CLASS- VII
SCIENCE
CHAPTER 4 - HEAT

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HOT OR COLD

In our day-to-day life, we come across a number of objects.

- Some of them are hot and some of them are cold
- Tea is hot and ice is cold.
- Usually we identify them by touching. But we cannot always rely on our sense of touch to decide whether an object is hot or cold. Sometimes it may deceive us.
- Then how do we find out how hot an object really is?
- A reliable measure of the hotness of an object is its temperature.

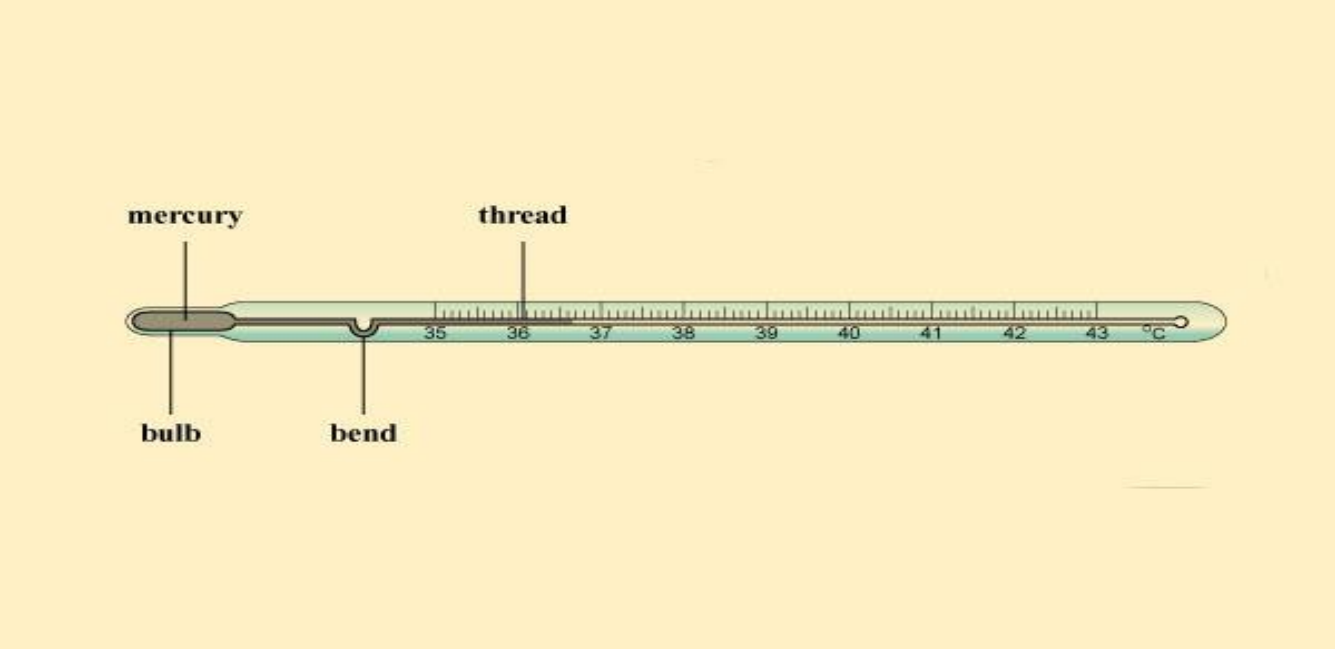
MEASURING TEMPERATURE

Temperature is measured by a device called thermometer. There are different types of thermometers.

1. Clinical thermometer
2. Laboratory thermometer
3. Maximum- minimum thermometer
4. Digital thermometer.

1. CLINICAL THERMOMETER

- The thermometer that measures our body temperature is called a clinical thermometer.
- A clinical thermometer consists of a long, narrow, uniform glass tube. It has a bulb in one end which contains mercury. Outside the bulb, a shining thread of mercury can be seen.



- We can also see a scale on the thermometer. The scale we use is Celsius scale indicated by ºC.
- Kink prevents mercury level from falling on its own
- The clinical thermometer is designed to measure the temperature of the human body only..
- The temperature of the human body does not go below 35ºC or above 42ºC.
- That is the reason that this thermometer has the range from 35ºC to 42ºC.

HOW TO USE A CLINICAL THERMOMETER?

