

## 7.1 states of Matter "NOTES".

Matter is anything that has mass and volume.

Mass: is the quantity of matter an object contains. The unit = Kg or g.

Volume: is the amount of space taken up by an object. Measured in ml or l or  $\text{cm}^3$ .

### States of Matter

- a. Solid : has a definite shape and volume .
- b. Liquid : has a definite volume, but its shape is determined by its surroundings .  
(Ex. water in a cup or a lake)
- c. Gas : Volume and shape are determined by surroundings (Ex. helium in a balloon).

### The Particle Model of Matter .

1. All matter is made up of very small particles so small to observe with the naked eye .
2. There is spaces b/w the particles, which varies depending on the type of matter .
3. Particles that make up matter are always moving .
4. Particles are attracted to one another. The strength of the attraction depends on the type of particle .

### Kinetic Molecular Theory

Kinetic Energy is the energy of motion

1. All matter is made up of very small particles.
2. There is empty space b/w particles.
3. Particles are constantly moving. The particles are colliding with each other and their containers.
  - a. Solids: particles are so tightly packed together they can not move around freely; they can only vibrate.
  - b. Liquids: particles are farther apart; so they can slide past one another.
  - c. Gas: particles are very far apart and can move quickly.
4. Energy makes particles move. The more energy the faster they can move, and the farther apart they can move.

**Science 8**  
**Chapter 7.1: States of Matter**

Name: \_\_\_\_\_

What is Matter?

Mass is the amount of material that makes up an object.  
Volume is that amount of space that a material takes up. Anything that has mass and volume is called matter.

What are the States of Matter?

The 3 common states of matter are solid, liquid and gas. A solid has a distinct volume & shape. A liquid has a distinct volume and a shape that depends on the shape of its container. The volume and the shape of the gas depend on the size & shape of its container.

What Happens to Matter When Its Temperature Changes?

When you add energy to matter its temperature rises. This causes matter to expand. Thermal expansion is an increase in the volume of something when its temperature rises. For instance, if the temperature of the air in a balloon rises, the volume of air increases. The balloon gets a little bit bigger.

When you take energy away from matter, its temperature drops. This causes matter to contract. Thermal contraction is a decrease in the volume of something when its temperature drops. If you lower the temperature of the air in a balloon, the volume of the air decreases. The balloon gets a bit smaller.

If the temperature of matter keeps rising or falling, the state of the matter can change.

# The Kinetic Molecular Theory aka "KMT"

Kinetic energy is the energy of motion. All particles in solids, liquids and gases are always moving, so they have kinetic energy. A theory is a scientific explanation based on experimental results.

The Kinetic Molecular Theory has Four Parts:

1. All matter is made up of very small particles ( atoms and molecules ).
2. There is empty space <sup>b/w</sup> between the particles.
3. Particles are constantly moving. They are colliding with each other and the walls of their container.
  - a. Particles of a solid are so tightly packed they can NOT move around freely – they can only vibrate.
  - b. Particles of a liquid are farther apart and they can move by sliding past each other.
  - c. Particles of a gas are very far apart and they move around quickly.
- ★ 4. Energy makes particles move. The more energy the particles have, the faster they can move and the farther apart they can get.

## Are Heat and Temperature the Same Thing?

Consider a third quantity: thermal energy. If you consider all the kinetic energy of all the particles in a substance, the total amount of energy is thermal energy.

Heat is the energy transferred from one material to another as a result of a difference in temperature or a change in state.

The temperature is the average kinetic energy of the particles.