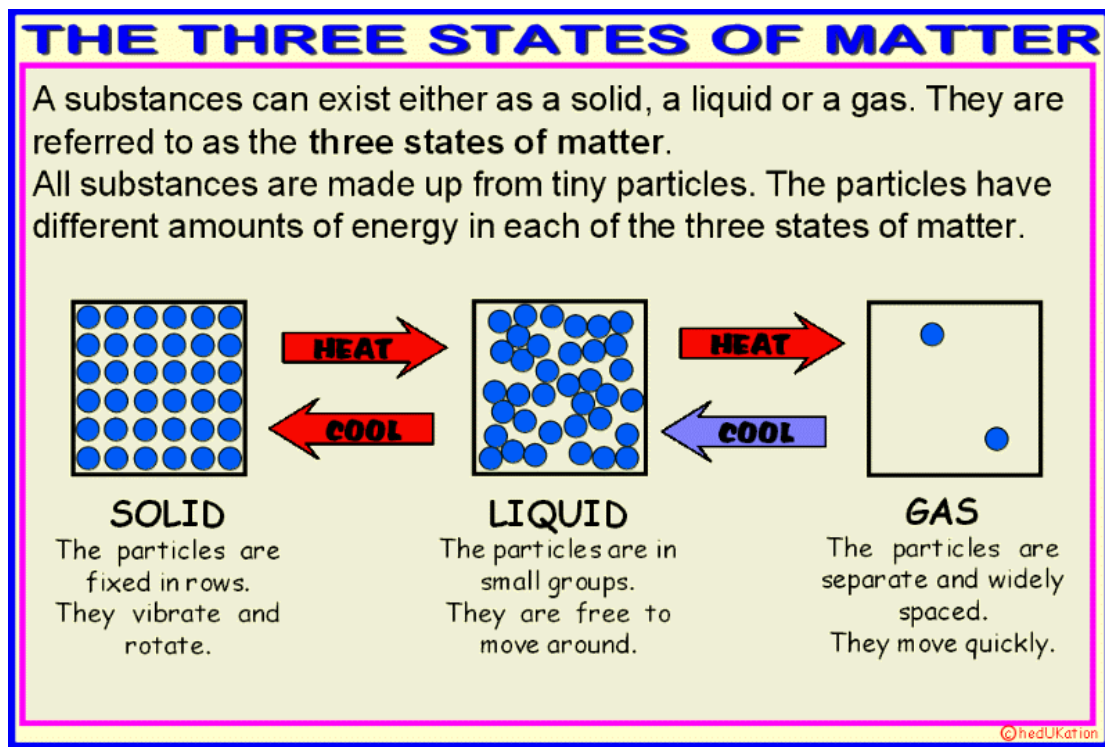


Matter - Summary Notes

States of Matter



Solids

Solids are substances which tend to be hard.

Solids **cannot** change their **shape** or **volume**.

Solids are very hard to squash because the particles are so close.

Liquids

Liquids are substances which can flow.

Liquids can change their **shape** but not their **volume**.

Liquid particles are close making liquids hard to squash.

Gases

Gases will fill any container they are put in.

Gases can change their **shape** and their **volume**.

Gases are easily squashed because the particles can be pushed closer together.

Matter - Summary Notes

Diffusion

Because the particles in substances have energy they can move by themselves.

If we put orange juice and water together they will mix due to the movement of the particles.

If we open a bottle of perfume, the vapour will come out of the bottle and the gas particles will move all over the room, mixing with the air particles.

This mixing of particles is called **diffusion**.

Diffusion happens quickest in gases.

Expansion and Contraction

When we heat any substance, the particles get more energy and begin to move faster.

This movement causes the particles to move further apart so that the substance **expands**.



If we cool down a hot substance we take energy away from the particles. They start to move more slowly and get closer together so the substance **contracts**.

All states of matter expand when heated and contract when cooled.

Gases expand most when heated and solids the least because gas particles are already far apart and are much freer to move.

Matter - Summary Notes

Expansion and Contraction in Everyday Life



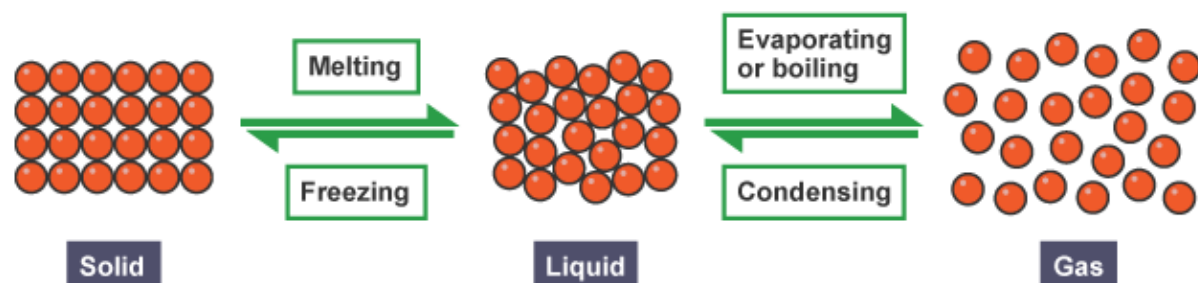
Expansion joints are provided in running rails to allow for temperature changes. The additional rails in the centre of the track are bolted to the sleepers to prevent the sleepers being shifted by rail expansion.

