

Features of Thermometers

Introduction:



Perhaps insert a bright explanatory idea here to grab the readers attention.

Explanation:

The liquid-in-glass

The liquid-in-glass is the most common thermometer. It consists of a bulb filled with liquid (mercury or alcohol) and a very small cross-section which is attached to the bulb. This tube is enclosed in an outer tube of glass and temperatures are read off on the scale which is placed alongside it.



Glass thermometer

The liquid-in-glass thermometer works on the principle of expansion. Most liquids expand (increase in volume) quite uniformly when heated. When the liquid in the bulb of the thermometer is heated, it expands and rises up the narrow tube. The amount by which the volume of liquid increases, depends on the change in temperature. Hence the change in the length of the thread is proportional to the increase in temperature.

Temperature is measured in degrees Celsius ($^{\circ}\text{C}$). When the thermometer is used to measure the temperature of a liquid, the bulb is totally immersed in the liquid. Enough time is allowed for the bulb to attain the temperature of a liquid and the temperature is read by placing the eye level with the point at which the mercury thread stops and reading off the temperature on the scale.

Clinical Thermometer



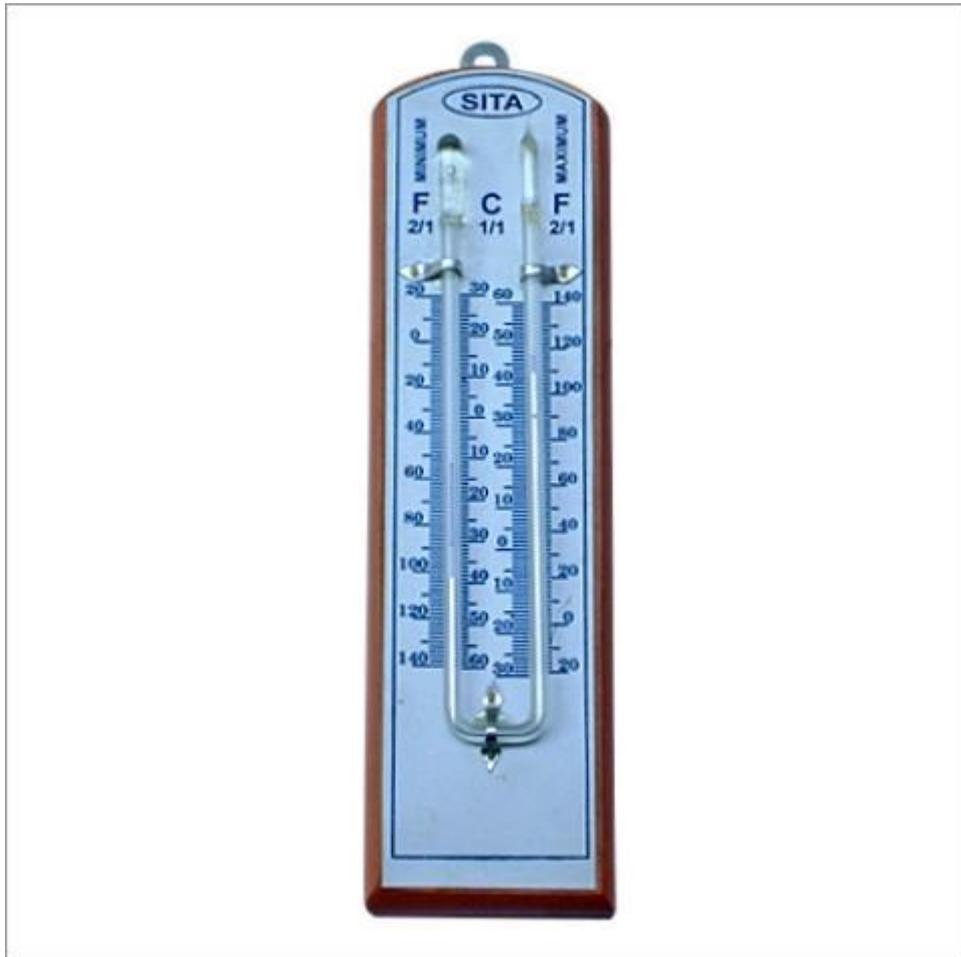
This is used to measure the temperature of the human body. This thermometer differs from the ordinary thermometer in at least three ways:

- 1.** There is a bend or constriction in the capillary tube just above the bulb
- 2.** The range of temperature is very small ($35\text{-}45^{\circ}\text{C}$) because there is very little variation in body temperature
- 3.** The bore is usually smaller so that slight changes in temperature can show up as longer lengths of the mercury thread. Because the bore is so small the stem of the thermometer is sometimes shaped like a lens to make the bore look bigger.

When a nurse or doctor takes the temperature of someone, the bulb of the thermometer is usually placed under the patient's tongue or under his/her armpit for about 2 minutes. The mercury thread rises past the constriction. When the thermometer is removed from the patient's mouth, the mercury contracts and the thread breaks the constriction.

The mercury on the side of the constriction near the bulb goes back into the bulb, but the portion of the thread on the other side remains in position and the temperature can be read at leisure. The thermometer is not sterilized by boiling since water boils at 100°C and the range of this thermometer does not extend beyond 45°C . Alcohol is used to sterilize this thermometer.

The Maximum and Minimum Thermometer



This thermometer is used for making records of the highest and lowest temperatures which occur during a day.

The thermometer consists of a bulb A which contains alcohol. A U- shaped tube connects this bulb to a second one which is nearly full with alcohol. The U- shaped tube contains a mercury thread. When the temperature rises, the alcohol in A expands and pushes the mercury thread up in the right hand limb of the thermometer. A steel index B marks the highest point at which the mercury thread stopped. When the temperature drops, the alcohol in A contracts and the mercury thread moves up in the left-hand limb pushing the index C (index B remains in position). The index C remains in position corresponding to the smallest volume of alcohol in A, hence lowest temperature. After the thermometer has been read the steel indices are returned to their original positions with a magnet.