

Heat and Temperature (English Medium)

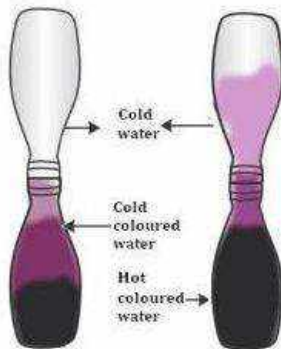
Exercise 91:

Solution 1(a):

1. Hot tea in a cup gradually becomes cold.
2. Ice cream absorbs heat from the surroundings and starts melting.
3. Hot water cools down.
4. A metal plate kept in sunshine becomes hot.

Exercise 92:

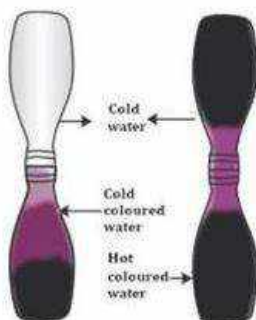
Solution 1(a):



When the card paper is removed, the coloured water in hot coloured water diffuses in the inverted bottle over it.

Solution 1(b):

The water molecules from the hot water bottle diffuse towards the cold water bottle because diffusion of heat takes place from a hot substance to a cold one.



Solution 1(c):

Water in the cold water bottle inverted over the cold coloured bottle does not get coloured. Since, the temperature of both the bottles is the same, they are at thermal equilibrium and there is no transfer of heat between them.

Exercise 93:**Solution 1(a):**

After a while, water in the pan feels warm on touching and after some more time the temperatures of the water in the pan and water in the glass become the same.

Solution 1(b):

We blow air over hot tea while drinking to cool it. By doing so, the air comes in contact with the hot tea and cools it.

Exercise 94:**Solution 1(a):**

Water in the bowl which is half filled with water is hotter than the water in the completely filled bowl.

**Solution 1(b):**

Water in the completely filled bowl is less hot as compared to the water in the half filled bowl.

Solution 1(c):

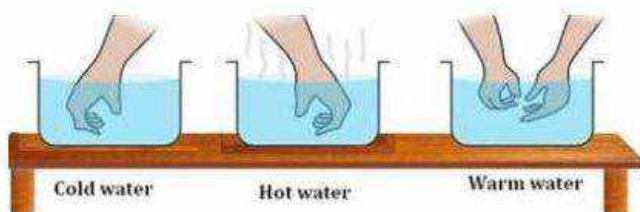
The thermal energy of a body depends upon its quantity. Even though both the bowls are supplied with heat for the same time period, the temperature of the water which is less in quantity is more. Thus, the temperature of water in the half filled bowl is more.

Solution 1(d):

The water in the pond has more heat as compared to the hot tea in the cup. This is because the quantity of hot tea in the cup is extremely more than the quantity of water in the pond.

Exercise 95:**Solution 1(a):**

Your left hand feels the cold temperature of the water in the first bowl.

**Solution 1(b):**

Your right hand feels the hotness of the water in the second bowl.

Solution 1(c):

The left hand feels the water is hot and the right hand feels the water to be relatively cooler.

Solution 1(d):

The left hand feels the water is hot and the right hand feels the water to be somewhat cool. This is because the left hand was initially kept in cold water and the right hand was kept in hot water. Thus, we cannot estimate the temperature of a substance by simply touching it and cannot make a conclusion about the hotness or coldness of the water in the third bowl.

Exercise 97:**Solution 1(a):**

While observing a thermometer, the mercury column is observed to be steady at the digit which shows the temperature of the place. Mercury in contact with air rises as per the temperature of the air in its surroundings.

Exercise 98:**Solution 1(a):**

Clinical thermometer	Domestic thermometer
The markings on a clinical thermometer are marked from 35°C to 42°C.	The markings on a domestic thermometer are marked from 0°C to 110°C.
It has a constriction.	It does not have a constriction.

It is used to measure body temperature.	It is used to measure the temperature of substances.
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Exercise 99:

Solution 1(a):

The following precautions should be taken while measuring the body temperature with a clinical thermometer:

1. The thermometer should be washed properly before and after use.
2. Before using the thermometer slight jerks should be given to it so that the mercury comes below the constriction.
3. To measure the temperature of the body, the cylindrical bulb of the thermometer should be kept in the mouth or underarms for one-two minutes.
4. The temperature should be measured by keeping the level of mercury in the thermometer along the line of sight.
5. It should be handled carefully since it may break if it falls or hits any hard object.

Solution 1(b):

To measure body temperature, the thermometer is kept in contact with the body. The level of mercury in the capillary of the thermometer rises slowly due to the body temperature and becomes steady when it reaches temperature of the body.

Exercise 100:

Solution 1(a):

A clinical thermometer has a small constriction in its capillary tube above the bulb. It is because of this constriction that the mercury does not fall back in the capillary tube.

Solution 1:

A clinical thermometer has a small constriction in its capillary tube above the bulb. It is because of this constriction that the mercury does not fall back in the capillary tube. Hence a light jerk is given to it so that the mercury falls down below the constriction.

Solution 2:

No.

This is because a clinical thermometer is used to measure the temperature of human body and can measure temperature of about 42 °C only. The temperature of boiling water is 100°C. Hence, we cannot measure the temperature of boiling water with the help of a clinical thermometer.

Exercise 104:

Solution 1:

The temperature of the hot water is more than the temperature of the air in the bathroom. Since heat transfer takes place from a body at a higher temperature to a body at a lower temperature, the hot water loses heat and the air gains heat. Thus, the hot water cools down till there is thermal equilibrium between the hot water and the air in the bathroom. Hence, the hot water taken for a bath, becomes cold after some time.

Solution 2:

No, the temperature of an ice cream cannot be judged by touching it.

By touching any substance we can only experience the degree of hotness or coolness of the substance.

To know exactly how hot or cold a substance is, it is necessary to measure the temperature of the substance using a thermometer.

Solution 3:

We cannot measure the temperature of ice cream using a clinical thermometer.

The temperature of ice cream is 0°C or below it. The measuring scale of a clinical thermometer is graduated from 35°C to 42°C . Since the temperature of an ice cream is lower than the lower graduated mark (35°C) on the clinical thermometer, it cannot be used to measure the temperature of the ice cream.

Solution 4:

To measure the temperature of a patient the thermometer, which is in contact with the patient, has to be removed.

If there is no constriction or wedge in the clinical thermometer, the raised mercury in the capillary will fall back towards the bulb.

Solution 5:

The water in the cup will cool down quickly. Both the vessels cool to the same extent. But the quantity of water in the cup is less than that in the bowl, thus it cools faster.

Solution 6.1:

The doctor uses a clinical thermometer to measure the temperature of a patient. This is because a clinical thermometer has a constriction or wedge above the bulb. So, after removing the thermometer in contact with the patient's body, the mercury does not fall back because of the constriction. This helps the doctor to determine the temperature of the patient accurately.

Solution 6.2:

The doctor has the following types of thermometers:

1. Clinical thermometer
2. Digital thermometer
3. A liquid crystal thermometer or plastic strip thermometer which is put on forehead

Solution 6.3:

The body temperature of a healthy person is 37°C (or 98.6°F).

Solution 6.4:

If the body of a person feels hot on touching, it can be said that he/she has fever.

Also, if the body temperature of a person is above 37°C when measured with a clinical thermometer, the person is said to have fever.

Solution 6.5:

Name of the patient: ABC

Temperature: 38°C or 100.4°F

Solution 7:

