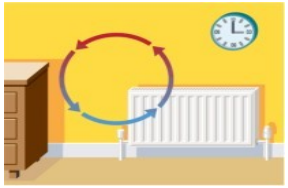
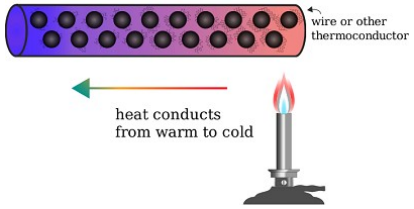
Temperature and Energy

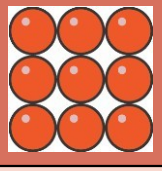
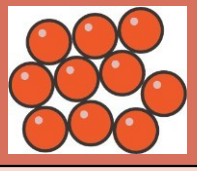
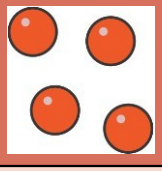
Keyword	Definition
Particle	A term for a small piece of matter. For example atoms.
Matter	A substance which is made up by atoms or molecules.
Internal Energy (Heat)	The total kinetic energy and potential energy of the particles in an object.
Temperature	How hot or cold a substance is measured in degrees celcius
Thermal Conductivity	A measure of how well a material conducts energy when it is heated.
Conduction	The transfer of heat through a material by transferring kinetic energy from one particle to another. Mainly solid objects.
Convection	The transfer of thermal energy through a liquid or gas when hot particles move up and cold particles fall back down.
Infrared Radiation	Electromagnetic radiation emitted from a hot object. An example is a hot cup of tea.

Convection
Liquids and gases are fluids because they can be made to flow. Liquids and gases expand when they're heated and become less dense, so the particles rise. The fluids then cool, and become more dense and fall. This cycle is called a convection current that transfer heat from place to place are set up.



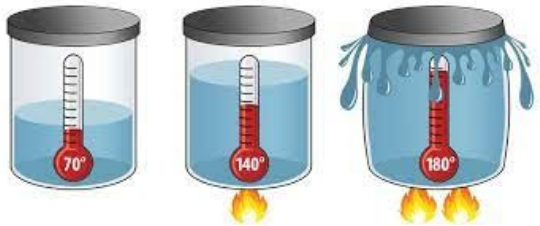
Conduction
Heat energy is conducted from the hot end of an object to the cold end. When the metal is heated, the particles gain kinetic energy, they pass this energy to particles they are close to, so energy is transferred from the hot part of the metal to the cooler part.



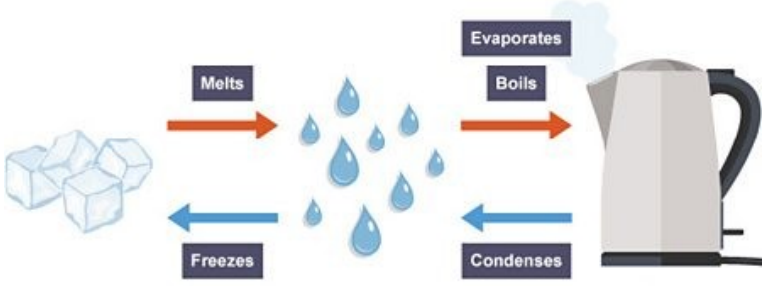
Solid	Liquid	Gas
		
The particles vibrate in a fixed position.	The particles are close together and move around each other.	The particles are far apart and move quickly in all directions.
The particles cannot move from place to place.	The particles are arranged in a random position.	The particles are arranged in a random way.
Particles have a fixed shape and cannot flow.	The particles flow and take the shape of the bottom of their container.	The particles flow and completely fill their container.
The particles cannot be compressed (squashed)	The particles cannot be compressed.	The particles can easily be compressed.

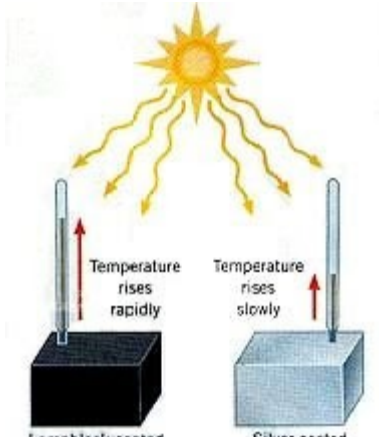
Thermal Expansion

As a substance gets hotter it will expand as its particles vibrate faster with more energy. The particles start to move further apart, so the substance expands.



Internal Energy:
The internal energy is the total amount of kinetic energy and potential energy of all the particles in the system.





Radiation
Thermal energy can also be transferred as infra-red waves of energy. These waves do not need particles. So radiation can travel through space, space is a vacuum and has no particles. This is how thermal energy is transferred to earth from the sun.
All hot object emit or give out thermal radiation, even you, this is how police night vision cameras work by picking up the thermal waves given out by your body!