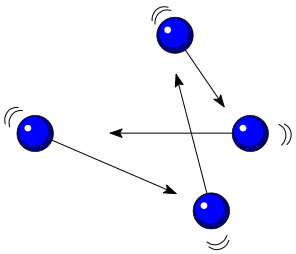
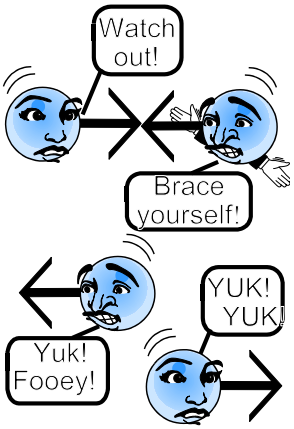
The Ideal Gas

How do gases behave? In order to study gases, chemists have devised a model. The model is called an ideal gas (a gas which explains the behavior of all gases). This *Ideal Gas* model is based on the following assumptions, and can be applied only under conditions of **LOW PRESSURE AND HIGH TEMPERATURE**.

MOTION – gas molecules are continuously moving in a random, straight line motion.

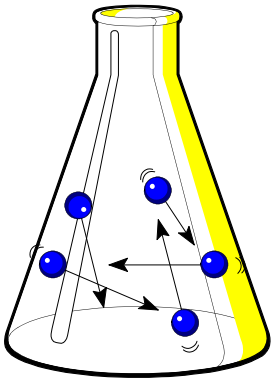


COLLISION – when gas molecules collide with each other or with the walls of the container there is no energy lost. Therefore, the total energy of the system never changes.



VOLUME – the actual volume of the molecules is insignificant when compared to the volume of the contained area (the container).

ATTRACTION – no attraction exists between molecules.



Deviations from the Ideal Gas Situation

- ☆ Gases deviate from the ideal conditions when conditions of **HIGH PRESSURE AND LOW TEMPERATURE** exist. These conditions lead to confinement and intermolecular attractions begin to act.
- ☆ VOLUME – gas molecules do have a volume of their own.
- ☆ ATTRACTION – there does exist a force of attraction between gas molecules. The above factors (deviations) allow for the existence of gases as either solids or liquids under certain conditions,

Answer the questions below based on your reading above and on your knowledge of chemistry.

1. Of the following: $H_2(g)$; $He(g)$; $CO_2(g)$; which would behave least like an ideal gas? Why? _____

   _____

2. Compared to other gases, why doesn't water vapor behave like an ideal gas? _____

   _____

3. Why do gases behave least like ideal gases at low temperature and high pressure? _____

   _____

4. The relationship between the Kelvin temperature and volume of a gas is linear until the temperature begins to approach 0 K. Why? _____

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