\_\_\_ . The mathematical equation for the law is:

$$P_1V_1 = P_2V_2$$

- 2)  $P_1 = 2 \text{ atm}$      $V_1 = 100 \text{ mL}$   
 $P_2 = 0.5 \text{ atm}$      $V_2 = ?$
- 3)  $P_1 = 760 \text{ mm Hg}$      $V_1 = 22.4 \text{ L}$   
 $P_2 = 1520 \text{ mm Hg}$      $V_2 = ?$
- 4)  $P_1 = 200 \text{ psi}$      $V_1 = 70 \text{ cm}^3$   
 $P_2 = ?$      $V_2 = 100 \text{ cm}^3$
- 5)  $P_1 = 85.0 \text{ kPa}$      $V_1 = 175 \text{ m}^3$   
 $P_2 = ?$      $V_2 = 350 \text{ m}^3$
- 6) A volume of gas that starts at 2 atm of pressure changes volume from 10 L to 2 L as a result of a pressure change.
- What are your knowns?
  - What is your unknown?
  - What was the new pressure of the gas?
- 7) A hot air balloon on the ground that contains 10,000 L of hot air at 1 atm of pressure, rises to 5000 feet where the pressure is 0.2 atm. What will be the balloon's new volume?
- 8) If the pressure on a 240 mL sample of hydrogen gas at a constant temperature is increased from 325 mm Hg to 550 mm Hg, what will be the final volume of the sample?

- 9) A flask containing 155 mL of helium was collected under a pressure of 2.00 atm. What does the pressure need to change to in order to have the volume of helium be 96 mL?
- 10) A 350. cm<sup>3</sup> sample of Krypton at standard pressure has a pressure increase up to 12,500 mm Hg. What will the new volume of the gas be?
- 11) Find the new volume of a gas sample that has a pressure of 3.0 atmospheres if it was formerly in a 45 m<sup>3</sup> container and held a pressure of 5.0 atmospheres.
- 12) Find the new volume of carbon dioxide that has a pressure of 200 mm Hg if it was originally in a 25 L container and had a pressure of 700 mm Hg.
- 13) A 95.0 L sample of oxygen gas at 125 mm Hg is changed to standard pressure. What will the new volume be?
- 14) 6.0 moles of nitrogen at standard pressure is compressed into a container that is at 7.0 atmospheres of pressure. What volume will the gas now occupy? (change moles to L)
- 15) On a hot, humid spring afternoon, a tornado passes near your high school. Before the storm reaches your schoolroom (430 cubic meters), the air pressure inside and outside the room is 760 mm Hg. At the peak of the storm, the pressure outside the classroom drops to 596 mm Hg.
- Find the volume the air inside the room tries to reach to equalize the pressure.
  - Why is it a good idea to open a window or two as such a storm approaches?