

**WORKSHEET: BOYLE'S LAW WS #1 – Pressure & Volume (OBJECTIVE 4)**

**Algebra Review:**

1) Solve the following equations for X, show your algebra steps!

**12 = 3X**

**X = \_\_\_\_\_**

**7X = 57**

**X = \_\_\_\_\_**

**11X = 27.7**

**X = \_\_\_\_\_**

**Boyles Law Problems: SHOW ALL WORK; INCLUDE UNITS IN YOUR ANSWERS!**

**EQUATION:  $P_1V_1 = P_2V_2$**

**ANSWERS:**

1) Solve for the unknown variable:

$P_1 = ??$

$V_1 = 10 \text{ mL}$

$P_2 = 100 \text{ kPa}$

$V_2 = 15 \text{ mL}$

2) Solve for the unknown variable:

$P_1 = 760 \text{ mm Hg}$

$V_1 = 2.5 \text{ L}$

$P_2 = ??$

$V_2 = 25 \text{ L}$

3) Solve for the unknown variable:

$P_1 = 1.55 \text{ atm}$

$V_1 = 27.7 \text{ mL}$

$P_2 = 3.60 \text{ atm}$

$V_2 = ??$

4) Solve for the unknown variable:

$P_1 = 37.7 \text{ psi}$

$V_1 = ??$

$P_2 = 18.2 \text{ psi}$

$V_2 = 17.8 \text{ L}$

(OVER for word problems)

5) What will  $V_2$  be if  $V_1$  is 5.5 L,  $P_1$  is 2.7 atm, and  $P_2$  is 3.6 atm?

**ANSWERS:**

6) What is the new pressure ( $P_2$ ) of a gas that is compressed to a volume of 5.0 mL when it originally occupied a volume of 50.0 mL under 1.75 atm of pressure?

7) At one sewage treatment plant, bacteria cultures produce 1000 L of methane gas per day at 1.0 atm pressure. What volume tank ( $V_2$ ) would be needed to store one day's amount of gas at a pressure of 5.0 atm?

8) Hospitals buy 400 L cylinders of oxygen gas compressed at 150 atm pressure. They need to administer oxygen to patients at 3.0 atm. What volume ( $V_2$ ) of oxygen can a cylinder supply at this lower pressure?

9) A 1.00 L balloon is filled with helium at a pressure of 1.20 atm. If the balloon is squeezed into a 0.500 L beaker and doesn't burst, what is the new pressure ( $P_2$ ) of the helium?

10) A 2.0 L helium balloon at a pressure of 1.00 atm on the Earth's surface ascends 10 km into the atmosphere, where the pressure is 0.27 atm. What is the volume of the balloon at that altitude (assuming the temperature stays the same)?

11) A sample of hydrogen at 1.65 atm had its pressure decreased to 0.454 atm producing a new volume of 755 mL. What was its original volume ( $V_1$ )?