

Name \_\_\_\_\_ Date \_\_\_\_\_ Period \_\_\_\_\_

### Boyle's Law Worksheet

#### Abbreviations

atm - atmosphere  
mm Hg - millimeters of mercury  
torr - another name for mm Hg  
Pa - Pascal (kPa = kilo Pascal)  
K - Kelvin  
°C - degrees Celsius

#### Conversions

$K = ^\circ C + 273$   
 $1 \text{ cm}^3 \text{ (cubic centimeter)} = 1 \text{ mL (milliliter)}$   
 $1 \text{ dm}^3 \text{ (cubic decimeter)} = 1 \text{ L (liter)} = 1000 \text{ mL}$

#### Standard Conditions

$0.00 \text{ }^\circ\text{C} = 273 \text{ K}$   
 $1.00 \text{ atm} = 760.0 \text{ mm Hg} = 101.325 \text{ kPa} = 101,325 \text{ Pa}$

Example #1: 2.00 L of a gas is at 740.0 mmHg pressure. What is its volume at standard pressure?

Answer: this problem is solved by inserting values into  $P_1V_1 = P_2V_2$ .

$$(740.0 \text{ mmHg}) (2.00 \text{ L}) = (760.0 \text{ mmHg}) (x)$$

Problems:

1. A gas occupies 12.3 liters at a pressure of 40.0 mm Hg. What is the volume when the pressure is increased to 60.0 mm Hg?
2. If a gas at 25.0 °C occupies 3.60 liters at a pressure of 1.00 atm, what will be its volume at a pressure of 2.50 atm?
3. A gas occupies 1.56 L at 1.00 atm. What will be the volume of this gas if the pressure becomes 3.00 atm?
4. A gas occupies 11.2 liters at 0.860 atm. What is the pressure if the volume becomes 15.0 L?
5. 500.0 mL of a gas is collected at 745.0 mm Hg. What will the volume be at standard pressure?