

**Boyle’s Law is Inversely Proportional. For a given mass, if the volume is decreased, the pressure will increase. This is shown in the graphic above with the picture on the right. Temperature must be constant.**

**Equation: PV=k (k is constant temperature, P is pressure, V is volume)  
 P1V1=P2V2**

**Practice Problem:   
1.00 L of a gas at standard temperature & pressure is compressed to 473 mL. What is the new pressure of the gas?   
 P1V1=P2V2 P1 = 1.0 atm V1=1.00 L (1000mL) V2=473 mL  
 Step 1 ---- 1000 x 1 = P2 x 473 Step 2 ---- 1000/473 = P2 Step 3 ---- P2 = 2.11 atm** Useful Explanation:  
*According to this law, the pressure exerted by a gas held at a constant temperature varies inversely with the volume of the gas. For example, if the volume is halved, the pressure is doubled; and if the volume is doubled, the pressure is halved. The reason for this effect is that a gas is made up of loosely spaced molecules moving at random. If a gas is compressed in a container, these molecules are pushed together; thus, the gas occupies less volume. The molecules, having less space in which to move, hit the walls of the container more frequently and thus exert an increased pressure.*

*Boyle's Law actually applies only to an ideal, theoretical gas. When real gases are compressed at a constant temperature, changes in the relationship between pressure and volume occur. However, the law is accurate enough to be useful in a number of practical applications. It is used, for example, in calculating the volume and pressure of internal-combustion engines and steam engines.*

*The law was first stated in 1662 by Robert Boyle. In 1676, Edme Mariotte of France independently stated the same law, and it is sometimes called Mariotte's Law.*

Useful Video Link:http://video.mit.edu/watch/boyles-law-pressure-vs-volume-8456/