- Gaps are left between sections of railway line to allow expansion in summer
- Telephone wires are deliberately left loose to allow contraction in winter.
- Central heating systems have an expansion pipe to allow the heated water to expand without bursting out the system

Matter - Summary Notes

State changes

Substances can exist as a **solid**, **liquid** or **gas**. Converting from one state to another usually involves heating or cooling.



- Heat must be **supplied** to a substance for it to melt, **evaporate** or boil. For example, you need to heat ice to melt it, and you need to heat water to make steam.
- Heat must be **removed** from a substance to **condense** or freeze it. In other words, the substance must be cooled down.

Under certain conditions, some solids turn straight into a gas when heated. This process is called **sublimation**. A good example is solid carbon dioxide, also called 'dry ice'. At atmospheric pressure, it turns straight into gaseous carbon dioxide.

Matter - Summary Notes

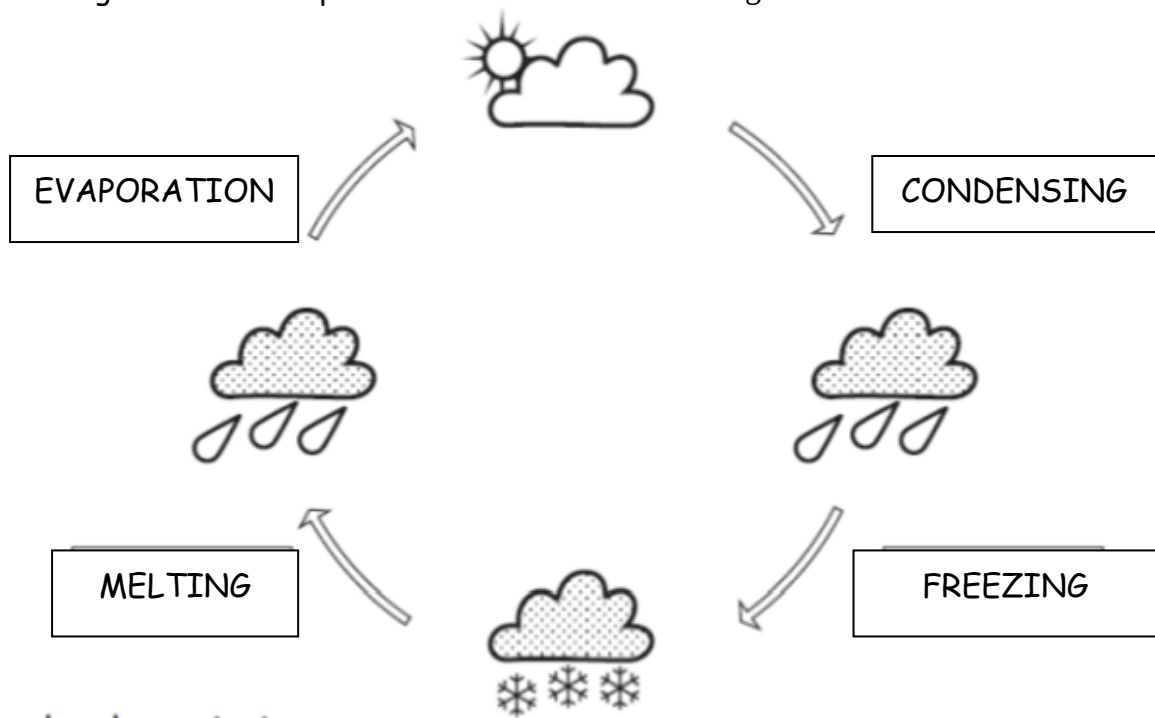
The Water Cycle

Ice, water and steam are all the same substance - they are simply all in different states.

When the solid ice is heated the particles gain energy and eventually break away from each other forming water.

When water is heated the particles gain more energy and eventually can separate from each other then water vapour is formed.

Cooling turns water vapour to water and further cooling turns water to ice.