- Wash the thermometer, preferably with an antiseptic solution.
- Hold it firmly and give it with a few jerks. The jerk will bring the level of mercury down. Ensure that it falls below 35ºC.
- Now place the bulb of the thermometer under your tongue.
- After one minute, take the thermometer out and note the reading. This is your body temperature.
- The temperature should always be stated with its unit.
- The normal temperature of the human body is 37ºC.

PRECAUTIONS TO BE OBSERVED WHILE READING A CLINICAL THERMOMETER

- Thermometer should be washed before and after use, preferably with an antiseptic solution.
- Ensure that before use the mercury level is below 35ºC.
- Read the thermometer keeping the level of mercury along the line of sight.
- Handle the thermometer with care. If it hits against some hard objects, it can break.
- Don’t hold the thermometer by the bulb while reading it.

2. LABORATORY THERMOMETER

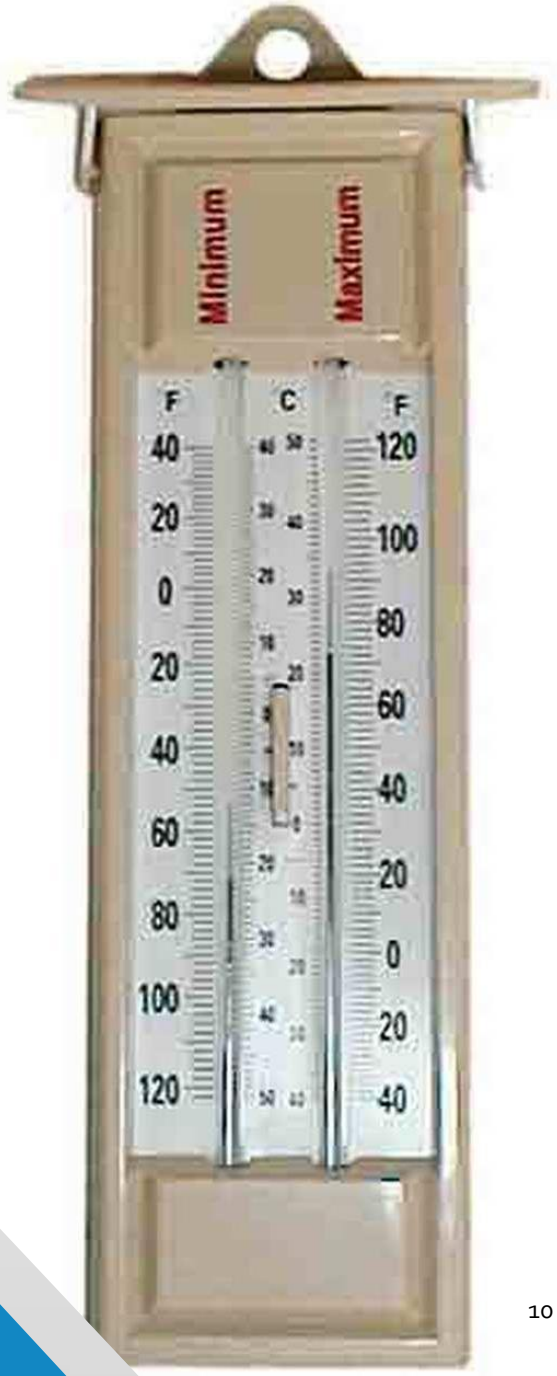
- The range of laboratory thermometer is -10ºC to 110ºC .
- It is used in laboratories to measure temperature with high accuracy.

PRECAUTIONS TO BE OBSERVED WHILE READING A LABORATORY THERMOMETER

- In addition to the precautions needed while reading a clinical thermometer, the laboratory thermometer
- Should be kept upright, not tilted.
- The bulb should be surrounded from all sides by the substance of which the temperature should be measured.
- The bulb should not touch the surface of the container.

3.MAXIMUM – MINIMUM THERMOMETER

- The maximum and minimum temperatures of the previous day, reported in weather reports, are measured by this thermometer.



