

## Unit 8 Reading Assignment

### 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

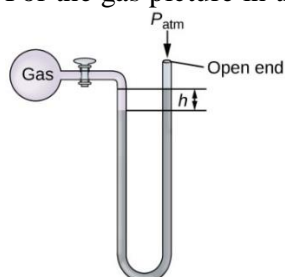
Read more about this topic: [Chapter 9](#)

#### 1. Choose all of the statements that are true

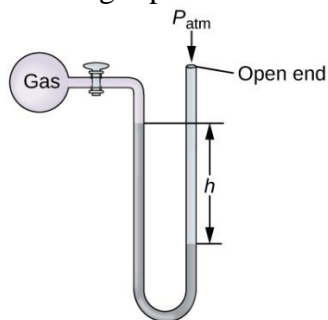
- The SI unit of pressure is pounds per square inch (psi)
- Pressure is the force exerted on a given area
- Gas pressure is the result of molecules colliding with surfaces
- A barometer is used to measure the pressure of a gas trapped in a container
- Mercury is often used in barometers because it is very dense

#### 2. Consider each of the manometers below; choose the correct statement

- For the gas picture in the open ended manometer below...



- The pressure of the gas is equal to the pressure of the atmosphere
  - The pressure of the gas is less than the pressure of the atmosphere
  - The pressure of the gas is greater than the pressure of the atmosphere
- For the gas picture in the open ended manometer below...



- The pressure of the gas is equal to the pressure of the atmosphere
- The pressure of the gas is less than the pressure of the atmosphere
- 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>

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3. 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).

4. Fill in the blanks

The ideal gas law is only reasonable for gases at relatively [\_\_\_\_\_] pressure and [\_\_\_\_\_] temperature.

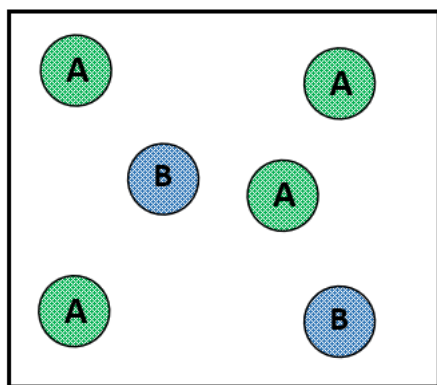
5. Indicate whether the following statement is true or false

The value of R used in calculations is chosen based on the units required by the problem.

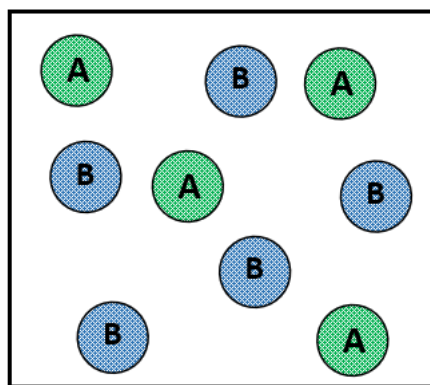
6. Match the variables in Dalton’s law to their definitions

$P_A$	the mole fraction of the gas
$X_A$	the partial pressure of the gas
$P_{\text{Total}}$	the total pressure of the gas

7. Consider the following containers of gas:



**Container 1**



**Container 2**

- a. 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?  
b. 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?

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8. Choose all of the statements which are postulates of kinetic molecular theory
- Gas molecules are all noble gases
  - Gas molecules are in continuous motion, traveling in straight lines until collision
  - Gas molecules exert not attractive or repulsive forces on each other or the container
  - The average kinetic energy of the gas molecules is proportional to the kelvin temperature
  - Pressure results from the low density of gases