

CBSE Class-7 Science Heat and temperature solve questions and Notes**Fill in the blanks :**

- (a) The hotness of an object is determined by its temperature.
- (b) Temperature of boiling water cannot be measured by a clinical thermometer.
- (c) Temperature is measured in degree Celsius.
- (d) No medium is required for transfer of heat by the process of Radiation.
- (e) A cold steel spoon is dipped in a cup of hot milk. It transfers heat to its other end by the process of conduction.
- (f) Clothes of dark colours absorb heat better than clothes of light colours.

Match the following :

- (i) Land breeze blows during à night
- (ii) Sea breeze blows during-àday
- (iii) Dark coloured clothes are preferred during à winter
- (iv) Light coloured clothes are preferred during-àsummer

What is heat?

Heat is a form of energy, entry or exit of which correspondingly increases or decreases internal energy of a body when no work is done on the body or by the body.

What is temperature?

A measure of the hotness of an object is its temperature. Temperature is measured by a device called thermometer.

What is 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 at one end. This bulb contains mercury.

Why clinical thermometer ranging 35°C to 42°C.?

The normal temperature of human body is 37°C. The temperature of human body normally does not go below 35°C or above 42°C. That is the reason that this a clinical thermometer has the range 35°C to 42°C.

What is the use of the maximum - minimum thermometer?

Different types of thermometers are used for different purposes. The maximum and minimum temperatures of the previous day, reported in weather reports, are measured by a thermometer called the maximum - minimum thermometer.

What is the range of a laboratory thermometer?

The range of a laboratory thermometer is generally from -10°C to 110°C

Why does the mercury not fall or rise in a clinical thermometer when taken out of the mouth?

Kink prevents mercury level from falling on its own.

What is conduction?

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

Why conduction is only possible in solids

In solids, generally, the heat is transferred by the process of conduction because particles of solids are closely packed and heat is transferred from the hotter end to the colder end of an object.

What are conductor and insulators?

The materials which allow heat to pass through them easily are **conductors** of heat. For examples, aluminum, iron and copper

The materials which do not allow heat to pass through them easily are poor conductors of heat known as **insulators** such as plastic and wood.

Explain how water heated by convection?

The water is poor conductors of heat so do not heated by conduction.

When water is heated, the water became lighter. 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

What is land and sea breeze explain?

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**.

At night, 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**

How does the heat from the sun reach us?

It cannot reach us by conduction or convection as there is no medium such as air in most part of the space between the earth and the sun. From the sun the heat comes to us by another process known as radiation.

Radiation can take place whether a medium is present or not.

In summer we prefer light-coloured clothes and in winter we usually wear dark-coloured clothes. Why

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.

How Woolen clothes keep us warm in winter

Woolen clothes keep us warm during winter. It is so because wool is a poor conductor of heat and it has air trapped in between the fibres

Why one thick blanket is less warm up than two thin blankets joined together?

There is a layer of air in between the blankets.. Since air is bad conductor of heat prevent body heat to escape out.

How is heat transferred in solids, liquids and gases?

The heat flows from a body at a higher temperature to a body at a lower temperature

In solids, generally, the heat is transferred by conduction. In liquids and gases the heat is transferred by convection. No medium is required for transfer of heat by radiation

Why we wear light cloths in summer?

Dark-coloured objects absorb radiation better than the light-coloured objects. That is the reason we feel more comfortable in light-coloured clothes in the summer

What are the different thermometer scales?

Different thermometer scales

(a) The centigrade or Celsius scale: It is introduced by Celsius, is usually used in scientific laboratories. In this scale the lower fixed point or the ice-point is 0°C and the steam-point 100°C . The fundamental interval is divided in 100 equal parts; each part is called 1°C (one degree Celsius).

(b) The Fahrenheit scale: It is suggested by Gabriel Fahrenheit, is usually used in clinical and meteorological purposes. Here, the ice-point and the steam-point are correspondingly marked as 32°F and 212°F , and the fundamental interval is divided into 180 equal divisions. Each division is called one degree Fahrenheit. (1°F).

(c) Absolute scale or Kelvin scale: It is designed by Lord Kelvin, is used internationally in modern scientific world. In this scale the ice-point is marked 273K and the steam-point 373K , the fundamental interval is divided into 100 equal divisions, like that in the Celsius scale. Each division is read as one degree absolute or one Kelvin (1K). In fact, Kelvin scale of temperature starts from the temperature corresponding to -273°C , taken as zero Kelvin

What is the Relation between Celsius, Fahrenheit and Kelvin scales?

Since the range of temperature from ice-point to steam-point is equal in all the three scales, 100 centigrade degrees = $(212 - 32)$ or 180 Fahrenheit degrees = $(373 - 273)$ or 100 absolute degrees.

We consider three thermometers in the above three scales are dipped simultaneously in a liquid of certain temperature.

Let the temperatures recorded in the Celsius, Fahrenheit and Kelvin thermometers respectively be C, F and K.

Now it can be proved that $C / 5 = F - 32 / 9 = K - 273 / 5$

What is the unit of heat

Units of Heat

- (a) C.G.S. unit of heat is Calorie.
- (b) The M.K.S. or S.I. unit of heat is Joule

1 calorie equals 4.18 or 4.2 joules approximately.

The quantity of heat absorbed or given out by a substance during a thermal change depends on what factors?

The quantity of heat absorbed or given out by a substance during a thermal change depends on

- (a) mass,
- (b) difference of temperature and
- (c) Specific heat of the material of the substance.

(a) **Mass:** A larger mass of a substance absorbs or gives out more heat than a smaller mass of it for a certain change of temperature. So, if 'H' be the quantity of heat absorbed or given out by a substance of mass 'm' for a given change of temperature, $H = m$.

(b) **Temperature:** The heat absorbed or released by a certain quantity of a given substance increases or decreases accordingly as the difference between the initial and final temperatures is large and small. Thus, $H = (T-t)$ where, $(T-t)$ is the difference between the initial and the final temperatures of the body.

(c) **Specific heat:** This is a fundamental property of matter. An equal mass of different materials absorb or give out different quantities of heat, even if they are heated or cooled through the same range of temperature. This is also called specific heat capacity (abbreviated as SHC) in S.I. system.

Heat (H) absorbed or given out by body of mass (m) for rise or fall of temperature through t is given by $H = mst$.

State similarities between the laboratory thermometer and the clinical thermometer

1. Laboratory thermometer and the clinical thermometer consist of a long, narrow, uniform glass tube.
2. Laboratory thermometer and the clinical thermometer have a bulb containing mercury at the end of the tube.
3. Laboratory thermometer and the clinical thermometer are marked with Celsius scale on the glass tube.

Discuss why wearing more layers of clothing during winter keeps us warmer than wearing just one thick piece of clothing.

In between the layers of cloths there is trapped air. As air is bad conductor of heat so the out side low temperature do not get transferred to body as well as prevent our body heat to escape out side. Hence more layers of cloths keep us warmer during cold winter.

In places of hot climate it is advised that the outer walls of houses be painted white. Explain.

In places of hot climate it is advised that the outer walls of houses be painted white because a light colour absorb very less radiant heat and we feel comfortable inside such houses due to lower temperature inside house.

Why stainless steel cooking utensils are usually provided with copper bottoms?

The reason for this could be that copper is the best conductor of heat than the stainless steel