



MATTER

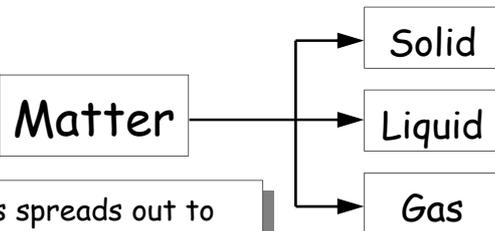
Domain: 4.7

describes observed properties of substances using scientific models and theories

What is Matter?

Matter is anything that has **mass** and occupies **space**. Matter can be classified into three groups as shown in the diagram.

Solids, liquids and gases are classified according to **volume** and **shape**.



A solid has definite volume and shape.

A liquid has a definite volume and it takes the shape of the container.

A gas spreads out to occupy the whole container. A gas can be compressed.

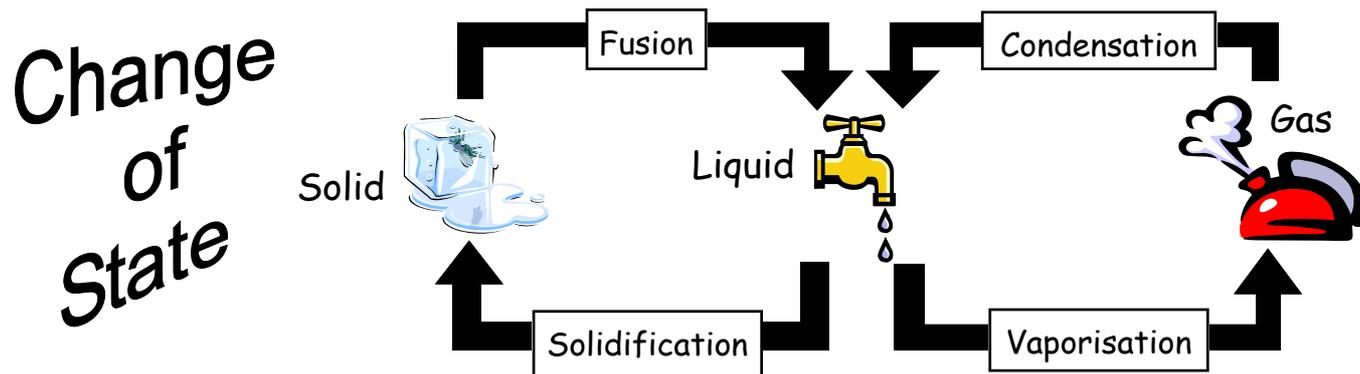
The Particle Theory of Matter

Scientists have proposed a theory that all matter is made up of very small units called **particles**. These particles are arranged differently in each of the states of matter as summarised below:

State	Arrangement of particles	Sketch of particles
Solid	Particles are packed close together. They vibrate but don't move from their fixed position.	
Liquid	Particles are close together but are able to move past each other.	
Gas	Particles are much further apart compared to solids and liquids. They are moving rapidly.	

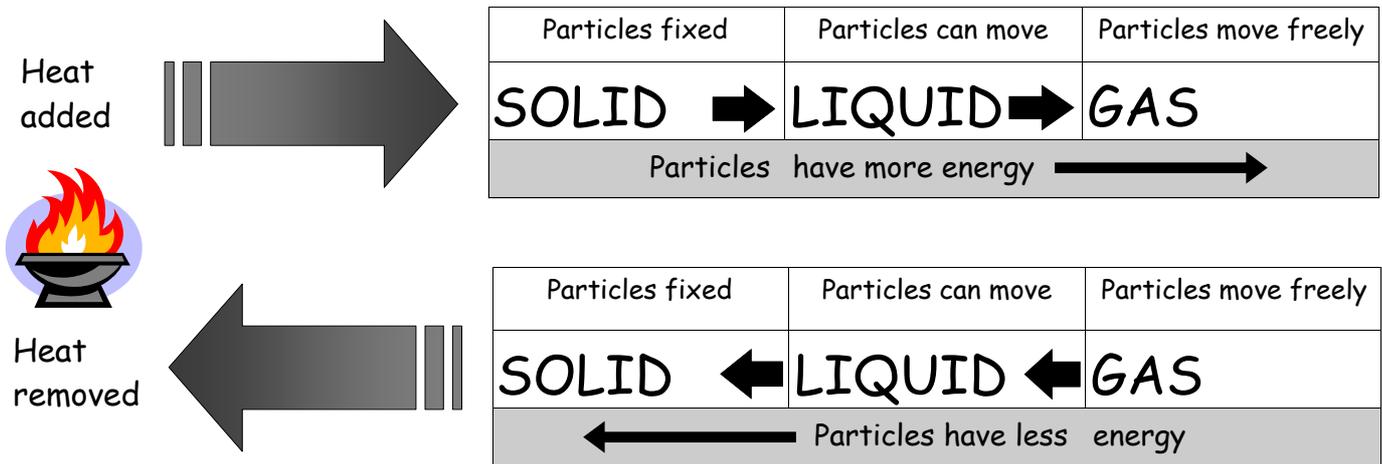
Changes of State

Matter will change its state if **energy** is added or removed. This energy is in the form of **heat**. There are four main changes of state as shown below:





The changes of state occur because particles either have more energy (heat added) or less energy (heat removed). The diagram below summarises this:



Questions:

1. What is matter?
2. What are the three states of matter?
3. Complete the table by placing a tick (if correct) or cross (if incorrect) in each column:
4. What are the small units which make up matter called?

State	Can it be weighed?	Does it occupy space?	Does it have a fixed shape?	Does it have a fixed volume?	Can it be compressed?
solid					
liquid					
gas					

5. Using the Particle Theory of Matter, describe:
 - (a) how particles are arranged in a solid;
 - (b) how particles are arranged in a liquid;
 - (c) how particles are arranged in a gas;
 - (d) why a liquid can be poured;
 - (e) why a gas can be compressed.
6. Complete the table below about changes of state:

Change of state:	liquid to gas		liquid to solid	
Name given to this:		fusion		condensation

7. What changes can occur to a solid if it is heated? (heat is added)
8. What changes can occur to a gas if heat is removed? (it is cooled down)
9. Complete the diagram showing the changes which ice will go through if heated:

