Chemistry
Characteristics of solids, liquids, gases, and plasma
Kinetic theory

Name: Key 2017
Period:

Plasma

Go to Chem4Kids plasma at http://www.chem4kids.com/files/matter_plasma.html

1. The individual particles in gases are atoms or molecules. What type of particles make up a plasma?

free pos & neg charged particles (ions)

2. How is the glowing plasma created in fluorescent light bulbs and neon signs?

electricity charges the gas & excites the atoms causing it to glow

Characteristics of solids, liquids and gases

Go to http://www.chem.purdue.edu/gchelp/atoms/states.html

3. Write solid, liquid, or gas for each of the following characteristics

gas Particles are well separated with no regular arrangement.

solid Particles are tightly packed, usually in a regular pattern.

liquid Particles are close together with no regular arrangement.

liquid Particles vibrate, move about, and slide past each other.

solid Particles vibrate (jiggle) but generally do not move from place to place.

gas Particles vibrate and move freely at high speeds.

liquid Assumes the shape but not volume of the container.

solid Retains a fixed shape and volume.

gas Assumes the shape and volume of the container.

gas Can be easily compressed into a smaller volume

solid Does not flow easily

Kinetic theory
Go to Kinetic molecular theory at

Ideal gas does not really exist but it makes the math easier & is a close approximation

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

The assumptions of Kinetic molecular theory are mainly for gases. The imaginary gas acts like a real gas under most conditions.

Real gases behave similarly enough at high temps & low pressure

Assumptions

The gas particles have a mass but very small volume compared to the container.

The gas particles travel randomly in a straight-line motion.

All collisions involving gas particles are elastic; the kinetic energy of the system is conserved.

"attractions"
The gas particles do not interact with each other or with the walls of any container.

The entire average kinetic energy is proportional to temperature; the kinetic energy varies among the particles in a bell shaped curve. The hotter the gas, the wider the energy distribution.

When kinetic theory assumptions for gases are no longer valid

When high pressure forces gas particles closer together the particles begin to attract each other and the gas changes into a liquid. Lower temperatures force the gas particles to move slower and help the particles attract each other and form liquids also

4. If an ideal gas has no attraction between particles would it ever form a liquid? Why or why not?

Yes – if pressure is high enough
No - there has to be some particle attraction to keep the particles close enough to be a liquid

5. The volume of an ideal gas is determined by the container. What determines the volume of a liquid or solid?

amount of matter present

6. What happens when two ideal gas particles strike each other?

E is conserved (perfectly elastic)

7. Under what conditions do real gases condense to form a liquid?

lower temps → less E so particles move slower & are closer together. Part. will attract each other more (IMA's) OR higher pressu

8. Why do gases have a very low density?

↑E, moving faster, more space between molecules

9. Which state of matter has the least amount of attraction between particles?

gas

10. Why will gases spread out or diffuse much more than liquids or solids?

Gas particles are moving faster because they have more E. Thus, they are more spread out so it is easier for them to diffuse.

11. When a gas is heated does the volume become larger or smaller? Why?

gas is heated → ↑ velocity → space between molecules

12. Describe the movement of the particles in a gas.

fast, straight, random

13. Why do liquid particles collide with each other more frequently than gas particles when they move?

liquid particles are closer together

14. Will a heated liquid expand more or less than a heated gas? Why?

less- the particles in a liquid are more attracted to each other as they are closer together

15. What is Brownian motion?

random drifting of particles suspended in a fluid

16. Describe the motion of particles in a solid.

fixed, vibrating in place

17. Why do solids have both a fixed volume and a fixed shape?

IMA's are strong & keep the particles together

18. Why do solid particles not diffuse into the air the way that liquid and gas particles do?

IMA's are too strong