Ch-4 Heat

Temperature and Its Measurement

Transfer of Heat

Sea Breeze and Land Breeze

Kinds of Clothes in Summer and Winter



Temperature and Its Measurement

Hot and Cold

Temperature is a measure of the degree of hotness of an object. It can be measured by a device called thermometer.

Measuring Thermometer

Thermometers are of three types the clinical thermometer, the laboratory thermometer and the maximum minimum thermometer.

Clinical thermometer

Clinical thermometer is used to measure our body temperature. The range of this thermometer is from 35°C to 42°C. This is because the normal temperature of human body is 37°C and never goes below 35°C or beyond 42°C. A clinical thermometer consists of a long, narrow, uniform glass tube. It has a bulb at one end. This bulb contains mercury. The kink near the bulb of the thermometer prevents mercury level from falling on its own.

Laboratory thermometer

Laboratory thermometer is used to measure the temperature of all objects and its range is generally from -10°C to 110°C. The temperature of the object should be taken while the thermometer is dipped in the solution whose temperature is to be measured because when the thermometer is out of solution, the level of mercury begins to fluctuate.

Max Min 50 40 40 30 20 30 10 20 0 10 10 + 20 10 20 30 30 40 40 50

ximum and minimum thermometer

thermometer e maximum and minimum thermometer is used to measure the maximum and nimum temperatures of the previous day as reported in weather reports. This minimum type of minimum and maximum thermometer uses a U shaped tube. Both sides should measure the same nperature. However, the scale is inverted. As the temperature drops, the rcury pushes the left hand side needle upwards. This then measures the nimum temperature because a magnet at the back holds the needle in Maximum sition. As the temperature increases to a maximum, the right hand side edle is pushed upwards to record a maximum when it stops.





Transfer of Heat

The heat flows from a body at a higher temperature to a body at a lower temperature. There are three ways in which heat can flow from one object to another. These are conduction, convection and radiation.



Conduction

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

Take an iron rod fix it between some bricks. Attach few iron nails on this rod with the help of wax. Now burn a Bunsen burner at the other extreme end of the rod. Observe what happens to the iron nails. The nails fall down one by one starting from the one nearest to the burner. This because the is heat generated by the burner is passed through the iron rod which makes the wax melts.





The materials like metals which allow heat to pass through them easily are called as **conductors** while materials that do not allow heat to pass through them are called as **insulators** for example plastics and rubber.

Convection

The transfer of heat by the movement of the heated parts of a liquid or gas from one region to another is called convection.



Activity

Take some water in a vessel and heat it on flame. Let the water boil. Observe the process. When water is heated, the water near the flame gets hot. Hot water rises up. The cold water from the sides moves down towards the source of heat. This water also gets hot and rises and water from the sides moves down. This process continues till the whole water gets heated. This mode of heat transfer is known as convection.

Radiation

The heat transfer between two bodies without change in the temperature of the intervening medium is known as radiation. The heat energy reach the earth surface from the sun by the process of radiation.



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 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. To receive the cooler sea breeze, the windows of the houses in coastal areas are made to face the sea. 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.





Kinds of Clothes in Summer and Winter

Dark surfaces absorb more heat and, therefore, we feel comfortable with dark coloured clothes in the winter. Light coloured clothes reflect most of the heat that falls on them and, therefore, we feel more comfortable wearing them in the summer. Wool acts as an insulator which traps the hot air. This air prevents the flow of heat from our body to the cold surroundings and hence makes us warm.

Activity

Take two identical metallic containers; one painted Black and other painted White. Pour equal amounts of water in each and leave them in the mid-day sun for about an hour. Measure the temperature with thermometer in both containers. What do you observe? Temperature of water present in black container is more than the white container. It happens because Black colour absorbs all the radiation that falls on it. On the other hand, white colour does not absorb radiation at all. Rather, it reflects radiation.



