***Learning Objectives in this Unit:***

* *Describe the kinetic molecular theory of gases and how it predicts the macroscopic behavior of gases*
* *Qualitatively predict the behavior of gases based on the simple gas laws, and perform quantitative calculations using the Ideal Gas Law*
* *Perform calculations for mixtures of gases using Dalton’s law and the concept of a mole fraction*

Read more about this topic: [Chapter 9](https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure)

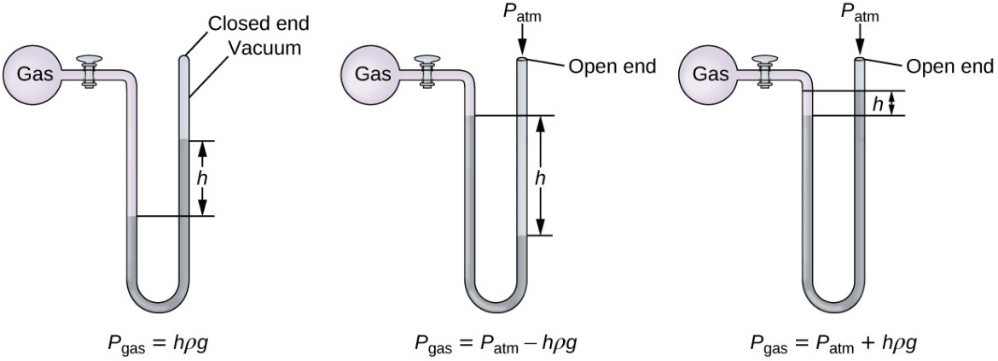
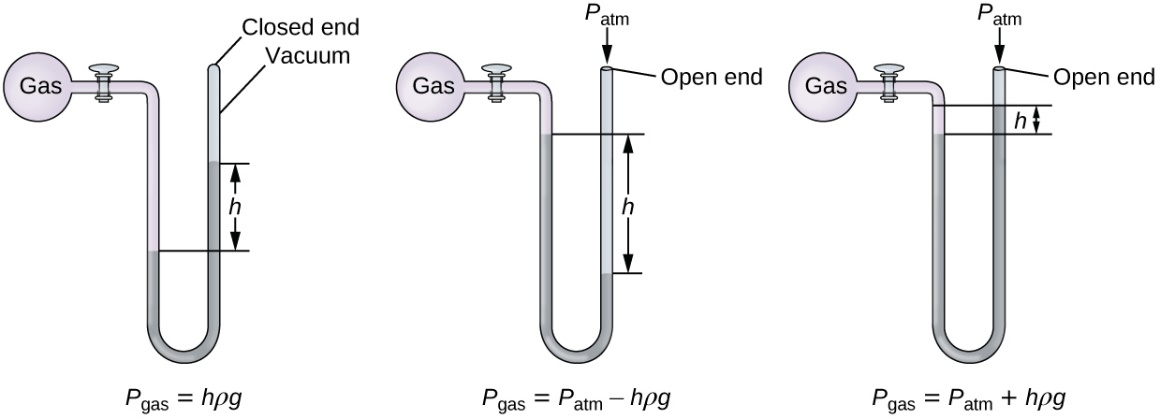
1. Choose all of the statements that are true
   1. The SI unit of pressure is pounds per square inch (psi)
   2. Pressure is the force exerted on a given area
   3. Gas pressure is the result of molecules colliding with surfaces
   4. A barometer is used to measure the pressure of a gas trapped in a container
   5. Mercury is often used in barometers because it is very dense
2. Consider each of the manometers below; choose the correct statement
   1. For the gas picture in the open ended manometer below…  
      
      1. The pressure of the gas is equal to the pressure of the atmosphere
      2. The pressure of the gas is less than the pressure of the atmosphere
      3. The pressure of the gas is greater than the pressure of the atmosphere
   2. For the gas picture in the open ended manometer below…  
      
      1. The pressure of the gas is equal to the pressure of the atmosphere
      2. The pressure of the gas is less than the pressure of the atmosphere
      3. The pressure of the gas is greater than the pressure of the atmosphere

Image Credit: <https://openstax.org/books/chemistry-2e/pages/9-1-gas-pressure>

1. Name each of the following laws and fill in the blank with “directly” or “inversely”  
   Match each of the simple gas laws to their name

[\_\_\_\_\_] Law– The pressure of a gas is [\_\_\_\_\_] proportional to temperature (assuming the amount and volume are held constant).

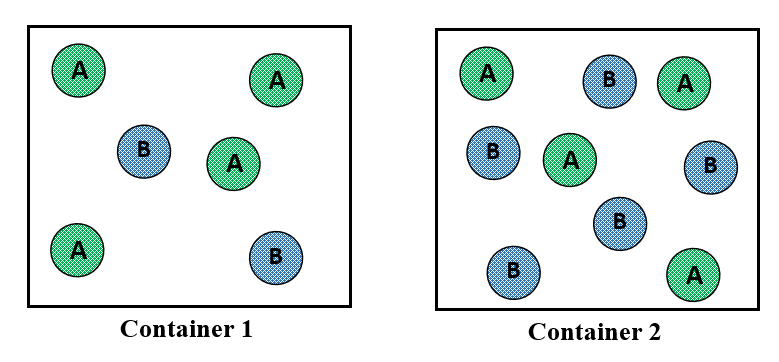
[\_\_\_\_\_] Law – The volume of a gas is [\_\_\_\_\_] proportional to temperature (assuming the amount and pressure are held constant).

[\_\_\_\_\_] Law – The volume of a gas is [\_\_\_\_\_] proportional to pressure (assuming the amount and temperature are held constant).

[\_\_\_\_\_] Law – The volume of a gas is [\_\_\_\_\_] proportional to the number of mols (assuming the pressure and temperature are held constant).

1. Fill in the blanks  
   The ideal gas law is only reasonable for gases at relatively [\_\_\_\_\_] pressure and [\_\_\_\_\_] temperature.
2. Indicate whether the following statement is true or false  
   The value of R used in calculations is chosen based on the units required by the problem.
3. Match the variables in Dalton’s law to their definitions

|  |  |
| --- | --- |
| PA | the mole fraction of the gas |
| XA | the partial pressure of the gas |
| PTotal | the total pressure of the gas |

1. Consider the following containers of gas:   
   
   1. Assuming that Container 1 and Container 2 each have a total pressure of 1.0 atm. In which container is the partial pressure of B higher than the partial pressure of A?
   2. Assuming that Container 1 and Container 2 each have a total pressure of 1.0 atm. In which container is the partial pressure of B lower than the partial pressure of A?
2. Choose all of the statements which are postulates of kinetic molecular theory
   1. Gas molecules are all noble gases
   2. Gas molecules are in continuous motion, traveling in straight lines until collision
   3. Gas molecules exert not attractive or repulsive forces on each other or the container
   4. The average kinetic energy of the gas molecules is proportional to the kelvin temperature
   5. Pressure results from the low density of gases