

Chemistry CP

Name:

Boyle's Law Worksheet

Section:

Standard Temperature and Pressure (STP): 0°C, 1 atm (or equivalent)

$$760 \text{ mm Hg} = 1 \text{ atm} = 101.3 \text{ kPa} = 760 \text{ torr}$$

Remember to follow the general strategy:

List what you know

Set up the problem

Estimate and calculate

1. The gas in a balloon has a volume of 4L at 100 kPa. The balloon is released, and the gas in it expands to a volume of 8L. What is the pressure on the balloon at the new volume?
2. The gas in a 10.0 L container exerts a pressure of 100. kPa. What pressure is needed to compress the gas to 2.0 L while keeping the temperature constant?
3. If the pressure of a 2.5 m³ sample of a gas is 1.5 atm, what volume will the gas occupy if the pressure is changed to 7.5 atm?
4. A syringe has a sample of gas with a volume of 3.95 mL at a pressure of 760 torr. What is the pressure of the gas in the syringe if the volume is changed to 2.53 mL?
5. A partially inflated weather balloon has a volume of 1.50 x 10³ L at 0.998 atm of pressure. What is the volume of the balloon when released to a height where the pressure is 0.441 atm?
6. A 2.0 L balloon at a pressure of 1.0 atm on 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)?
7. A flask containing 155 cm³ of hydrogen was collected at a pressure of 22.5 kPa. Under what pressure would the gas have a volume of 90.0 cm³ at constant temperature?
8. If the pressure exerted on a 300. mL sample of hydrogen gas at constant temperature is increased from 0.500 atm to 0.750 atm, what will be the final volume of the sample?
9. A helium balloon has a volume of 5.0L at a pressure of 1.0 atm. The balloon is released and reaches an altitude of 6.5 km at a pressure of 0.50 atm. If the gas temperature remains the same, what is the volume of the balloon?
10. A small 2.00 L fire extinguisher has an internal pressure of 506.6 kPa at 25°C. What volume of methyl bromide, the fire extinguisher's main ingredient, is needed to fill an empty fire extinguisher at standard pressure if the temperature remains constant?