4.DIGITAL THERMOMETER

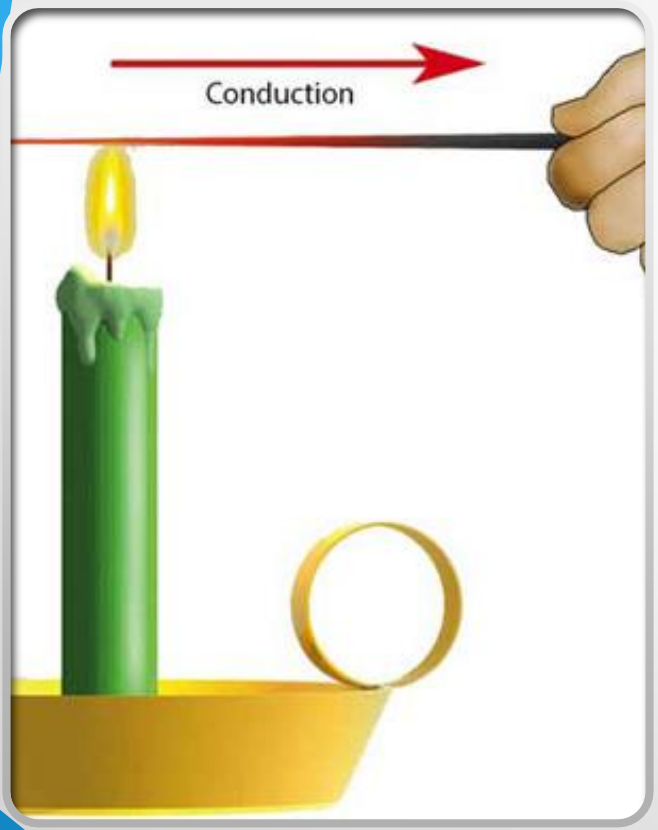
- There is a lot of concern over the use of mercury in thermometers.
- Mercury is a toxic substance and is very difficult to dispose of ,if a thermometer breaks.
- Digital thermometers do not use mercury.

TRANSFER OF HEAT

Transfer of heat takes place through

- conduction
- convection
- radiation

CONDUCTION



The process by which heat is transferred from the hotter end to the colder end of an object is known as conduction. In solids, generally, the heat is transferred by the process of conduction.

CONDUCTORS AND INSULATORS

- **Conductors-** The materials which allow heat to pass through them easily are conductors of heat.

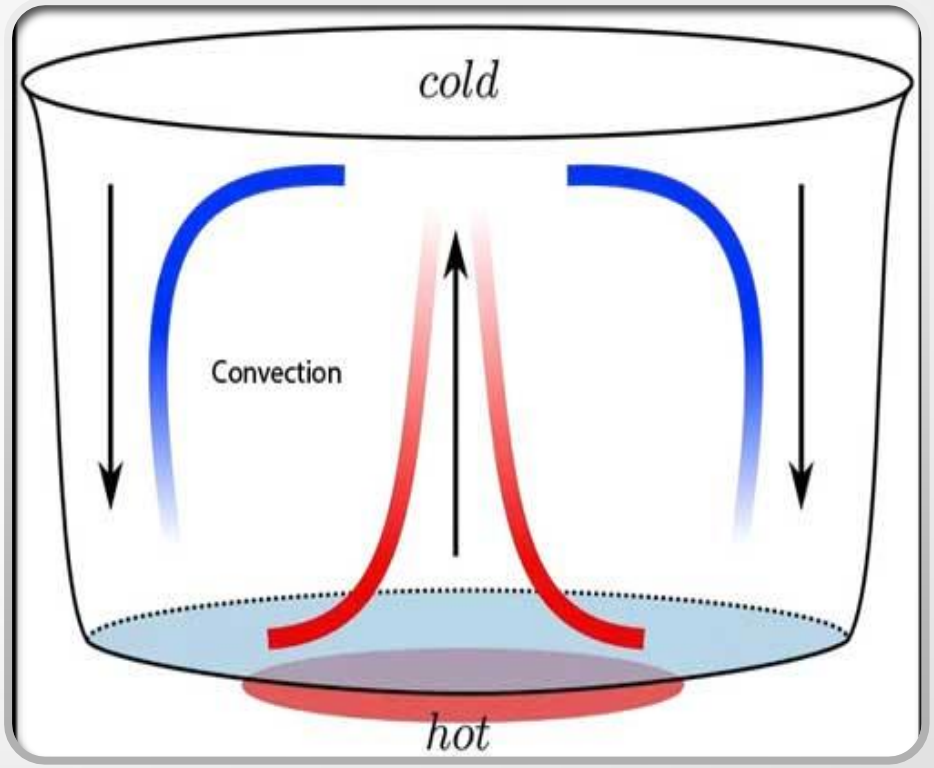
  Eg:- Aluminium, iron, copper

- **Insulators-** The materials which do not allow heat to pass through them easily are poor conductors or insulators of heat.