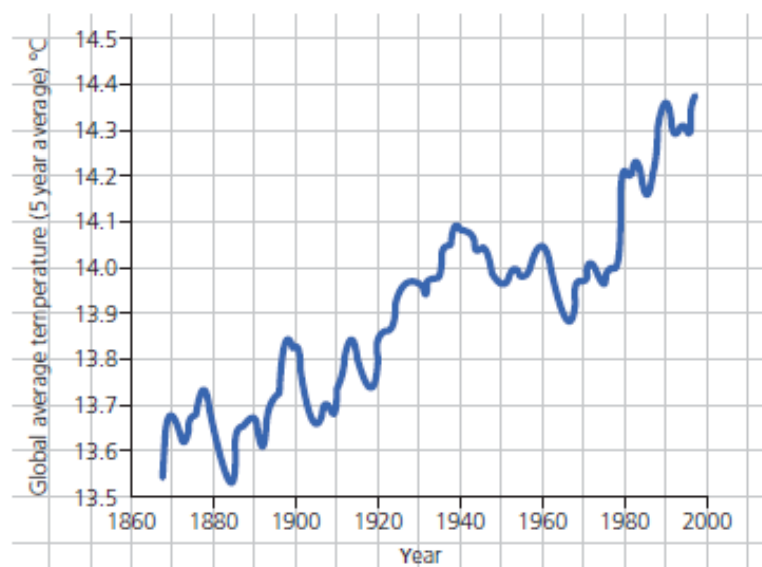
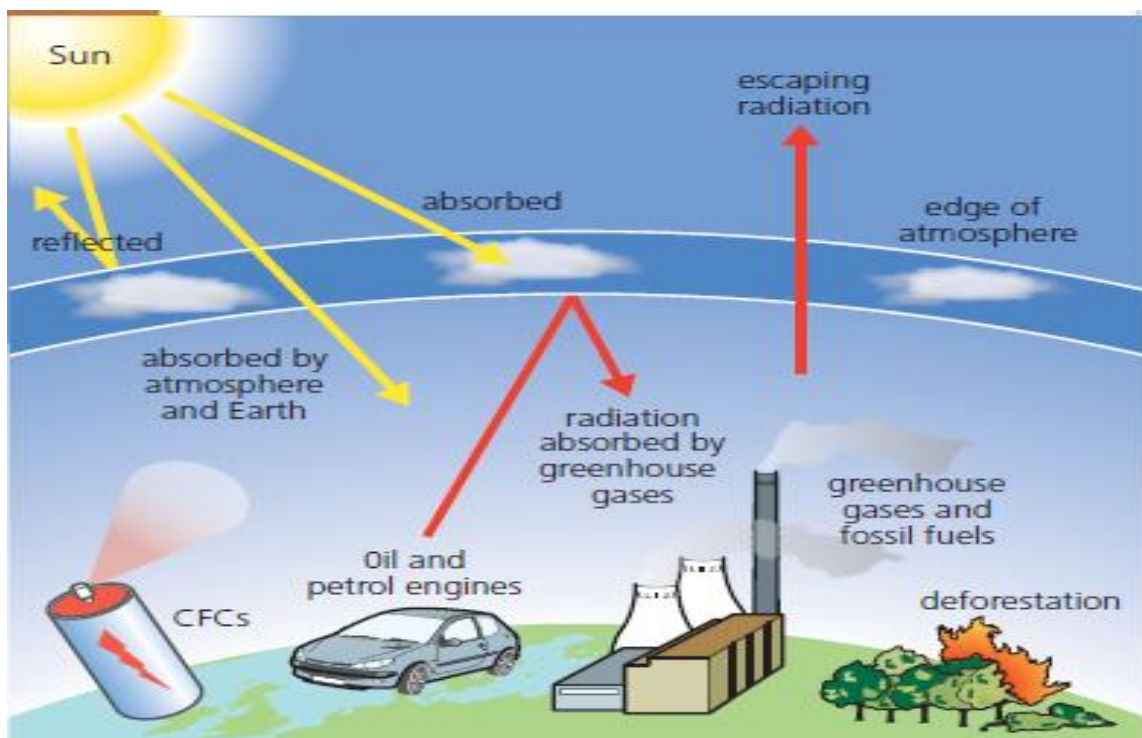
Matter - Summary Notes

Global Warming

Global Warming- Greenhouse effect

Some gases in the Earth's atmosphere stop heat radiating into space from the Earth. This is called the greenhouse effect and the gases involved are called greenhouse gases. They include:

- methane
- water vapour
- carbon dioxide.



Matter - Summary Notes

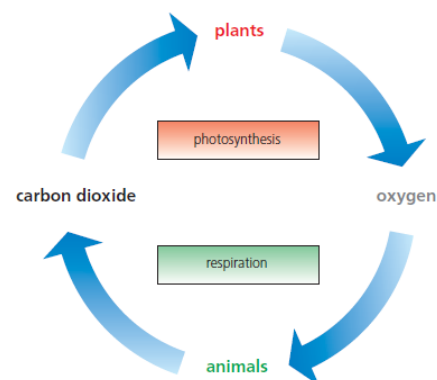
Impact of global warming

Global warming may make it impossible to grow certain food crops in some regions. Melting polar ice, and the thermal expansion of sea water, could cause rising sea levels and the flooding of low-lying land.

Why are Carbon dioxide levels increasing?

1. Deforestation - cutting down forests of trees around the world which use up carbon dioxide during photosynthesis
2. Respiration of organisms
3. Increased combustion (burning) of fossil fuels

When fossil fuels (hydrocarbons) burn in a plentiful supply of air they produce **carbon dioxide** and **water**



The test for carbon dioxide gas

Carbon dioxide gas turns lime water **CLOUDY** (milky)

The test for water

Water turns cobal chloride paper from **BLUE** to **PINK**