Molecular structure of solids, liquids and gases

Distinguishing properties of solids , liquids and gases:

	Flow	Shape	Volume	Density
Solid	No	Fix	Fixed	Much higher than a gas
Liquid	Yes	Takes the shape of the container	Fixed	Much higher than a gas
Gas	Yes	Fills the container	Can be changed	Low compared to a solid and a liquid

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All matter is made up of mostly three types of particles namely; solids. liquids and gases

Qualitative description of molecular structure of solids , liquids and gases:

	Solids	Liquids	Gases
Arrangement	The particles in a solid are arranged in a fixed pattern	The particles in a liquid are not arranged in any fixed pattern	The particles in a gas are arranged in a random manner
Separation	The particles of a solid are very close to each other	The particles in a liquid are close to each other	The particles of a gas are further apart from each other
Motion	The solid particles can only vibrate in their fixed(mean) positions	The liquid particles can slide past over each other	The gas particles are free to move everywhere rapidly

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In a solid:

- The molecules are arranged in a three dimensional structure.
- Each molecule vibrates about a fixed mean position.
- When a solid is heated its molecules gain kinetic energy and vibrate more.
- If sufficient heat is provided, then enough energy may be given to the molecules so that they weaken their bonds from the neighbouring molecules in the lattice structure. When this happens, the solid melts or sublimes.

In a liquid:

- The molecules are in contact with each other and also move around freely.
- The forces of attraction between the liquid molecules are weak compared to solids , so they can slide past over each other. Hence they can flow and do not have a fixed shape.
- The forces of attraction are strong enough to stop the molecules from leaving the liquid surface.
- When a liquid is heated, some of the molecules gain enough kinetic energy to break away from the other molecules and leave the liquid surface and change to a gaseous form.

In a gas:

- The forces of attraction between gas molecules is negligible. So a gas can flow and has no fixed shape.
- The molecules move about freely in the container, colliding with each other and with the walls of the container.
- When a gas is heated, its molecules gain kinetic energy and move more rapidly and collide more frequently , thus exerting gas pressure.
