

DALTON'S LAW OF PARTIAL PRESSURES

Name _____

Dalton's Law says that the sum of the individual pressures of all the gases that make up a mixture is equal to the total pressure or : $P_T = P_1 + P_2 + P_3 + \dots$. The partial pressure of each gas is equal to the mole fraction of each gas x total pressure.

$$P_T = P_1 + P_2 + P_3 + \dots \quad \text{or} \quad \frac{\text{moles gas}_x}{\text{total moles}} \times P_T = P_x$$

Solve the following problems.

1. A 250. mL sample of oxygen is collected over water at 25° C and 760.0 torr pressure. What is the pressure of the dry gas alone? (Vapor pressure of water at 25° C = 23.8 torr)

2. A 32.0 mL sample of hydrogen is collected over water at 20° C and 750.0 torr pressure. What is the volume of the dry gas at STP? (Vapor pressure of water at 20° C = 17.5 torr)

3. A 54.0 mL sample of oxygen is collected over water at 23° C and 770.0 torr pressure. What is the volume of the dry gas at STP? (Vapor pressure of water at 23° C = 21.1 torr)

4. A mixture of 2.00 moles of H₂, 3.00 moles of NH₃, 4.00 moles of CO₂ and 5.00 moles of N₂ exerts a total pressure of 800 torr. What is the partial pressure of each gas?

5. The partial pressure of F₂ in a mixture of gases where the total pressure is 1.00 atm is 300. torr. What is the mole fraction of F₂?
