



Measuring warmth

Thermometers are instruments for measuring the temperature of objects accurately.

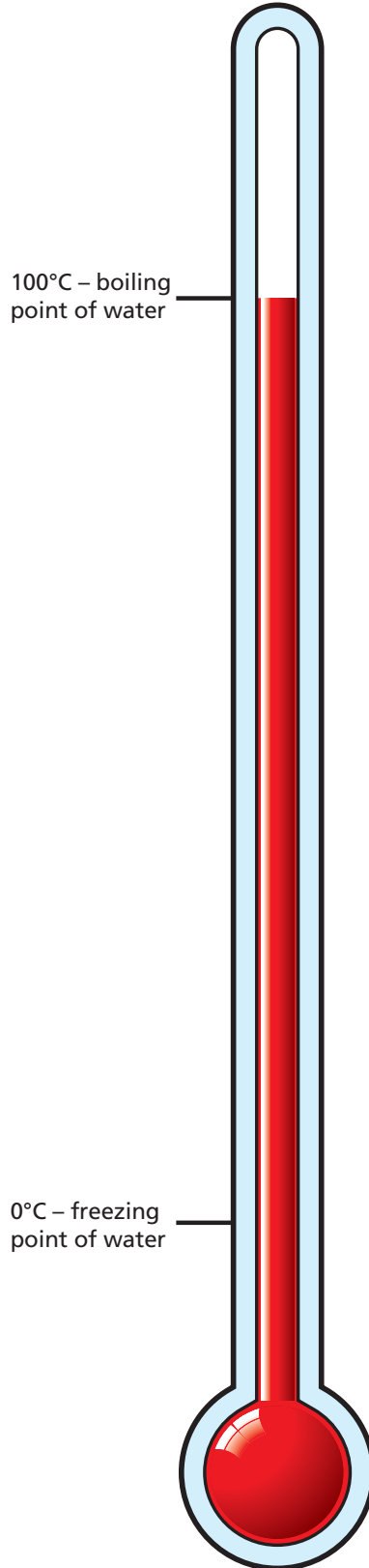
We cannot tell the temperature reliably by touch, so we need a better way of measuring it. The instrument we use is called a **THERMOMETER** (Picture 1).

What is a thermometer?

A thermometer is usually a plastic or glass tube with a very narrow space, or bore, running through its length. The bottom of the tube is connected to a bulb that holds a liquid. Thermometers with red bulbs use a runny liquid called alcohol, while thermometers with silver bulbs use a runny metal called mercury.

Once some liquid has been put in the bulb, all the air is sucked out from the top of the tube, and the thermometer is sealed.

Warming the bulb causes both the liquid and the glass to swell (expand), but the liquid swells much



more than the glass does. The extra volume of liquid has nowhere else to go but up the tube. If the tube is narrow enough, the liquid will rise a long way up the tube and will be easy to see.

Temperature scale

Now that we have a sensitive way of measuring warmth, we need to draw a scale on the tube.

The scale we use is marked in units called degrees, and is called the **CELSIUS SCALE** after the Swedish scientist Anders Celsius.

On this scale, boiling water is 100°C (one hundred degrees Celsius) and freezing water is 0°C (zero degrees Celsius). Notice that we use a small circle as a shorthand for the word degree.

◀ (Picture 1) A thermometer is a narrow-bored tube with a narrow space inside and a bulb filled with liquid. As the liquid gets hotter, it swells in the bulb and rises up the tube. The scale on its side is marked in degrees Celsius.

Making measurements

It is important to become familiar with using a thermometer. If you are measuring the temperature of a solid object, you place the bulb of the thermometer so that it touches the object. If you are measuring a gas (such as air), or a liquid (such as water), you place the thermometer bulb in the gas or liquid.

▼ (Picture 2) It takes time for the thermometer to give a steady reading. You can test this by putting a thermometer in hot water and writing down the temperature every ten seconds. When a reading is the same as the one before it, the thermometer is giving an accurate reading.

You should only take readings from a thermometer after the liquid has had enough time to rise or fall. Always wait for the level of the liquid in the tube to become steady. This means you would normally wait a little while before making a reading (Picture 2).

Summary

- A thermometer is a device for measuring temperature.
- A thermometer takes a little while to react to a change in temperature.
- Thermometers use the Celsius scale.

