

Chapter 9

Temperature

CONCEPT OF TEMPERATURE

Take two cups, one having normal water and another having hot water. Put your one hand in first cup and other hand in the second cup. What do you feel? You will say, one contains cold water and the other contains hot water. But the question is how much cold and how much hot is the water. To answer this question, we need some measure of hotness or coldness.

Measure of degree of hotness or coldness of a body or an object is called Temperature.



During summer, it is very hot, the temperature is high. We like to take cold things like cold water, thandai, cold drinks, ice-creams etc.

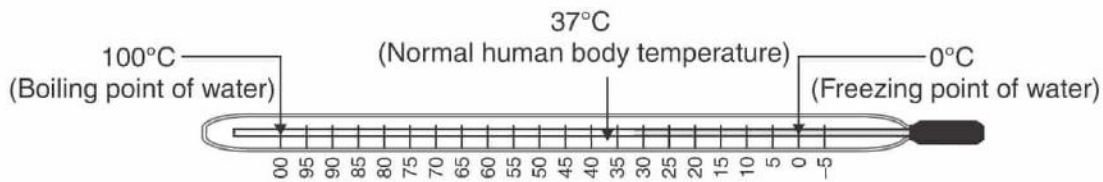
But during winter, it is very cold, the temperature is low. We like to drink tea, hot coffee etc.

The temperature is measured by an instrument called a thermometer.

THERMOMETER

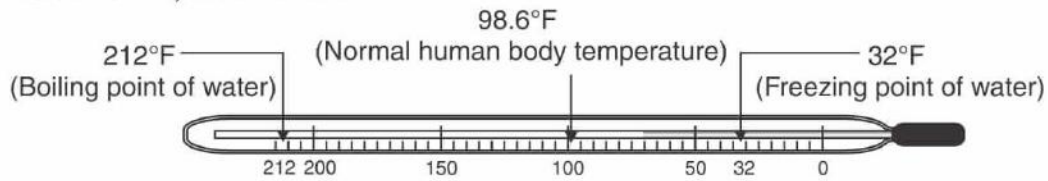
There are two types of scales used in the thermometers : Celcius scale and Fahrenheit scale.

The Celcius scale is shown below :



The range of Celcius thermometer is divided into 100 equal parts and each part is called 1°C . So, the reading starts from 0°C and ends at 100°C in this scale. The normal human body temperature is 37°C .

The Fahrenheit scale, is shown below:



The range of Fahrenheit scale is divided into 212 equal parts and each part is called 1° F. The reading starts from 0° F and ends at 212° F in this scale.

The normal human body temperature is 98.6° F.

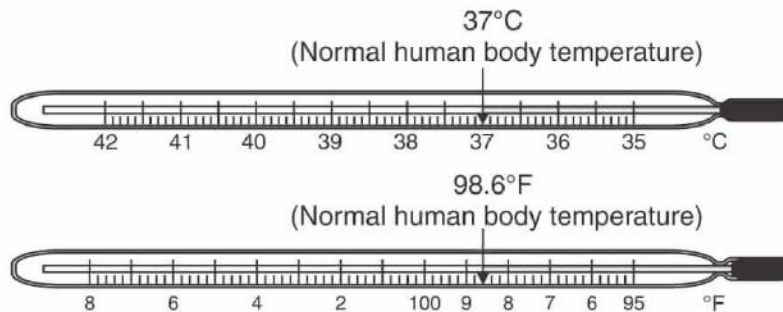
The boiling point of water is 212° F.

The freezing point of water is 32° F.

| | | |
|---------------|---|----------------|
| 0° C | = | 32° F |
| 100° C | = | 212° F |
| 37° C | = | 98.6° F |

On comparing the readings of two scales, we find that

To measure the temperature of a human body, we use a special type of thermometer called clinical thermometer. It has a special arrangement which does not permit the mercury to change level when it is taken out of the mouth or armpit of the person.



The range of temperature on a clinical thermometer is from 35° C to 42° C and from 95° F to 108° F.

READING TEMPERATURE OF A HUMAN BODY BY THERMOMETER

To measure the body temperature of an adult, we place the bulb of the thermometer in his mouth under the tongue. The mercury of the thermometer expands due to the heat of the body and after sometime (about 1 minute) it stops at a certain point. We take out the thermometer and take its readings. If the reading is more than 37° C (or 98.6° F), it means that the person is suffering from fever. In case we want to measure the body temperature of a child, we generally place the bulb of the thermometer in his armpit and follow the above steps.

Keep in Mind :

Before using a thermometer, bring down the level of mercury below the normal body temperature by giving it a few jerks.

In the winter season, the temperature in some parts of our country falls very close to 0°C and sometime even below 0°C . As a result of this, there is snowfall in the hilly regions.

**Testing Time 9.1**

1. Name the instrument which is used to measure temperature.
2. What are the units of measurement of temperature?
3. **What is the freezing point of water in:**
 - (a) degree Celsius
 - (b) degree Fahrenheit
4. **What is the boiling point of water in:**
 - (a) degree Fahrenheit
 - (b) degree Celsius
5. Write the normal human body temperature in degree Celsius ($^{\circ}\text{C}$) and degree Fahrenheit ($^{\circ}\text{F}$).
6. **On a particular day, the maximum and minimum temperatures of four cities are given below. Find the difference in temperature at each place.**

| | | |
|---------------|--------------------------------|----------------------------------|
| (a) Delhi | Minimum 22°C | Maximum 33.4°C ; |
| (b) Chennai | Minimum 31.7°C | Maximum 35.6°C ; |
| (c) Mumbai | Minimum 25.4°C | Maximum 28°C ; |
| (d) Bangaluru | Minimum 35.6°C | Maximum 40.2°C ; |