Unit 8 NAME

Class Work 3/29/14

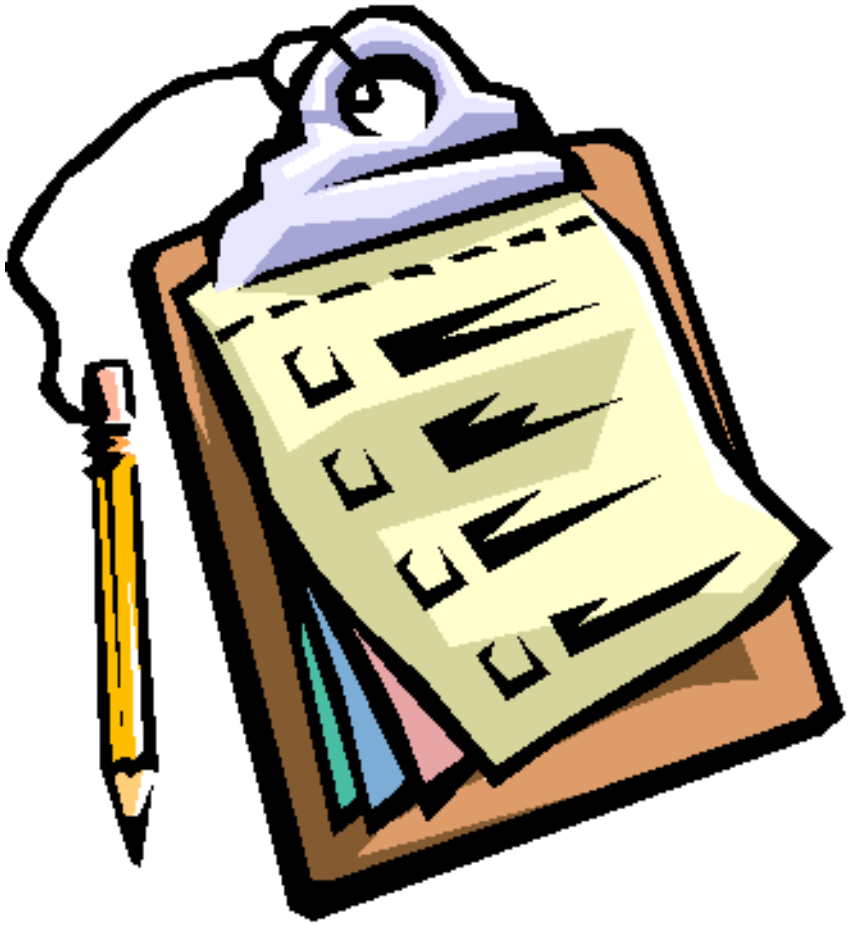
8.9 Ideal Gas/Kinetic Molecular Theory

Objective

SWBAT define an ideal gas

Agenda:

- SPARK/Objective
- Notes
- Practice
- Homework



Objective: SWBAT define an ideal gas

What would happen if…

Aerosol cans usually come with a "Do not incinerate" and a "Store above 120 F" warning label.

What do you think would happen if we lit an aerosol can on fire or we kept it in a room hotter than 120 F?

