Temperature and its Measurement

What is Temperature?

Temperature is a measure of how **hot** or **cold** something is.



Thermal Energy

Temperature is a measure of **thermal energy** (i.e. heat).



The hotter the object, the more thermal energy it has.

Units of Temperature

The standard unit is **Degree Celsius (°C)**.



Other units:

- Kelvin (K)
- Fahrenheit (°F)

0°C – Freezing point of water

100°C – Boiling point of water



SI Unit: Kelvin (K)

Measuring Temperature

We use a **thermometer** to measure temperature.

- It has a scale (in °C, °F or K).
- It shows the temperature accurately.



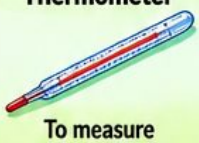
Types of Thermometers

Clinical Thermometer



To measure body temperature.

Laboratory Thermometer



To measure temperature in labs.

Maximum-Minimum Thermometer



To record the highest and lowest temperature.

Digital Thermometer



Quick and easy to read.

Temperature Scales

Celsius (°C)	Fahrenheit (°F)	Kelvin (K)
0°C – Ice	32°F – Ice	273 K – Ice
100°C – Boil	212°F – Boil	373 K – Boil



Heat and Temperature

- **Heat** is the transfer of thermal energy.
- **Temperature** tells us how hot or cold something is.
- **Heat** flows from a hotter body to a colder body.



Heat always flows from hot to cold.

Factors Affecting Temperature

- Amount of heat supplied or removed.
- Nature of the material.
- Size and colour of the body.
- Position (altitude).



Key Points to Remember

- Temperature measures hotness or coldness.
- SI Unit: Kelvin (K).
- Thermometer is used to measure temperature.
- Water freezes at 0°C and boils at 100°C.
- Heat and temperature are different.

Observe Measure Learn

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Types of Thermometer

Thermometers are used to measure temperature accurately.

Clinical Thermometer

Used to measure the **body temperature**.



Laboratory Thermometer

Used to measure temperature **in labs**.



Key Differences

Feature	Clinical Thermometer	Laboratory Thermometer
Purpose	To measure human body temperature	To measure temperature in experiments and samples
Range	About 35°C – 42°C	Wide range, e.g. –10°C to 110°C
Scale	Usually in °C (sometimes °F)	In °C (or other scales)
Design	Short, with a kink (to stop mercury)	Long, straight tube
Accuracy	High accuracy for body temperature	Very high accuracy
Uses	Hospitals, homes	Schools, research labs, industries



In Short...

- Clinical thermometer – for our body.
- Laboratory thermometer – for experiments.

Both help us measure temperature accurately!

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Correct Way to Measure Temperature

Use the right thermometer and follow the correct steps!

Using a Clinical Thermometer
(To measure body temperature)

1. Clean the thermometer with a soft cloth.



2. Place the bulb under the tongue (or in the armpit).



3. Keep it in position for about 1 minute (or until the beep).



4. Remove it gently and read the temperature at eye level.



5. Clean and store it in a safe place.



Using a Laboratory Thermometer
(To measure temperature in experiments)

1. Choose a suitable container (beaker, test tube etc.).



2. Immerse the bulb of the thermometer completely in the liquid (not the stem).



3. Make sure the thermometer does not touch the sides or bottom of the container.



4. Wait for the liquid level to become steady.



5. Read the temperature at eye level and record it.



Key Tips to Remember

- Use the right thermometer for the right purpose.
- Ensure the bulb is properly placed (under tongue or fully in the liquid).
- Read at eye level, not from above or below.
- Clean the thermometer after use.
- Handle with care.

Measure Correctly... Get Accurate Results!



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Air Temperature
The Heat in the Air

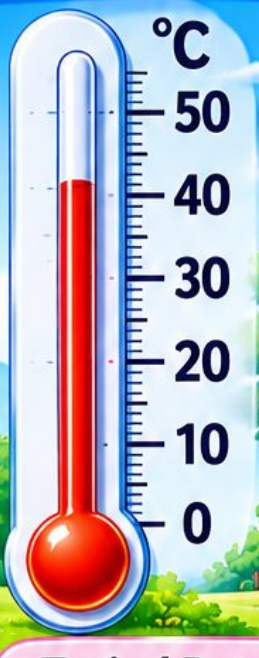
What is Air Temperature?

Air temperature is the measure of how **hot** or **cold** the air is.

How is it Measured?

Using a thermometer (in a weather station).





Important Points

- Air temperature changes from place to place and time to time.
- It is higher in summer and lower in winter.
- We record it in °C.

Typical Range

In India:
5°C to 45°C
(approximately)

Factors Affecting Air Temperature



Sunshine



Latitude (distance from the Equator)



Altitude (height above sea level)



Distance from Sea



Wind

Weather Woman of India



Dr. Anna Mani
(1918 – 2001)

Pioneer of Indian Meteorology



Who was she?

Dr. Anna Mani was India's first woman meteorologist and a renowned scientist.

Her Contributions

- Made accurate weather forecasts for India.
- Helped in the development of meteorology in India.
- Worked at the India Meteorological Department (IMD).

Her Achievements

- First woman to join the Indian Meteorological Department.
- Served as Deputy Director General of Meteorology.
- Received the Padma Shri Award for her valuable service.



Why is she remembered?

She showed great dedication and paved the way for women in science and meteorology in India.

A true inspiration!

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