

Key Terms

Kinetic Theory:

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.

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:

pressure - Force applied uniformly over a surface, measured as force per unit of area.

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,

kilopascal - One thousand (10^3) pascals; the metric unit of pressure; one pound per square inch is equal to 6.89 kilopascals; abbreviated kPa.

mm Hg - A unit of pressure that is equal to approximately 1.316×10^{-3} atmospheres or 133.3 pascals.

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.

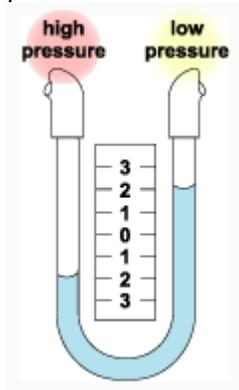
standard temperature - A temperature of 0°C or 273 Kelvin.

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.

STP - standard temperature and pressure

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.

manometer - A double-leg liquid-column gage used to measure the difference between two fluid pressures.



Gas Laws:

Boyle's Law - The principle that at a constant temperature the volume of a confined ideal gas varies inversely with its pressure. $p_1V_1 = p_2V_2$.

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.

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

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

$$\frac{p_1V_1}{T_1} = \frac{p_2V_2}{T_2}$$

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

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.

$$P_{\text{total}} = p_1 + p_2 + p_3 + \dots$$

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.

Definitions derived from answers.com.