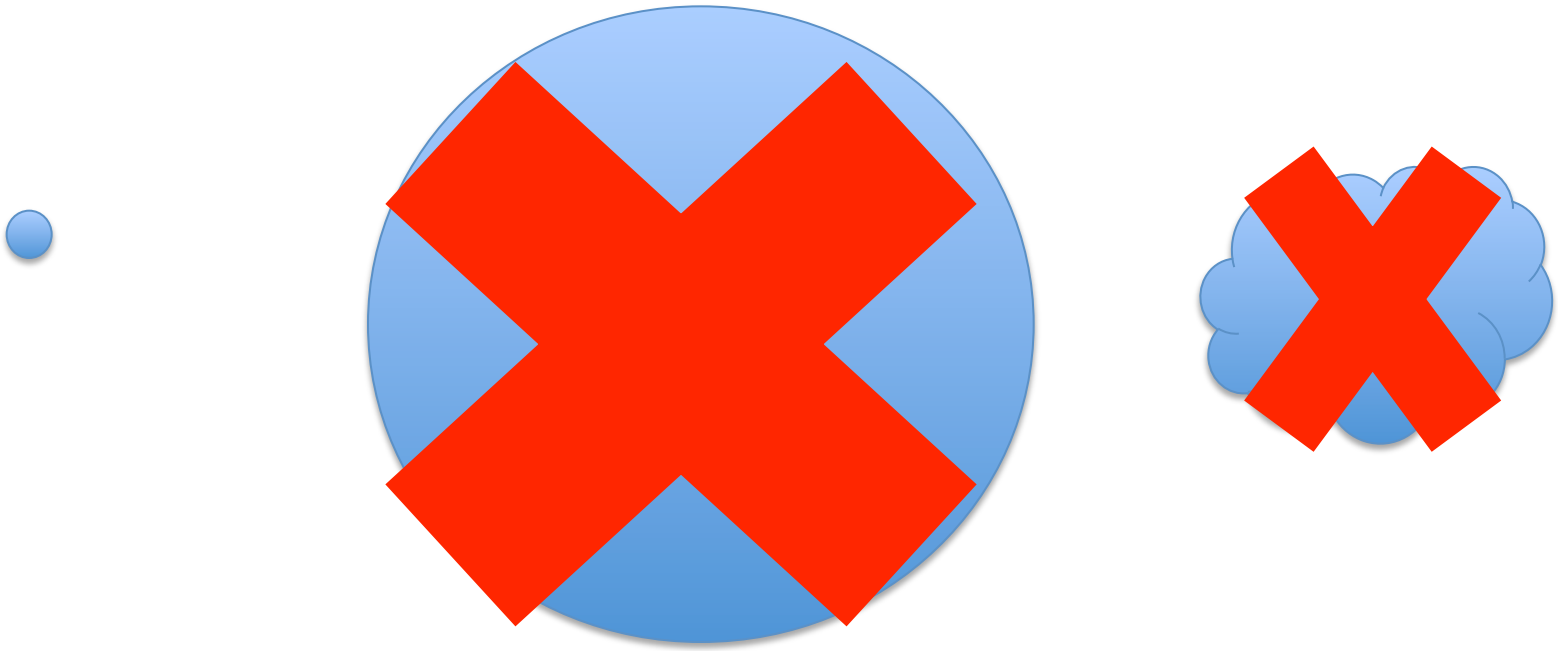
Objective: SWBAT define an ideal gas

The Kinetic Molecular Theory

- Defines the assumptions we make about gases in order to make understanding their behavior more manageable

Objective: SWBAT define an ideal gas

All gas particles are hard, tiny spheres



Objective: SWBAT define an ideal gas

The volume/size of gas particles are negligible compared to the distance between the particles

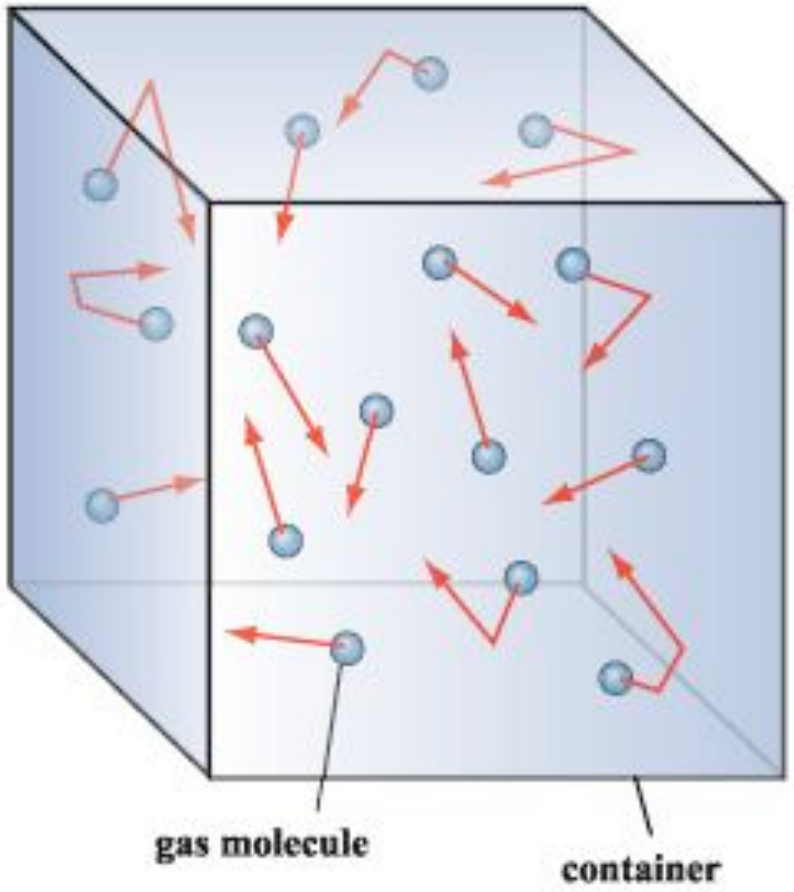
Gas Particle 1

Gas Particle 2

- Compared to the space between the molecules, the gas particles are SO tiny that we say that the actual size of the particle doesn't matter.

Objective: SWBAT define an ideal gas

The particles move in a random, straight line motion hitting the walls of the container



Objective: SWBAT define an ideal gas

There are NO forces of attraction between the particles

http://www.chm.davidson.edu/vce/kineticmoleculartheory/basicconcepts.html

Objective: SWBAT define an ideal gas

The kinetic energy of the particles is directly proportional to the temperature

http://www.phy.ntnu.edu.tw/ntnujava/index.php?topic=296.0

Objective: SWBAT define an ideal gas

Brainstorm:
What are some complications?

