

# [Gas laws essay](https://assignbuster.com/gas-laws-essay/)

Gas Laws Gases exhibit many qualities that are very different from those of liquids or solids. Gases have particles that are farther apart when compared to liquids and solids. The particles in gases move at different speeds in random directions and they are constantly moving. These particles collide with each other and with whatever container or area they are in. Gases are also very easy to compress. They expand to fill their containers and they occupy far more space than the liquids and solids from which they form. An ideal gas follows all of the gas laws. The conditions that allow real gases to behave like ideal ones are high temperatures, low pressure, and weak intermolecular forces. Gases may be measured in newtons/square meter (N/m2), pascals (Pa), atmospheres (atm), millimeters of mercury (mmHg), torrs, and pounds per in2 (PSI). When these units are all equal, they end up being 1. 01 x 105 N/m2, 1. 01 x 105 Pa, 1. 00 atm, 760. mmHg, 760. torr, and 14. 7 PSI. Gasses at STP, or standard conditions of pressure, are at 1 atm and 0°C. Gases have certain law formulas that they tend to follow. For these formulas, P= pressure, V= volume, n= moles, and T= temperature. According to Boyle’s law, P1V1= P2V2, and any unit of pressure and volume may be used. This is successful because pressure and volume are inversely related, meaning as one goes up the other goes down, and vise versa. Charles’s law states that V1/T1= V2/T2, where volume may be in any unit but temperature must be in Kelvin (K). Charles’s law works because volume and pressure vary directly, meaning as one goes up or down the other does as well. Gay-Lussac’s law says that P1/T1= P2/T2. This law is applicable because pressure and temperature are directly related as well. Avagadro’s law tells us that n1/V1= n2/V2, and when using this law you may have to go from number of particles or grams to moles. This also works because moles and volume vary directly. As stated in the combined gas law, P1V1/T1= P2V2/T2. The ideal gas law reports that PV= nRT, where P is measure in atmospheres (atm), V in Liters (L), T in Kelvin (K), and R being the universal gas constant, or . 0821 Lxatm/molK. Graham’s law states that the rate of effusion of a gas is inversely proportional to the square root of its molecular weight. Graham’s Law of effusion, v2/v1= âˆšFm1/âˆšFm2, where Fm is the formula mass and v is the velocity (rate). Dalton's law of partial pressures states that the total pressure exerted by the mixture of non-reactive gases is equal to the sum of the partial pressures of individual gases. The formula for this is PT= P1+P2+P3…+Pn. While gases have many laws with corresponding formulas, these may be easily applied in real life situations. Charles law states that if the temperature of a gas increases, then the volume increases. So for example, imagine a balloon filled with helium on a cold winter day. While you are indoors, the balloon is normal. As you step outside the balloon begins to shrivel up. This happens because of the temperature of the helium in the balloon deceases and becomes less dense, because the helium particles lose energy and become more concentrated, decreasing the volume. But when you put the balloon in a warm area, it goes back to its original size. Another example would be a popgun. It follows Boyle’s law that states volume and pressure are inversely related. When the volume decreases, the pressure increases and eventually the tube can't hold the pressure anymore and the cork pops off. In the end, by following the gas laws and properties, we are able to figure out gases.