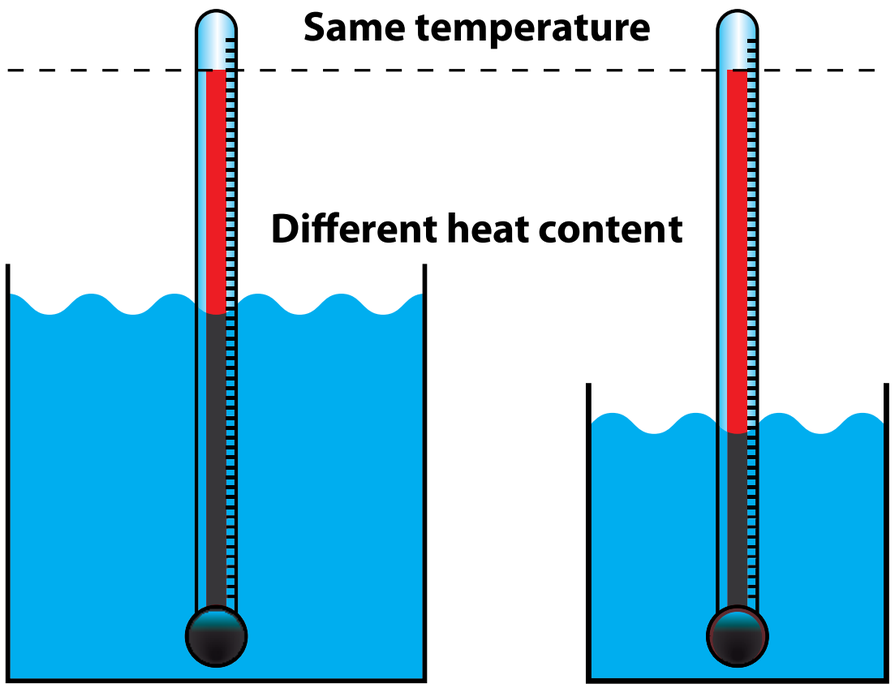
National Physical Laboratory

How hot is it?

The **temperature** of an object is a measure of **how hot or cold** it is. The normal unit of measurement for temperature is the **degree Celsius (°C)** but scientists sometimes use a related unit called the **kelvin (K)**.

Heat is the **amount of thermal energy** an object contains, measured in **joules (J)**.

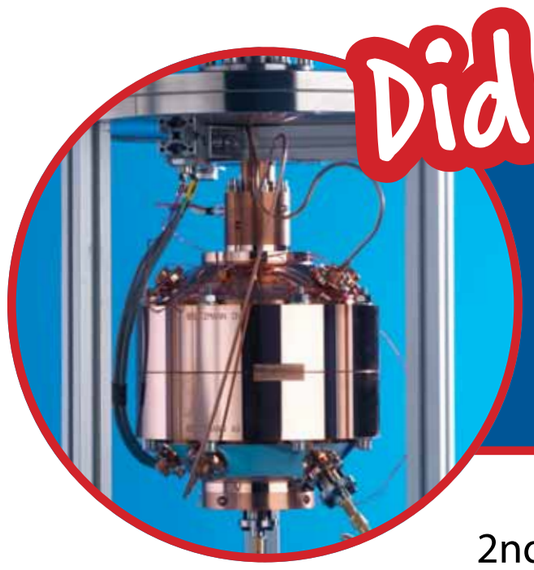


Accurate measurement of temperature is vital for many activities, from making steel to preparing food. It is also crucial in scientific discovery.

Thermometers have a measurable property that changes with temperature. Scientists first check how the property varies with temperature and **calibrate** the thermometer so it reads correctly at some standard temperatures, for example, at the freezing temperature of water (0 °C).

Type of thermometer	Measurable property	Temperature range	Features
Liquid-in-glass	Thermal expansion of the liquid	–100 °C to +300 °C	Can break!
Resistance	Electrical resistance	–250 °C to +600 °C	Very accurate
Thermocouple	Voltage generated by two wires made of different metals	–200 °C to +1500 °C	Cheapest and most common
Infrared	Amount of infrared light given out by an object	–40 °C to +3000 °C	No need to touch an object to measure its temperature

Did you know?



The National Physical Laboratory (NPL) has made the most accurate thermometer ever (shown left) which works by measuring the property of speed of sound in a gas. Its calibrations will give the world high confidence in their temperature measurements.

2nd Edition

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