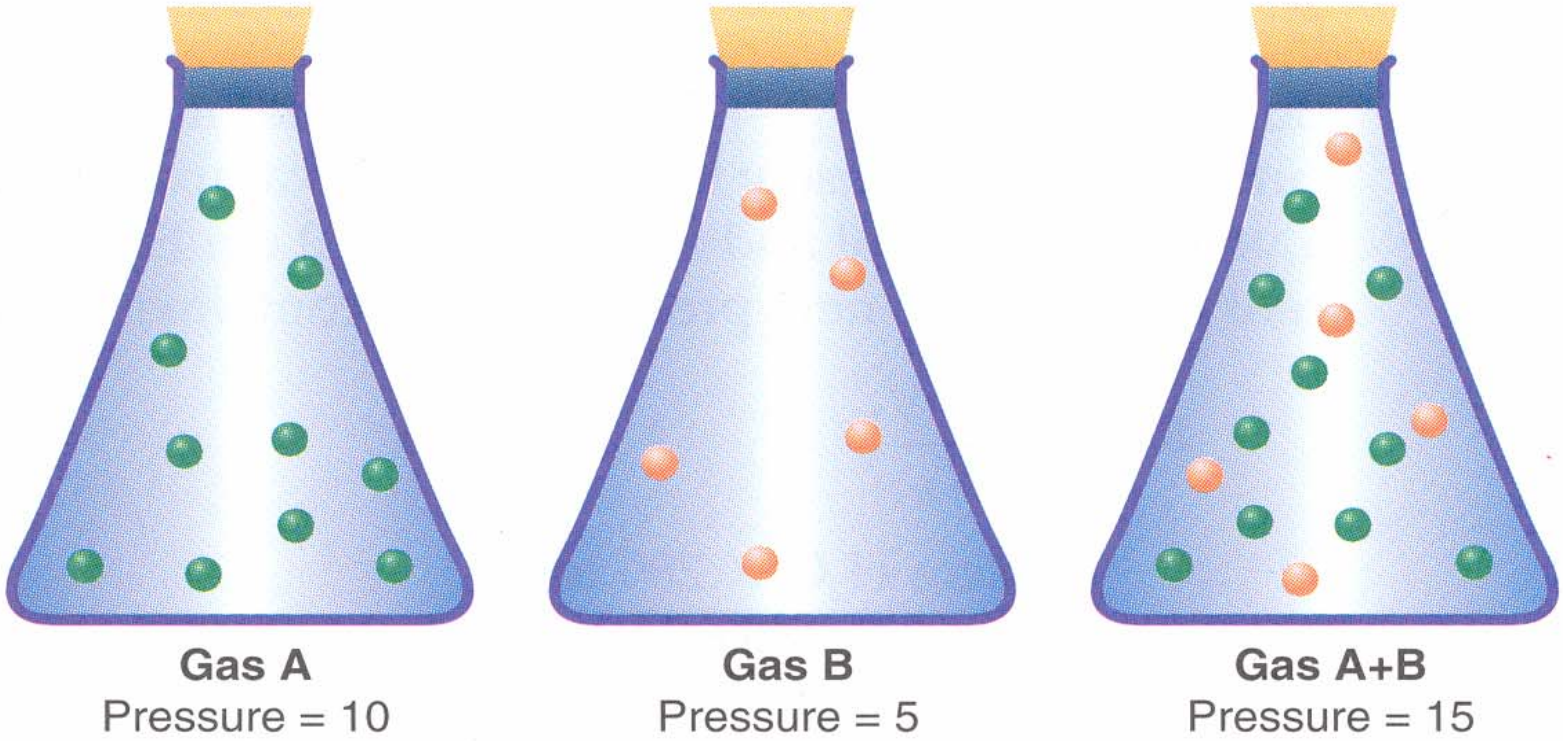
Dalton's Law

- In a mixture of gases, the total pressure is equal to the sum of the partial pressures of each individual gas.



Partial Pressure

- Def: The pressure exerted by an individual gas in a mixture of gases.
  - Designated by P_{GAS}
  - To determine the partial pressure of any gas, multiply the percentage of that gas by the total pressure.
    - Example: Oxygen occupies 21% of the atmosphere. If the total pressure of the atmosphere (i.e. Barometric Pressure) is 760 mmHg, the P_{O_2} of the atmosphere is 159.6 mmHg.

Barometric Pressure

- Application of Dalton's Law
- $P_{N_2} + P_{O_2} + P_{Ar} + P_{CO_2} = P_{BARO}$
- As altitude increases, barometric pressure falls and the constituent gases decrease proportionally.
- The percentage of a gas is also expressed as the "Fractional Concentration" or F_{GAS}.
  - Example: The F_{O_2} of the atmosphere is 20.95%

TABLE 3–1. Gases that Compose the Barometric Pressure

GAS	% OF ATMOSPHERE	PARTIAL PRESSURE (mm Hg)
Nitrogen (N_2)	78.08	593
Oxygen (O_2)	20.95	159
Argon (Ar)	0.93	7
Carbon Dioxide (CO_2)	0.03	0.2

Partial Pressure of Key Gases

- Oxygen partial pressure is reduced as it goes from the atmosphere to the alveoli secondary to "competition" with carbon dioxide and water vapor.

TABLE 3–2. Partial Pressure (in mm Hg) of Gases in the Air, Alveoli, and Blood*

GASES	DRY AIR	ALVEOLAR GAS	ARTERIAL BLOOD	VENOUS BLOOD
P_{O_2}	159.0	100.0	95.0	40.0
P_{CO_2}	0.2	40.0	40.0	46.0
P_{H_2O} (water vapor)	0.0	47.0	47.0	47.0
P_{N_2} (and other gases in minute quantities)	600.8	573.0	573.0	573.0
Total	760.0	760.0	755.0	706.0