Introduction

- We wear woollen clothes during winters because they keep us warm.
- We usually prefer to wear light coloured cotton clothes in summers. These give us a feeling of coolness.
- In winters you feel cold inside the house. If you move out in the sun, you feel warm. In summers, you feel hot even inside the house.

Temperature

- In our day - to - day life we observe that some objects are hot while some are cold.
- For example, tea is hot and ice is cold.
- Some objects are hotter than others and some may be colder than others.
- A reliable measure of the hotness or coolness of an object is called temperature.
- Temperature is measured by using a device called thermometer.

Types of Thermometers

- The device used for measuring temperature is known as Thermometer. A thermometer consists of a long, narrow glass tube with a bulb at one end that contains mercury.
- When heat is supplied to the thermometer bulb containing mercury, it expands and rises in the glass tube of the thermometer.
  Thermometers can be classified as:
  - Clinical thermometer – these are used to measure temperature of human body. It measures temperature between 35^{o} to 42^{o}.
  - Digital thermometer - Digital thermometer is an advanced clinical thermometer. Because of high toxicity of the Mercury present in clinical thermometer and difficulty in its disposal, this modified thermometer is used which do not use mercury and hence is safe to use.
  - Laboratory Thermometer – Thermometers used to measure the temperature in science laboratory is called a Laboratory Thermometer.

Reading a Clinical Thermometer

- While using clinical thermometer for measuring temperature following steps should be followed:
  1. Rinse the thermometer properly with a an antiseptic solution.
  2. Hold it firmly and give a few jerks to bring the level of mercury down.
  3. Ensure the temperature falls below 35^{o} C.
  4. Now, place the bulb of the thermometer under your tongue.
  5. After one minute, remove the thermometer and note the Reading carefully.
  6. This is your body temperature.

7. The temperature should always be written with its unit, °C.
8. The thermometer should be handled carefully because it is made of glass.

Laboratory Thermometer

- The range of a laboratory thermometer is mostly between –10°C and 110°C.
- It is a long glass tube having a thin bore in it.
- A glass bulb containing mercury is present at the lower end of the glass tube.
- There is a thin line of mercury in the glass tube of the thermometer.
- The upper end of this mercury thread tells the temperature of the object in which it is placed.
- While reading a thermometer it should be kept upright, not tilted.
- The bulb should be completely surrounded by the liquid whose temperature is to be measured.
- The bulb should not touch the base of the container.

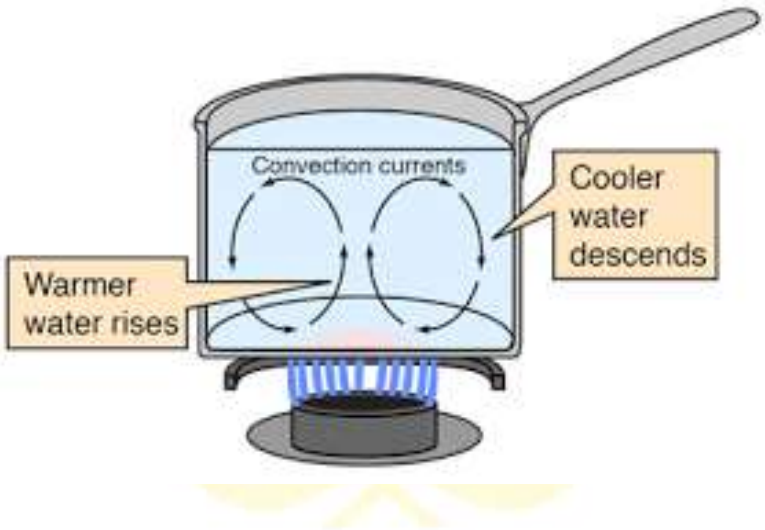
Transfer of Heat

- We observe that a frying pan becomes hot when kept on a flame. And it cools down when removed from the flame.
- We also observe that while boiling water we heat the utensil only from the bottom but the water at the top also becomes hot. Why does it happen?
- This means there is some phenomenon due to which heat gets transferred from one end to the other.
- Heat always flows from hotter end to the colder end.
- The process by which heat is transferred from the hotter end of an object to the colder end is known as conduction.

- In solids, heat gets transferred mostly by conduction. But all solids do not conduct heat because some are poor conductors of heat.
- The materials that allow heat to pass through them easily are called conductors of heat. For examples, iron, copper and aluminium.
- The materials that do not allow heat to pass through them easily are called poor conductors of heat such as plastic and wood. Poor conductors are also called insulators.

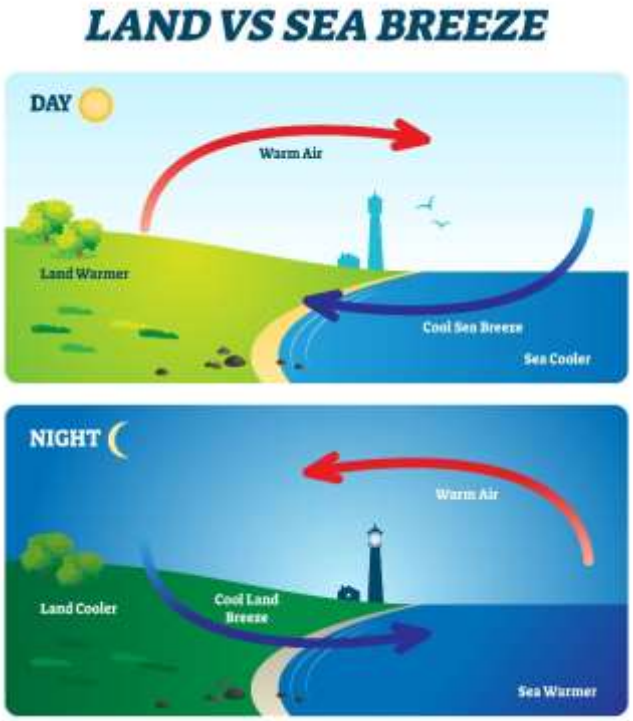
Convection

- Water and air are poor conductors of heat, then how will the transfer of heat take place in these?
- When water is heated, the water near the flame gets heated. Hot water rises up and the cold water from the sides moves down towards the source of heat. This water also gets heated and rises.
- So, this continues as a cycle, unless the entire water is heated up.



Sea Breeze and Land Breeze

- During the day, the land gets heated faster than the water. The air over the
- land becomes hotter and rises up. The cooler air from the sea flows towards the land to replace it.
- The warm air from the land flows towards the sea and completes the cycle. The air from the sea is called the sea breeze.
- At night, exactly reverse happens. The water cools down more slowly than the land. So, the cool air from the land moves towards the sea. This is called the land breeze.



Radiation

- The heat from the sun cannot reach us by conduction or convection because there is no medium like air between sun and earth.
- The process of conduction and convection requires a medium.
- Therefore, the heat is transferred to us by radiations.
- This does not require any medium.
- All hot bodies radiate heat, when heat falls on any object, a part of it is reflected, a part is absorbed and a part may be transmitted.
- A hot utensil cools down by radiating heat to its surroundings.
- Our body also gives heat to the surroundings and receives heat from it by radiation.

Kinds of clothes we wear in summer and winter

- Light coloured clothes reflect most of the heat fallen on them and therefore they are more comfortable to wear in summers.
- Dark coloured clothes absorb most of the heat and therefore they are more comfortable to wear in winters.
- In winters, we wear woollen clothes because wool is a poor conductor of heat. And there is air trapped in between the wool fibres. This air prevents the flow of heat from our body to the cold surroundings. Thus, we feel warm.