

Class 8

Subject. Physics

Chapter. Matter

Topic Kinetic theory of matter

Matter is anything that has mass and occupies space.

The Kinetic theory of matter

- Matter is made up of molecules hence all states of matter is made up of elements combined with each other in different proportions.
- The molecules are in a state of continuous random motion hence possess kinetic energy of all possible velocities moving in all possible directions. This motion of molecules is known as Brownian motion.
- Molecules in a substance always exert a force of attraction on each other, this force is known as Intermolecular force of attraction. This force of attraction between molecules of the same kind is called force of cohesion.
- This force of attraction between molecules of different kinds is called force of adhesion.
- The molecules of matter possess kinetic energy which depends on the temperature of the substance.
- Intermolecular space is the gaps between the different molecules in a substance. The intermolecular space increases when the intermolecular force of attraction is less and vice versa. The intermolecular space between molecules increases when the kinetic energy of the molecules increase with increase of temperature

NOTE: The intermolecular space Increases when there is a decrease in the intermolecular force of attraction and there is an increase in the temperature of the substance(Which increases the average kinetic energy of the molecules off the substance.)

Definition of some important terms.

- **ATOM** the smallest unit of an element that may or may not have an independent existence and all always take part in a chemical reaction.
- **MOLECULE** is the smallest unit of matter that has an independent existence and carries the physical and chemical properties of that matter

A molecule can either be made of two or more atoms of the same or of different elements.

Physical difference between solids liquids and gases on the basis of kinetic theory

SOLIDS

- Molecules in solids are very tightly packed hence the intermolecular space is small as there is a very large intermolecular force of attraction between the molecules.
- The strong intermolecular force of attraction does not allow the molecules to move away from their fixed position, **So the molecules vibrate or oscillate about their fixed positions.**
- So solids have definite shape and fixed volume.
- This strong intermolecular force of attraction prevents the molecules from sliding over each other, hence solids cannot flow.
- Solids have small intermolecular space hence solids cannot be compressed easily.
- Due to strong intermolecular force of attraction solids expand very little on heating.

LIQUID

- The molecules in a liquid are loosely packed because the intermolecular force of attraction in the liquid is weaker compared to that in solids. So the molecules do not have a definite position and are free to move in the volume of the liquid, **hence liquid does not have definite shape it takes the shape of the container.**
- The intermolecular space between the liquid molecules is more than that of the solids, **so liquids can be compressed slightly more than the solids.**
- Due to weaker intermolecular force of attraction liquid molecules can slide over each other and hence can flow.
- A liquid molecule at the surface of a liquid is attracted strongly inwards hence the liquid molecules move about the volume of the liquid **and has a fixed volume.**

Gases

- The molecules of gases have a very weak intermolecular force of attraction hence the intermolecular space in a gas is very large. **Hence the gas molecules move independently and occupy the entire space in a container. So a gas has neither definite shape nor definite volume.**
- The space between gas molecules is very large due to weak intermolecular force of attraction hence gases can be compressed to a great extent.
- The negligible intermolecular force of attraction allows the gas to flow easily.
- On heating because of negligible intermolecular force of attraction gases expand to a large extent easily. [kinetic theory of matter](#)

Worksheet

Answer the following questions in brief.

1. Why do liquid droplets stick to the wall of the container ?
2. What property of glue helps it to hold different types of material?
3. According to kinetic theory of matter explain why a drop of ink gets easily mixed in water, in a very short time?
4. Why do Liquids expand more than solids on heating?

Answer the following questions.

1. On the basis of the kinetic theory of matter explain why
 - Solids have a fixed shape and a fixed volume.
 - sponge is a solid But can be squeezed.
2. Differentiate between atoms and molecules.
3. List 4 differences between solids liquids and gases.

Complete questions C, D,E,F,G,H,I

- the fill in the blanks,
- mark the statements true and false,
- choose the odd one out giving reasons, match the following, give one word for the following,

given at the end of the chapter.