



**Heat and Heat Transfer**

**Science – Junior Cert**

**Quick Notes**

# Heat and Heat Transfer

Heat is a form of energy, so its unit of energy is Joule. Most solids, liquids and gases expand on heating and contract on cooling. Different materials expand at different rates. Like other liquids, water contracts on cooling down to  $4^{\circ}\text{C}$ , but then it expands to form ice which is less dense than water. This means ice can float on water. Temperature is a measure of how hot or cold an object is. Pressure affects the boiling point of a liquid. An increase in pressure raises the boiling point of the water. Matter exists normally in three states- solid, liquid and gas. When material changes its state, heat energy is taken in (absorbed) or given out (released). Latent heat is the heat that is needed to change the state of a substance. A cooling curve shows what happens over time when heat is removed from a substance. It has flat sections showing that energy is released when a substance changes state. Heat is transferred in three ways- conduction, convection and radiation. Conduction is the transfer of heat through a substance without any overall movement of the substance itself. Heat is transferred in metals by conduction. Convection is the transfer of heat through liquids and gases by the mass movement of particles. Radiation is the transfer of heat by means of waves that can travel through a vacuum. This is how the heat energy of the sun gets to the Earth. Conductors are materials that are good at transferring heat e.g. metals. Insulators are poor conductors of heat e.g. water, air. To keep heat within a building, it is important to use insulators to fill walls and windows and to cover attic floors.