

8 • Why Do Hot Air Balloons Float?

THE IDEAL GAS LAW

$$PV = nRT \text{ where}$$

P = pressure in atmosphere

V = volume in liters

n = number of moles of gas

R = Universal Gas Constant = 0.0821 L·atm/mol·K

T = Kelvin temperature

1. How many moles of oxygen will occupy a volume of 2.50 liters at 1.20 atm and 25 °C?

2. What volume will 2.00 moles of nitrogen occupy at 720. mmHg and 20.°C?

3. What pressure will be exerted by 25.0 g of CO₂ at temperature of 25 °C and a volume of 500. mL?

4. At what temperature will 5.00 g of Cl₂ exert a pressure of 900. mmHg at a volume of 750. mL?

5. What is the density of NH₃ at 800. mmHg and 25 °C? _____
6. If the density of a gas is 1.2 g/L at 745 mmHg and 20.°C, what is its molar mass?

7. How many moles of nitrogen gas will occupy a volume of 347 mL at 6680 mmHg and 27 °C?

8. What volume will 454 grams (1 lb) of hydrogen occupy at 1.05 atm and 25 °C?

9. Find the number of grams of CO₂ that exert a pressure of 785 mmHg at a volume of 32.5 L and a temperature of 32 °C. _____
10. An elemental gas has a mass of 10.3 g. If the volume is 58.4 L and the pressure is 758 mmHg at a temperature of 2.5 °C, what is the gas? _____