

## PRESENTAZIONE MULTIMEDIALE

<https://sway.com/fSSSdlpcOYIAsW6Q>

# The states of matter

## Solids, liquids and gases and changes of state

Most substances can exist in three different forms: as solids, liquids or gases. These are called the states of matter.

A solid has a definite volume and shape.

A liquid has a definite volume, but its shape changes according to the shape of the container.

A gas has neither shape nor volume so it will move to fill the space available.

The theory that explains the properties of solids, liquids and gases is called the kinetic theory. This theory is based on the idea that all substances are made up of moving particles and that their properties depend on the energy of these particles.

The particles in a solid have the least energy. They vibrate but they stay where they are.

Heating a solid gives the particles more energy so they can escape from each other. Heat melts a solid and turns it into a liquid. The particles in a gas have even more energy. They easily move far apart and fill the space available. So we can say that solids have definite volume and shape. Liquids have definite volume but can change shape, and gases have no definite volume and shape.

1. *According to the kinetic theory what are all the substances made of?*

2. *Heating a solid gives the particles .... More /less energy.*

## Changes of states

A substance changes from one state of matter, that is solid, liquid or gas, to another, depending on its temperature and pressure. When something changes state, heat is produced or lost. Different substances change state at different temperatures, some high, some low. These are called their melting points.

## Melting points

Different solids melt at different temperatures. Ice melts at 0 degrees Celsius (0°C). Chocolate melts at about 35°C. We say that chocolate has a higher melting point than ice. Metals, like aluminum and iron, also melt when we heat them. They have very high melting points. They have to be very hot to melt.

## Temperature

Temperature is a measure of how hot or cold things are. You need a thermometer to measure temperature. Temperature is measured in degrees Celsius (°C) or Fahrenheit (F).

Ice melts at exactly 0°C.  
A hot bath is about 40°C  
Water boils at exactly 100°C

### 3. Answer the following questions:

1. What is the melting point?
2. Do solids melt at the same temperature?
3. What do you need to measure temperature?
4. How can temperature be measured?

## Heating

If ice (solid) is heated, it changes to water (liquid). This change is called **melting**.  
Water (liquid) can change to water vapor (gas). This is called **evaporation**. In this case the particles have enough energy to escape, or evaporate from the surface of the liquid to form a vapor.

If water (liquid) is heated until it boils, it changes to water vapor (gas) very quickly. Water boils at 100°C.  
Heat can change solids into liquids or gases.

Most solids melt into liquid when they are heated.  
A liquid evaporates into a gas when it is heated.  
Some substances can change from gas to solid, or solid to gas, without passing through a liquid form. This is called **sublimation**.

## Cooling

If water vapor (gas) is cooled, it changes to water (liquid). This change is called **condensation**. This is because as it cools down its particles lose energy and are not able to stay as far away from each other.

If water (liquid) is cooled, it changes to ice (solid). This change is called **freezing**. Water freezes at 0°C.  
When we cool something we take heat away from it. Cooling changes a gas into a liquid, and a liquid into a solid.

A gas condenses into a liquid when it is cooled.

A liquid freezes into a solid when it is cooled.

### Answer the following questions:

1. How can water be observed?
2. What are the three states of matter called?

3. Can materials be changed from one state to another?
4. Does water move around the environment?

States of matter

<https://youtu.be/EwzkYTfHFbo>