

## Properties of the particles in the three states of matter

Solid	Liquid	Gas
Particles are very close together	Particles are close together	Particles are far apart from each other
In a regular pattern	In a random arrangement	In a random arrangement
Particles cannot move but can vibrate	Particles can slide past each other	Moving constantly in all directions

### HEAT TRANSFER

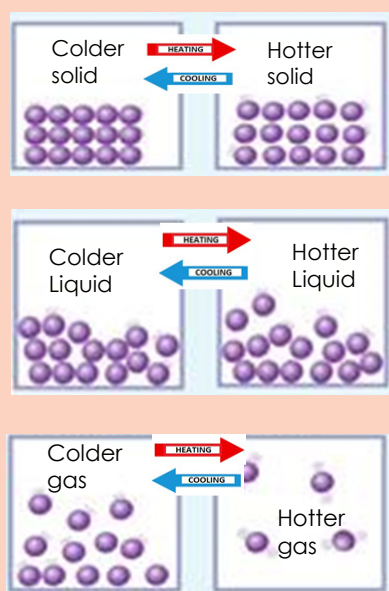
Temperature A: Warmer Object (red) and Cooler Object (blue)

Temperature B: HEAT TRANSFER (red wavy arrow)

Temperature C: Objects are the Same Temperature (purple)

## Effect of heat on particles

- Heating particles makes them move more.
- In solids, they vibrate more in their fixed position.
- In liquids and gases, they move more quickly.
- As a result, substances expand when they are heated and contract when they are cooled.



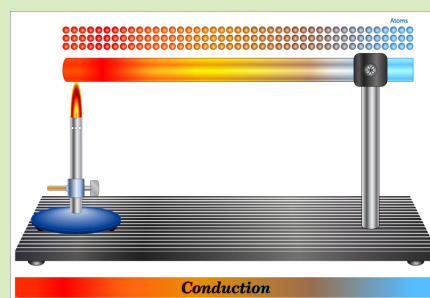
Heat transfer takes place when heat moves from a hotter object to a colder object.

Thermal equilibrium is reached when the heat is evenly spread between two or more objects.

Heat conduction - the process of heat energy being passed on between two objects in contact

Good conductors – materials that allow heat to pass through them easily (e.g. metals, graphite)

Good insulators - materials that DO NOT allow heat to pass through them easily (e.g. cloth, plastic, wood)



## Uses of Conductors

- Heating elements (e.g. the hot bits of toasters)
- Saucepans that contain food to be cooked
- From radiators
- Cooling fins on computers and car engines

## Uses of Insulators

- Handles of saucepans
- Oven gloves
- The materials that coats are made from
- Through hot drinks containers
- Hair on your head or the fur coat of an animal