Chapter Nine

Heat

- This is the type of energy which flows from the hot to the cold part of a body.

Temperature:

- This is a number which tells us how hot or cold a body is.

Sources of heat:

- Some of the sources of heat are:
  (i) The sun.
  (ii) Hydroelectric power.
  (iii) Friction.

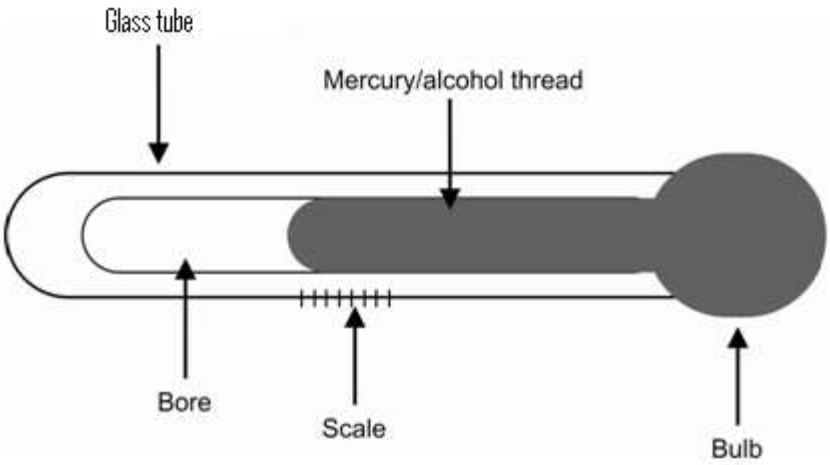
Thermometer:

- This is used to measure temperature.
- There are different types of thermometers and examples are:
(i) liquid in glass thermometer.
(ii) Digital thermometer.
(iii) Gas thermometer.

Liquid in glass thermometer:

- There are two types and these are:
(a) Mercury thermometer.
(b) Alcohol thermometer.
- The liquid in glass thermometer always contains a liquid.
- While mercury is the liquid used in the mercury thermometer, alcohol is the one used in the alcohol thermometer.

The structure of the liquid in glass thermometer:



- The liquid in glass thermometer is made up of a glass bulb, which is joined to a glass tube.
- Within or inside the glass tube can be found a space called the bore.
- Within the bulb and part of the bore can be found the alcohol or the mercury.
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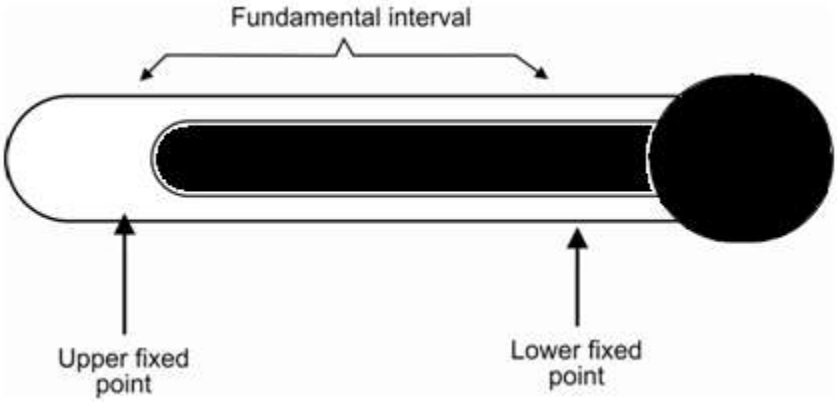
The fixed points of a thermometer:



- Every thermometer has two marks or points marked on it, and these are the upper fixed point and the lower fixed point.
- To get the lower fixed point, the thermometer is placed into pure ice.
- The ice will cause the mercury or the alcohol thread to start falling, and stop falling at a particular point.
- This point is marked as the lower fixed point.
- To get the upper fixed point, the thermometer is placed inside steam or water vapour.
- The steam will cause the mercury or the alcohol thread to start rising.
- At a particular point, the mercury or the alcohol thread will stop rising.
- This point is marked as the upper fixed point.
- The distance between the upper fixed point and the lower fixed point is called the fundamental interval.

Expansion of solids:

- Solids expand when they are heated and contract when they cool.
- This means that when a solid such as an iron nail is heated, it becomes bigger and when it cools, it becomes smaller.

Expansion of liquids:

- Liquids also expand when they are heated and contract when they cool.
- This means that when a liquid such as water is heated, it increases in volume and when it cools, it decreases in volume.

Good conductors of heat:

- These are materials through which heat can easily pass.
- Examples of good conductors of heat are metals such as aluminum, copper and zinc.

- Items such as cooking utensils which are used for cooking food are made of good conductors.
- This is to enable heat to easily pass through them and get to the food, when we are cooking food in them.

Bad conductors of heat:

- These are materials through which heat cannot easily pass.
- They are also called insulators and examples are rubber, wood and plastic.
- The handles of cooking utensils are made of bad conductors.
- This will enable these handles to be cold, while these utensils are hot.
- We can therefore use the handles to remove them from the fire while they are hot.

Transmission of heat:

- This refers to the movement of heat from one place to another, or the movement of heat from one part of a body to another part.
- The transmission of heat can occur in three ways and these are by:

(a) Conduction.
(b) Convection.
(c) Radiation. .

Conduction:

- This is the type of heat transmission in which the heat is passed from part of a solid to another part.
- It occurs in solids only.
- We can demonstrate or show conduction by holding one end of a spoon, and putting the other end in fire.
- The part of the spoon in the fire becomes hot first, but after sometimes, the part we are holding also becomes hot.
- By means of conduction, the heat has moved from the part of the spoon we put into the fire, to the part that we are holding.
- For conduction to occur, there must be a material medium such as a metal, concrete, stone or sand for the heat to travel or pass through.

Convection:

- This is the type of heat transmission which occurs in liquids and gases.
- This type of heat transmission also requires a material medium, such as water.
- Convection can be shown or demonstrated by putting water into a container, and placing the container on fire.
- The water at the bottom of the container becomes heated while the cold water at the top remains cold.