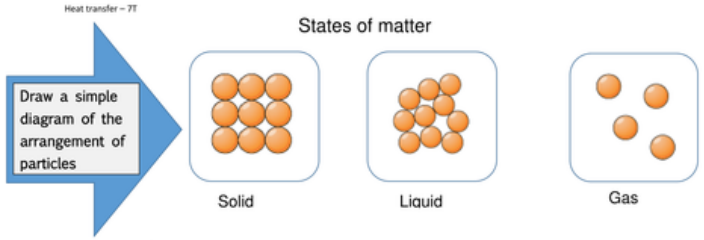
Heating and cooling



Organisation (Pattern)	Regular pattern	No pattern ,Random arrangement	No pattern, random arrangement
Spacing (Touching?)	All touching, close together	Close together	Wide spaces between, Far apart
Motion (Movement of molecules)	Vibrate on the spot, cannot move from one place to another	Move and slide around each other	Move quickly in all directions
Example (E.g. IPhone 6s...)	Bed	Cup of tea	Hairspray

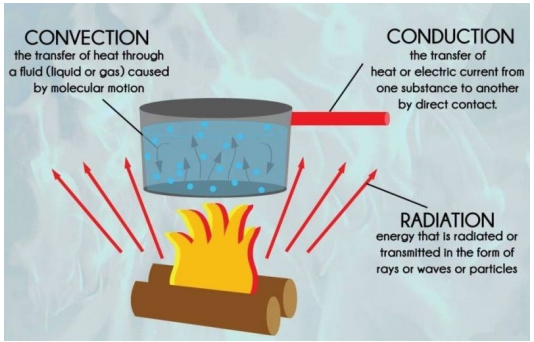
Radiation

All objects transfer

energy

to their surroundings

by infrared radiation. The hotter the object, the more infrared radiation it emits.



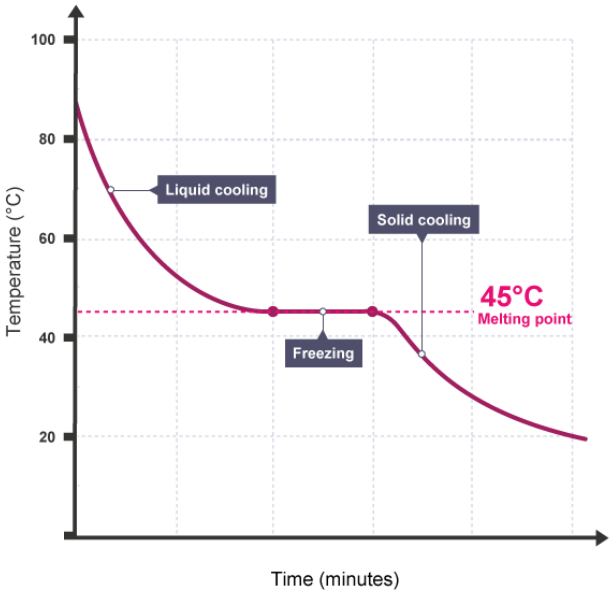
Infrared radiation is a type of electromagnetic wave. There are no particles involved. This means that energy can be transferred by radiation when there are no particles, like the vacuum of space.

Cooling practical

It is often easier to allow a substance to cool down. Salol is a solid used in these investigations. To investigate its cooling curve:

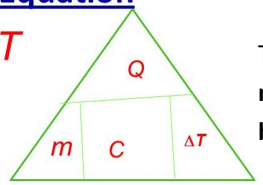
1. Put some salol and a thermometer into a boiling tube.
2. Put the boiling tube in a hot water bath. Allow the salol to melt and reach the temperature of the hot water.
3. Take the boiling tube out of the hot water.
4. Measure and record the temperature of the salol every minute for about 20 minutes, stirring briefly to evenly mix the hot and cold parts.

Cooling Curve



Specific Heat Equation

$$Q = mC\Delta T$$



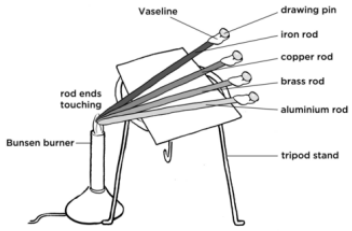
Q = thermal energy
m = mass
C = specific heat
ΔT = change in temp

The specific heat capacity is **the amount of energy required to raise the temperature of 1kg of substance by °C**, its units are J/(kg K) or J/(kg °C).

The specific heat of silicon is 700 J/kg/°C. How much energy is needed to raise a 7 kg of silicon by 10 °C?

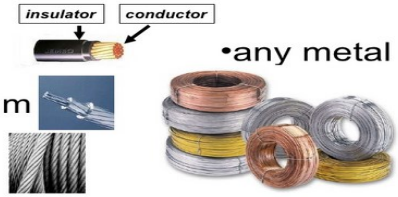
c = 700; m= 7kg; ΔT = 10^0C

$$Q = mC\Delta T = 7 \times 700 \times 10 = 49000J$$



Conductor –

Any material that allows electric current to pass through it



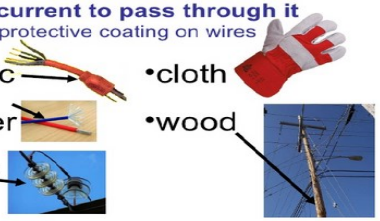
- copper
- aluminum
- steel
- any metal

Insulator –

Any material that does not allow electric current to pass through it

•like the protective coating on wires

- plastic
- rubber
- glass
- cloth
- wood



Investigating thermal conductivity

1) Add small blobs of wax 2cm apart onto each bar. (as far as this is possible)
2) Heat each bar on a medium flame
3) Time how long it takes for the 3 blobs of wax