  Eg:- Plastic, wood, rubber

CONVECTION

The transfer of heat by the movement of a fluid(liquid or gas)between the areas of different temperature.

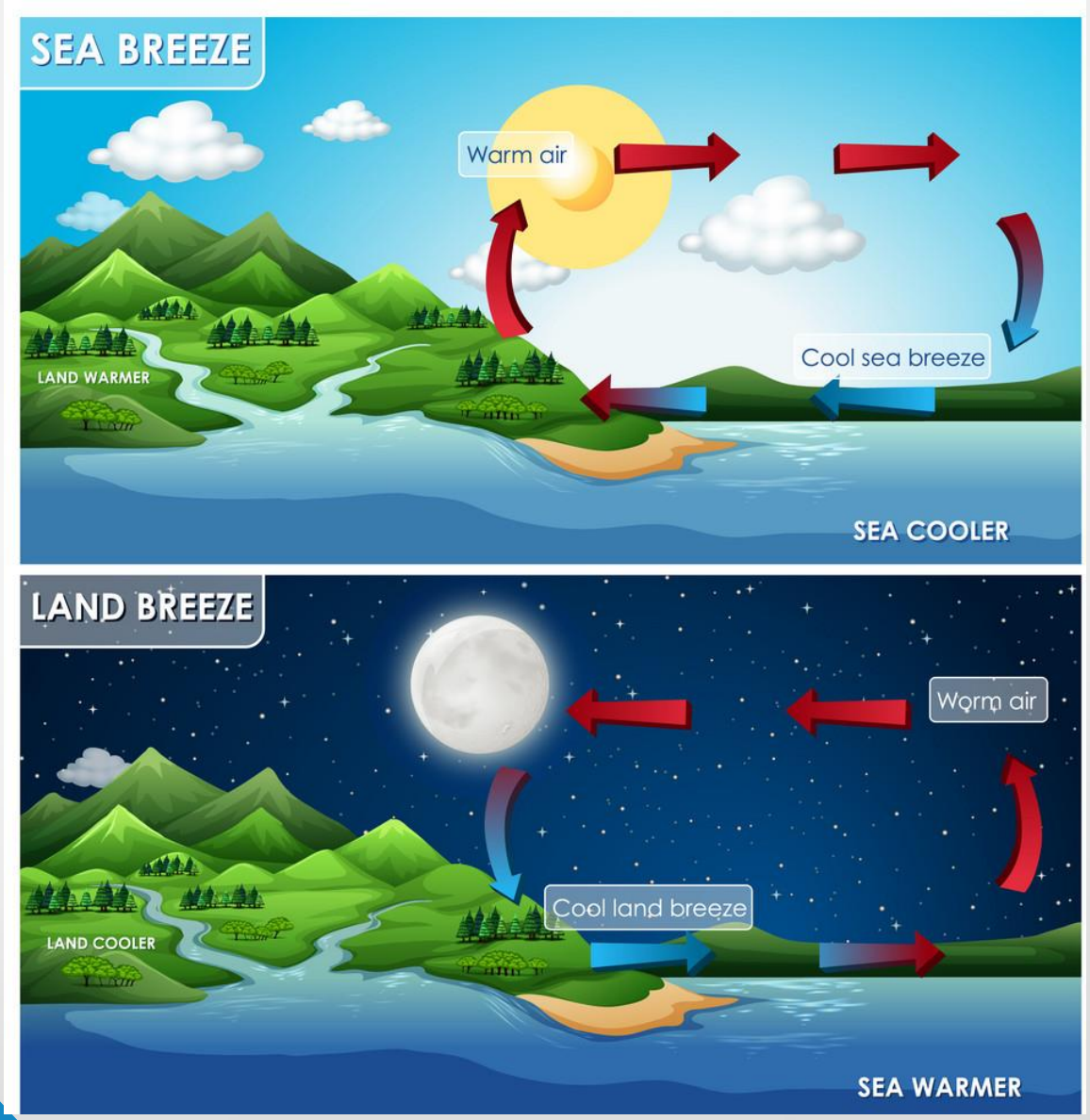


SEA BREEZE AND LAND BREEZE

Sea breeze

During the day, the land gets heated faster than water. The air over the land becomes hotter and rises up. The cooler air from the sea rushes in towards the land to take its place. The warm air from the land moves towards the sea to complete the cycle. The air from the sea is called the sea breeze.

