

Kinetic Theory

1. **Kinetic theory** – physical theory that explains the behavior of gases on the basis of the following assumptions: (1) Any gas is composed of a very large number of very tiny particles called molecules; (2) The molecules are very far apart compared to their sizes, so that they can be considered as points; (3) The molecules exert no forces on one another except during rare collisions, and these collisions are perfectly elastic, i.e., they take place within a negligible span of time and in accordance with the laws of mechanics.
2. **Ideal gas** – A gas that, when kept at a constant temperature, would obey the gas laws exactly. No known gas is an ideal gas.

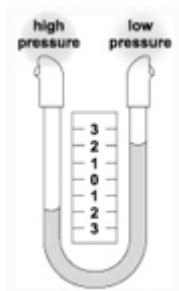
Pressure

3. **Pressure** – Force applied uniformly over a surface, measured as force per unit of area.
4. **Atmosphere** – A unit of pressure equal to the air pressure at sea level. It equals the amount of pressure that will support a column of mercury 760 millimeters high at 0 degrees Celsius under standard gravity.
5. **Kilopascal** – One thousand (10^3) pascals; the metric unit of pressure; one pound per square inch is equal to 6.89 kilopascals; abbreviated kPa.
6. **mm Hg** – A unit of pressure that is equal to approximately 1.316×10^{-3} atmospheres or 133.3 pascals.
7. **Atmospheric pressure** – Pressure caused by the weight of the atmosphere. At sea level it has a mean value of one atmosphere but reduces with increasing altitude.
8. **Standard temperature** – A temperature of 0°C or 273 Kelvin.
9. **Standard pressure** – A pressure of 1 atmosphere (101,325 newtons per square meter), to which measurements of quantities dependent on pressure, such as the volume of a gas, are often referred.
10. **STP** – standard temperature and pressure
11. **Barometer** – An absolute pressure gage specifically designed to measure atmospheric pressure. This instrument is a type of manometer with one leg at zero pressure absolute.

Lesson 108: Gas Laws Terms (cont.)

Chemistry with Lab

12. **Manometer** – A double-leg liquid-column gage used to measure the difference between two fluid pressures.



Gas Laws

13. **Boyle's Law** – The principle that at a constant temperature the volume of a confined ideal gas varies inversely with its pressure. $P_1V_1 = P_2V_2$

14. **Charles' Law** – The physical law that the volume of a fixed mass of gas held at a constant pressure varies directly with the absolute temperature.

$$\frac{V_1}{T_1} = \frac{V_2}{T_2} \quad \text{or} \quad \frac{V_2}{V_1} = \frac{T_2}{T_1} \quad \text{or} \quad V_1T_2 = V_2T_1$$

15. **Combined Gas Law** – A gas law which combines Charles' law, Boyle's law, and Gay-Lussac's law.

$$\frac{P_1V_1}{T_1} = \frac{P_2V_2}{T_2}$$

16. **Avogadro's Law** – The principle that equal volumes of all gases under identical conditions of pressure and temperature contain the same number of molecules.

17. **Dalton's Law of Partial Pressure** - The law that the pressure of a gas mixture is equal to the sum of the partial pressures of the gases composing it.

$$P_{\text{total}} = P_1 + P_2 + P_3 + \dots$$

18. **Ideal Gas Law** - The equation of state of an ideal gas which is a good approximation to real gases at sufficiently high temperatures and low pressures; that is, $PV = nRT$, where P is the pressure, V is the volume, n is the number of moles, T is the temperature, and R is the gas constant.