

IDEAL GASES

THE MODEL (microscopic)

- 1) Volume of molecules themselves very small compared to volume of container.
- 2) Molecules travelling very fast; in straight lines; with lots of collisions; but not all travelling at the same speed.
- 3) Temperature is related to average speed; in fact, temperature is a measure of average kinetic energy.
- 4) Molecules are not attracted to each other at all.

THE MEASUREMENTS (macroscopic)

P Pressure	1 atm = 14.7 lb/in ² = 760 mm Hg (torr)
V Volume	Liters; dm ³ ; ft ³ ; in ³ ; mL
T Temperature	K (kelvins) 0 °C = 273.15 K
n Amount	moles; or grams.

THE BEHAVIOR (THE LAW)

4 Variables: P, V, n, T

Keep 2 constant, study relationship of other two. 6 possible combinations. Either linear or reciprocal relationships.

P, V	V, T	P, T	$PV = R n T$ (wow)
V, n	P, n	n, T	

Relationships:

$$P = \frac{k_1}{V} \quad V = k_2 T \quad P = k_3 T \quad V = k_4 n \quad P = k_5 n \quad n = \frac{k_6}{T}$$

$P^3 V^3 = \frac{k_1 k_2 k_3 k_4 k_5}{k_6} n^3 T^3$