SEA BREEZE AND LAND BREEZE



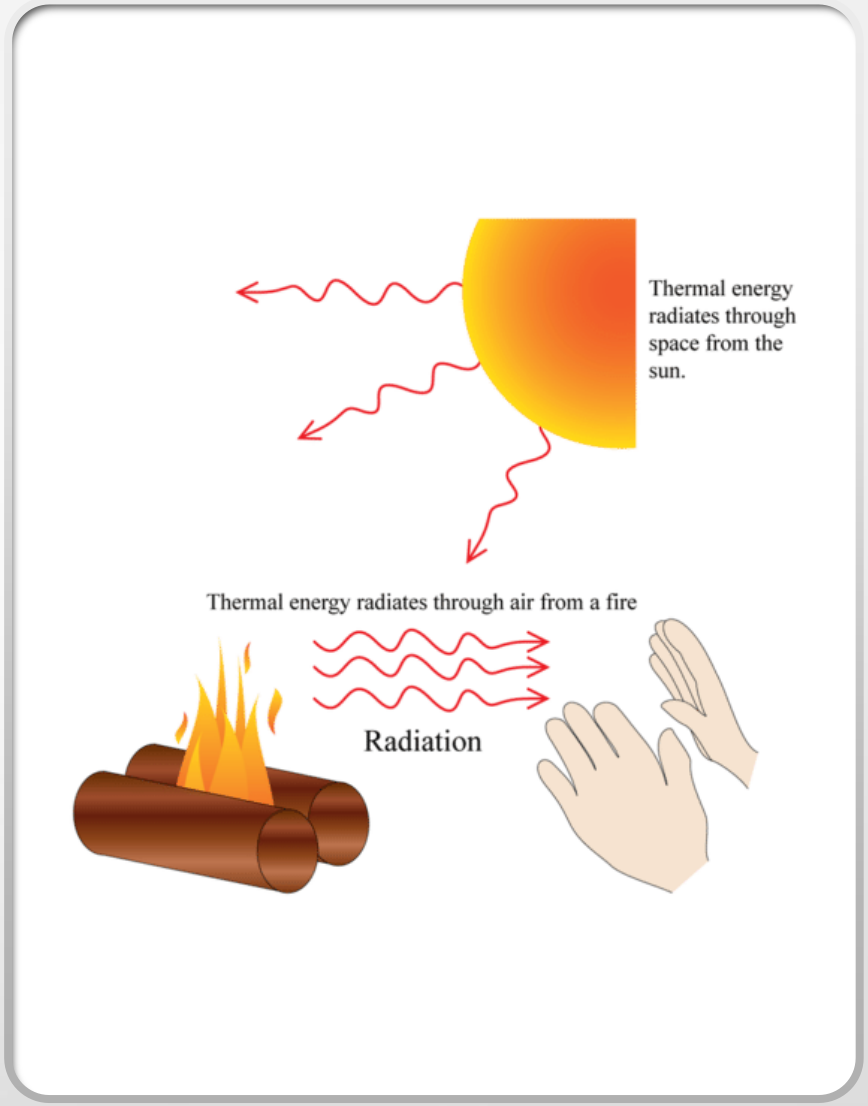
SEA BREEZE AND LAND BREEZE

Land Breeze

At night, it is exactly the reverse. 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

- It is the transfer of heat which does not require any medium.
- Eg:- From the sun heat comes to us by radiation.
- A hot utensil kept away from the flame cools down.
- We get heat from the room heater.



KINDS OF CLOTH WE WEAR IN SUMMER AND WINTER

- In summer we prefer light coloured clothes and in winter usually wear dark coloured clothes.
- Light coloured clothes reflects most of the heat falls on them, and therefore, we feel more comfortable wearing them in the summer.
- Dark surfaces absorb more heat and we feel more comfortable with dark coloured clothes in the winter.

WOOLLEN CLOTHES KEEP US WARM IN WINTER

- Wool is a poor conductor of heat.
- Air is trapped in between the wool fibers. This air prevents the flow of heat from our body to the cold surroundings. So, we feel warm.

THANK YOU