

UNDERSTANDING THE WEATHER

Class 7 • Complete Handwritten-Style Revision Notes ■■■🏠■■■

■■■ BIG IDEA

- Weather is the state of Earth's atmosphere at a particular time and place.
- Weather changes because atmospheric conditions change.
- Main elements: temperature, precipitation, atmospheric pressure, wind and humidity.

■ EXAM ROADMAP

- What is weather • atmosphere • layers • elements of weather
- Reading signals of nature • traditional knowledge • weather instruments
- Temperature • rainfall/rain gauge • atmospheric pressure • barometer
- Practice • in-text questions • MCQs • quick revision

These notes are based on the Chapter 2 pages you uploaded. If the textbook has additional pages beyond the uploaded set, send them and they can be added.

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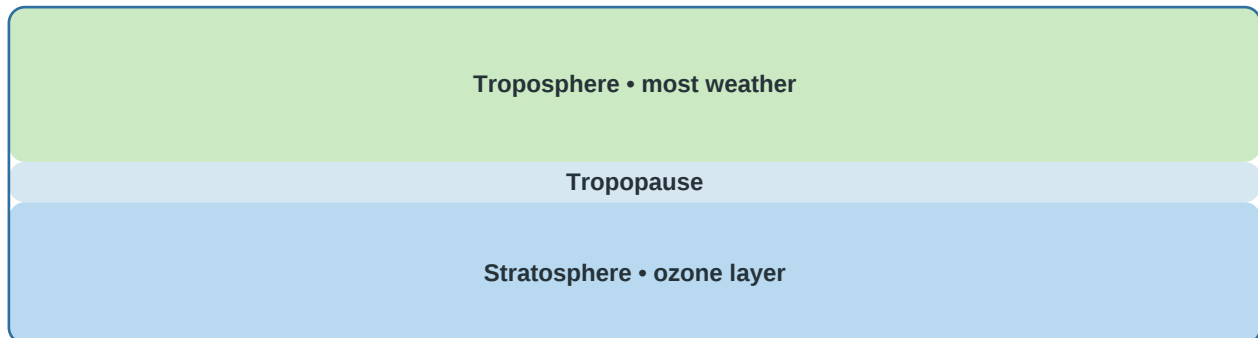
2.1 WHAT IS WEATHER?

Weather: The state of Earth's atmosphere at a particular time and place.

■ ATMOSPHERE

- Atmosphere is the layer of gases surrounding Earth; we commonly call it air.
- It can be imagined like a multi-layered cake.

LAYERS OF THE ATMOSPHERE



Troposphere — lowest layer; humans, animals and plants live here; almost all weather events occur here. It extends roughly 6–18 km and is thinner at the poles and thicker near the equator. Mount Everest lies within it.

Tropopause — thin boundary separating the troposphere and stratosphere; weather phenomena usually do not extend beyond it.

Stratosphere — layer above the troposphere; contains the ozone layer; some weather balloons and aircraft reach it; extends to about 50 km.

■■ OZONE LAYER

- Found in the stratosphere.
- Helps protect life by blocking much harmful ultraviolet (UV) radiation from the Sun.

2.1.1 HOW DO WE DESCRIBE WEATHER?

Words such as **hot, cold, rainy, cloudy, snowy, humid, windy** and **stormy** describe weather. These words point to measurable elements of weather.

ELEMENTS OF WEATHER

Element	Meaning
Temperature	How hot or cold the air is at a particular time and place.
Precipitation	Any water falling from the sky: rain, snow, sleet or hail.
Atmospheric pressure	The weight/pressure of air pressing down on Earth's surface.
Wind	Movement of air, described by its speed and direction.
Humidity	Amount of water vapour present in the air.

■ IMPORTANT WORDS

- **Water vapour:** water in gaseous form.
- **Sleet:** rain that is frozen or partly frozen when it falls.
- **Hail:** small, hard balls of ice that fall from the sky.

■ ■ WHY STANDARD MEASUREMENTS?

- People can feel the same weather differently.
- Standard measurements such as degrees Celsius allow weather to be understood and compared consistently.

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2.1.2 READING THE SIGNALS OF NATURE

Long before satellites and mobile apps, people **observed nature** to predict what weather might be coming.

■ TRADITIONAL WEATHER CLUES

- Birds flying low → rain may be near.
- Ants carrying eggs to higher ground → may signal heavy rain.
- Frogs croaking loudly → may indicate an approaching shower.
- Squirrels gathering nuts → may suggest a change of season.
- Pine cones close in wet conditions and open in drier conditions → clues about humidity.

This traditional knowledge was passed through generations and is still used in many Indian villages, especially for clues about the monsoon.