- In reality, gases are complicated because…

Objective: SWBAT define an ideal gas

Practice

1. Which statement describes the particles of an ideal gas according to the kinetic molecular theory?

- (1) The gas particles are arranged in a regular geometric pattern.
- (2) The gas particles are in random, constant, straight-line motion.
- (3) The gas particles are separated by very small distances, relative to their sizes.
- (4) The gas particles are strongly attracted to each other.

Objective: SWBAT define an ideal gas

When does a real gas act like an ideal gas?

- HIGH TEMPERATURE

  Reason: High temperature = fast movement. Therefore, less interaction between particles and fewer opportunities for attraction.

- LOW PRESSURE

  Reason: At low pressure, gas molecules have more space to move around so that their size doesn't matter and there are fewer opportunities for interaction

http://www.phy.ntnu.edu.tw/ntnujava/index.php?topic=296.0

Objective: SWBAT define an ideal gas

RECAP

	Temperature	Pressure	Volume
Definition			
Units			

Objective: SWBAT define an ideal gas

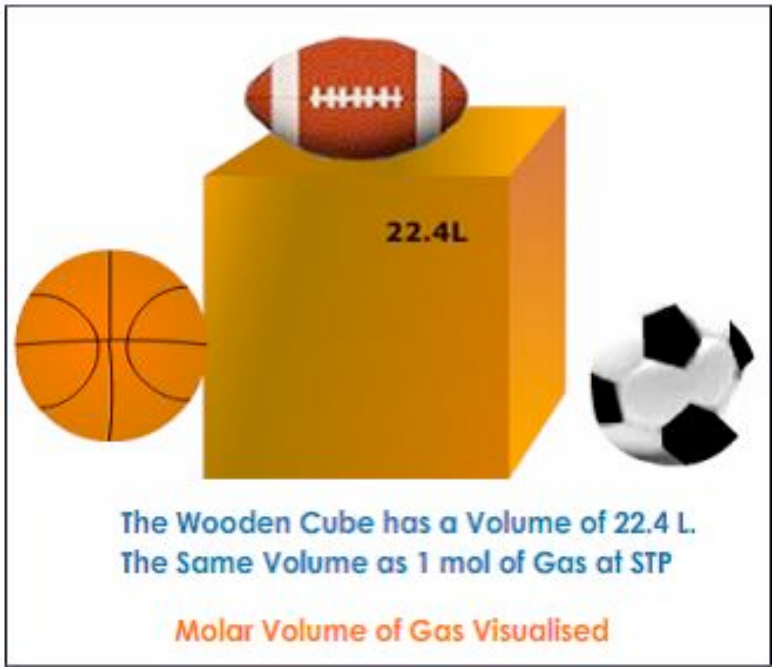
Recap

	Temperature	Pressure	Volume
Definition	Measure of average kinetic energy	Force on an object	Space an object takes up
Units	K (for gases)	kPa	cm^3

Objective: SWBAT define an ideal gas

How do we count gas particles???

- 1 mole (6.022×10^{23} particles) of gas ALWAYS TAKES UP 22.4 L of space at STP



Objective: SWBAT define an ideal gas

What does this mean?

- At the same temperature, pressure, and volume, every gas has the same amount of particles REGARDLESS OF IDENTITY.

PRACTICE:
Which two samples of gas at STP contain the same total number of molecules?
(1) 1 L of CO(g) and 0.5 L of N_2(g)
(2) 2 L of CO(g) and 0.5 L of NH_3(g)
(3) 1 L of H_2(g) and 2 L of Cl_2(g)
(4) 2 L of H_2(g) and 2 L of Cl_2(g)

Why do you think we can make this assumption that at the same temperature, volume, and pressure, the exact same number of gas particles are present?

Objective: SWBAT define an ideal gas

What would happen if…

Aerosol cans usually come with a "Do not incinerate" and a "Store above 120 F" warning label.

According to the kinetic molecular theory, what would happen if we lit an aerosol can on fire or we kept it in a room hotter than 120 F?

Objective: SWBAT define an ideal gas

8.9 Classwork

REMINDER:

- The Kinetic Molecular Theory (KMT) states:
  - Gas particles are hard, tiny spheres
  - The volume of a gas particle is insignificant compared to the space it is occupying
  - Gas particles move in random, straightline motion, colliding into walls and each other
  - No forces of attraction between molecules
  - The hotter the temp is the faster the movement of particles
- Gases with the same temperature, volume, and pressure have the same number of particles regardless of identity. (AT STP, 22.4 L = 1 mole of gas)

Objective: SWBAT define an ideal gas

HOMEWORK

Finish 8.9 Classwork/Homework

Objective: SWBAT define an ideal gas