

## Revision Notes

### Class-7 Science

### Chapter 4 – Heat

#### Heat:

- We know that many things around us can be hot or cold, like tea or boiling water is hot, and ice or ice cream is cold.
- This is not just a sensation but a form of energy called **heat energy**. Heat can be termed as an energy which makes you feel hot or warm or we can say scientifically that it is form of energy where the **transfer of energy** from a hot to a cooler object takes place.
- The differentiation of hot and cold comes from the difference in their **temperatures**. Hence temperature is a measure of degree of hotness of an object.

#### Measuring temperature:

- The device that measures the temperature is known as **thermometer**. There are various kinds of thermometers depending on the purpose or usage of the same.
- The various kinds of thermometers are as follows:

##### 1) Clinical thermometer:

- This type of thermometer is used to measure the **body temperature only** and is used in hospitals by doctors and also at home.
- A clinical thermometer generally consists of long narrow glass tube with a bulb at one end that contains **mercury**. A thread of shining mercury is seen along the scale indicated on the thermometer, which helps in taking the reading.
- The scale used in India is the **Celsius scale** and is indicated by the symbol  $^{\circ}\text{C}$ .
- The normal human body temperature is  $37^{\circ}\text{C}$ , and so the range of this thermometer is from  $35^{\circ}\text{C}$  to  $42^{\circ}\text{C}$ . To take the reading, the bulb of the thermometer is kept below the tongue for a minute.
- Now a days due to the toxic nature of mercury and issues of the thermometer being broken and spilling it, **digital thermometers** are in use which are safe and do not contain mercury.

##### 2) Maximum-minimum thermometers:

- These are used to measure the maximum and minimum temperatures of a day.
- They are U-shaped parallel glass tube. It is used to **record the temperatures at a place.**

### 3) Laboratory Thermometer:

- This thermometer is used to measure the **temperature of all objects** other than a human body.
- It consists of a long glass tube without a kink and has a bulb containing mercury at the end of the tube.
- This is generally **used in laboratories** for checking the boiling points, freezing points etc. Hence the range of this thermometer is from  $-10^{\circ}\text{C}$  to  $110^{\circ}\text{C}$ .

### Transfer of heat:

- We know that heat is the transfer of energy from a hotter object to a cooler object, like if a spoon is left in a bowl of hot soup, then the heat from the soup is transferred to the spoon and it becomes hot.
- This transfer of heat can occur by different ways. They are:

#### 1) Conduction:

- This is a process of heat transfer where the heat is **transferred from the hot part to the cold part** of the object. Example - The handle of a pan gets hot when the pan becomes hot and so a wooden or plastic handle is made for them.
- The substances that allow the heat to pass through them are termed as **conductors**. Example - iron, copper, etc.
- The substance that do not allow the heat to transfer through them are called as **insulators or poor conductors**. Example - wood, plastic.

#### 2) Convection:

- This is the form of **heat transfer in liquids and gases** where the heat is transferred by the movement of the heated molecules within them. Example - boiling of water.
- The molecules of the fluid or gas near the source of heat becomes hot and rises up and this is replaced by the colder molecules in the fluid or air. They also get heated up and rise till the entire fluid or air is heated.
- This is the principle behind the interesting feature in the coastal areas called the sea and land breeze.
-

a) **Sea Breeze:**

- In the coastal regions, the land gets heated up faster during the day time. And as the land gets hotter, the hot air rises up.
- At that time the cool air from the sea blows in to take its place and the warm air from the land moves to the sea to complete the cycle. This cool breeze flowing from the sea to the land is termed as the sea breeze.

b) **Land Breeze:**

- The opposite of this happens at night. The land cools faster than the water at night, so the cool air moves towards the sea to replace the warm air of the sea.
- The cool air moving from the land towards the sea is termed as land breeze.

3) **Radiation:**

- This is the form of heat transfer where a **medium** like air or liquid is **not required to transfer** the heat energy. Example - Heat from the sun, a hot utensil becomes cool after some time by transfer of heat to surroundings this way.
- All the hot bodies are capable of radiating heat.

**Absorption of heat:**

- The heat that is radiated by the objects is reflected, absorbed.
- The heat increases the temperature of the object.
- **Dark-colours** are capable of **absorbing heat**. So, we feel comfortable wearing them in winters and we use a black umbrella to go out in sun.
- **Light colours reflect heat** and so we feel comfortable wearing them in summers.
- We use woollen clothes in winters. Though **wool is a poor conductor** of heat, but it can trap air [again a bad conductor of heat] in between the fibres which does not allow the heat from the body to escape into the surroundings and thus keeping us warm.