■■ DID YOU KNOW?

- The India Meteorological Department (IMD) was established in 1875.
- Its motto is **■dity■t j■yate v■■■i**, meaning “From the sun arises rain.”
- The saying connects the Sun, rainfall, food and living beings in the cycle of nature.

FIGURE IT OUT — MODEL ANSWERS

Q1. Why did people link animal behaviour with rainfall?

Ans: Animals respond to environmental changes such as moisture, temperature and pressure, so people noticed repeated patterns before rain.

Q2. Name another plant/animal sign showing a change in weather.

Ans: Birds changing flight, ants moving eggs, or pine cones closing in humid conditions.

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2.2 WEATHER INSTRUMENTS

Meteorologists are scientists who study weather. They use precise instruments to measure weather elements and make forecasts.

■ INSTRUMENT → ELEMENT

- Thermometer → temperature
- Rain gauge → rainfall/precipitation
- Barometer → atmospheric pressure
- Wind instruments → wind speed and direction
- Humidity instruments → water vapour amount

2.2.1 TEMPERATURE

Temperature is the measure of how hot or cold something is, usually the air around us.

■■ THERMOMETERS

- **Ambient temperature:** general air temperature at a place.
- **Maximum–minimum thermometer:** records highest and lowest temperatures during a period.
- **Traditional thermometer:** coloured liquid expands on heating and contracts on cooling.
- **Digital thermometer:** precise, easy to read and may store/record data.

IMPORTANT CALCULATIONS

Temperature range = Maximum temperature – Minimum temperature.

Mean daily temperature = (Maximum temperature + Minimum temperature) ÷ 2.

■ EXAMPLE

- Max = 35°C, Min = 25°C → Range = 10°C.
- Mean = $(35 + 25) \div 2 = 30^\circ\text{C}$.

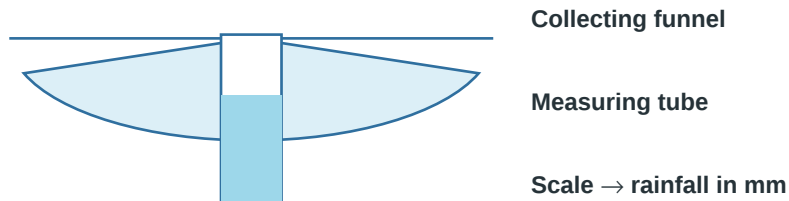
2.2.2 PRECIPITATION

Precipitation is any form of water that falls from the sky, such as rain, snow, sleet or hail.

■■ RAINFALL IN MILLIMETRES

- Rainfall is measured as a depth, usually in millimetres (mm).
- 30 mm rainfall means a 30 mm-deep layer would cover flat ground if water did not soak away or flow away.
- Depth makes rainfall easy to compare between places, regardless of container size.

RAIN GAUGE



Three main parts: collecting funnel → directs rainwater; measuring tube → collects it; scale → shows rainfall amount in mm.

Importance: Farmers, city planners and pilots use rainfall data. Too little rain can contribute to drought; too much can cause flooding.

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2.2.3 ATMOSPHERIC PRESSURE

Atmospheric pressure is the pressure caused by the weight of air pressing down on Earth's surface.

PRESSURE CHANGES WITH HEIGHT



■ HIGH ALTITUDE

- As we climb, air becomes thinner and lighter, so pressure decreases.
- There is less oxygen available for the lungs.
- Mountaineers may feel breathless, dizzy or tired until their bodies adjust.
- **Acclimatisation:** gradual adjustment of the body to reduced oxygen.

■ LOW-PRESSURE SYSTEMS

- A sudden fall in pressure can create a **low-pressure area (depression)**.
- Low pressure draws in winds and moisture and may grow into a storm.
- In coastal areas, intense depressions can develop into cyclones with strong winds and heavy rainfall.

■ BAROMETER

- A **barometer** measures atmospheric pressure.
- Common unit: **millibar (mb)**.
- Normal sea-level pressure: about **1013 mb**.
- Below about **1000 mb** may signal a depression and possible bad weather.

IN-TEXT QUESTIONS & ANSWERS

Q. What is weather?

Ans. The state of Earth's atmosphere at a particular time and place.

Q. What is the atmosphere?

Ans. The layer of gases surrounding Earth.

Q. Which atmospheric layer has almost all weather?

Ans. The troposphere.

Q. Why is the troposphere thicker near the equator?

Ans. Warm air expands.

Q. Why is it thinner at the poles?

Ans. Cold air contracts.

Q. What protects us from harmful UV rays?

Ans. The ozone layer in the stratosphere.

Q. What is humidity?

Ans. The amount of water vapour in the air.

Q. Which instrument measures rainfall?

Ans. A rain gauge.

Q. Why is rainfall measured in mm?

Ans. It represents rainfall depth and makes measurements comparable between places.

Q. Which instrument measures air pressure?

Ans. A barometer.

Q. What is acclimatisation?

Ans. The gradual adjustment of the body to reduced oxygen at high altitude.

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EXERCISE • CORRECT THE INCORRECT SENTENCES

1. Climate is the same as weather.

Correct: Weather is short-term atmospheric condition; climate describes long-term patterns.

2. Troposphere is thicker at poles and thinner at equator.

Correct: It is thinner at the poles and thicker near the equator.

3. Feelings about weather are always the same for everyone.

Correct: People can feel the same weather differently.

4. Hail is simply frozen rain.

Correct: Hail consists of small, hard balls of ice.

OBSERVATION & CONNECTION

Q. Why might people link frog behaviour with rainfall?

Ans: Frogs respond to moisture and environmental changes, so repeated observations can provide clues about approaching rain.

Q. Name another plant/animal sign.

Ans: Ants moving eggs to higher ground; birds changing flight; pine cones closing in humid weather.

SHORT-ANSWER EXAM QUESTIONS

1. Why are scientific weather instruments important?

Ans: They give precise, measurable data for comparing conditions and preparing forecasts.

2. Why is rainfall data important?

Ans: It helps farmers and planners and supports preparation for droughts and floods.

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MCQs — EXAM PRACTICE ■

Weather is the state of atmosphere at a particular:

A. century B. time and place C. continent D. year

Answer: B

Lowest atmospheric layer:

A. Stratosphere B. Troposphere C. Tropopause D. Ozone layer

Answer: B

Most weather occurs in:

A. Troposphere B. Stratosphere C. Mesosphere D. Core

Answer: A

Ozone layer is in:

A. Troposphere B. Stratosphere C. Ocean D. Lithosphere

Answer: B

Movement of air is:

A. Humidity B. Wind C. Pressure D. Rainfall

Answer: B

Water vapour amount is:

A. Temperature B. Humidity C. Pressure D. Wind

Answer: B

Rain, snow, sleet and hail are:

A. Winds B. Precipitation C. Pressures D. Clouds

Answer: B

Rainfall is measured with a:

A. Barometer B. Rain gauge C. Thermometer D. Compass

Answer: B

Pressure is measured with a:

A. Rain gauge B. Barometer C. Thermometer D. Compass

Answer: B

Normal sea-level pressure is about:

A. 1013 mb B. 130 mb C. 13 mb D. 10,130 mb

Answer: A

At high altitude pressure generally:

A. increases B. decreases C. doubles D. stays fixed

Answer: B

Temperature range is:

A. $\text{max} + \text{min}$ B. $\text{max} - \text{min}$ C. $\text{max} \div \text{min}$ D. $\text{max} \times \text{min}$

Answer: B

A low-pressure area is called a:

A. depression B. plateau C. tropopause D. ridge

Answer: A

Acclimatisation means:

A. measuring rain B. adjusting to reduced oxygen C. cooling air D. measuring pressure

Answer: B

Maximum–minimum thermometer records:

A. highest & lowest temperature B. rainfall C. humidity D. pressure

Answer: A

FINAL QUICK-REVISION SHEET ■

■■ WEATHER + ELEMENTS

- Weather = atmospheric condition at a particular time and place.
- Elements = temperature, precipitation, atmospheric pressure, wind, humidity.

■ ATMOSPHERE

- Atmosphere = layer of gases around Earth.
- Troposphere = lowest + almost all weather.
- Tropopause = boundary.
- Stratosphere = ozone layer + extends to about 50 km.

■■ TEMPERATURE

- Thermometer measures temperature.
- Range = max – min.
- Mean daily temperature = $(\text{max} + \text{min}) \div 2$.

■■ PRECIPITATION

- Rain, snow, sleet and hail.
- Rain gauge measures rainfall in mm.

■ PRESSURE

- Barometer measures pressure in mb.
- Sea level $\approx$ 1013 mb.
- Higher altitude → lower pressure → thinner air → less available oxygen.

■ NATURE'S CLUES

- Birds flying low, ants moving eggs upward, loud frog calls, squirrels gathering nuts and pine-cone changes can provide traditional weather clues.

■ MUST-LEARN DEFINITIONS

Weather • Atmosphere • Troposphere • Tropopause • Stratosphere • Temperature • Precipitation • Sleet • Hail • Atmospheric pressure • Wind • Humidity • Rain gauge • Barometer • Acclimatisation • Depression