Class 9 Social Science Chapter 3: Atmosphere and Climate - Notes, Important Questions and MCQs (2026-27)

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These Class 9 Social Science Chapter 3 notes cover “Atmosphere and Climate” from the new NCERT textbook Understanding Society: India and Beyond (Part 1, 2026-27): the composition and layers of the atmosphere, weather and climate, elements and factors of climate, India’s monsoon climate and seasons, and climate change with ways to reduce our carbon footprint – with tables, Q&A, 10 MCQs and a free PDF.

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Chapter Overview

The atmosphere is the blanket of air around the Earth. It is mainly nitrogen and oxygen, with small amounts of argon, carbon dioxide, water vapour and dust that support life, form clouds and cause rain. It has five layers divided by changes in temperature and density with height.

Weather is the day-to-day condition of the atmosphere, while climate is the average weather of a place over a long period. India has a tropical monsoon climate with four seasons recognised by the IMD. Human activities are causing climate change, making it vital to cut our carbon footprint.

Important Topics and Concepts

Composition of the Atmosphere

- Nitrogen about 78% and oxygen about 21%; argon, carbon dioxide and other gases form the rest.
- Water vapour and dust particles help form clouds and rain.
- Carbon dioxide and other greenhouse gases trap heat and keep the Earth warm.
- Ozone in the stratosphere absorbs harmful ultraviolet rays.

Layers of the Atmosphere

- Troposphere: about 12 km on average; all weather happens here; temperature falls with height.
- Stratosphere: up to about 50 km; contains the ozone layer; calm, suitable for jet aircraft.
- Mesosphere: meteors burn up here; coldest layer.
- Thermosphere: temperature rises with height; ionosphere reflects radio waves.
- Exosphere: outermost, very thin air with light gases like hydrogen and helium.

Weather, Climate and Their Elements

- Weather: short-term condition (hours or days); climate: average over about 30 years or more.
- Elements: temperature, air pressure, wind, humidity and precipitation.
- Insolation (incoming solar radiation) decreases from the equator to the poles, so temperature falls poleward.
- Air pressure decreases with altitude; winds blow from high to low pressure.

Factors Affecting Climate

- Latitude – distance from the equator.
- Altitude – temperature falls with height (hill stations are cooler).
- Distance from the sea – coastal areas have equable (moderate) climate; interiors have extreme climate.
- Ocean currents, relief (mountains block winds) and prevailing winds.

India’s Monsoon Climate and Seasons

- India has a tropical monsoon climate shaped by seasonal reversal of winds.
- South-west monsoon reaches Kerala around 1 June and covers India by about 8 July; it retreats from September to December.
- IMD seasons: Winter (Jan–Feb), Summer (Mar–May), Monsoon (Jun–Sep), Post-monsoon (Oct–Dec).
- During winter, dry north-east winds blow from land to sea; they bring rain to the Tamil Nadu coast after picking up moisture over the Bay of Bengal.
- Traditionally India recognises six ṛtus of about two months each: Vasanta, Grīṣhma, Varṣhā, Śharad, Hemanta and Śhiśhira.

Climate Change

- Long-term change in temperature and weather patterns, mainly due to burning fossil fuels and deforestation.
- Effects: global warming, melting glaciers, rising sea levels, heatwaves, floods and droughts.

- Case study: heavy monsoon rains and swollen Satluj, Beas and Ravi caused severe floods in Punjab in 2025, damaging villages, farms and infrastructure.
- Reduce your carbon footprint: save electricity and water, use public transport or cycles, renewable energy, plant trees, reduce waste.

Traditional Indian Seasons (Ṛtus)

From the Indian calendar.

Ṛtu	Season	Approx. Gregorian months
Vasanta	Spring	March–April
Grīṣhma	Summer	May–June
Varṣhā	Monsoon	July–August
Śharad	Early autumn	September–October
Hemanta	Late autumn	November–December
Śhiśhira	Winter	January–February

Layers of the Atmosphere

Layer	Height (approx.)	Key feature
Troposphere	0–12 km	Weather; temperature falls with height
Stratosphere	12–50 km	Ozone layer; jet planes
Mesosphere	50–80 km	Meteors burn; coldest
Thermosphere	80–400 km	Ionosphere; radio waves reflected
Exosphere	Above 400 km	Very thin air; satellites

Important Definitions and Terms

Term	Meaning
Atmosphere	Layer of air surrounding the Earth
Troposphere	Lowest layer where weather occurs
Ozone layer	Layer in stratosphere absorbing UV rays
Weather	Short-term atmospheric conditions
Climate	Average weather over a long period
Insolation	Incoming solar radiation
Air pressure	Weight of air on the Earth’s surface
Monsoon	Seasonal reversal of winds
Equable climate	Moderate climate with small temperature range
Carbon footprint	Total greenhouse gases caused by a person’s activities

Short Answer Questions

Q1. Name the two main gases of the atmosphere.

Nitrogen (about 78%) and oxygen (about 21%).

Q2. Why is the troposphere important?

All weather phenomena such as clouds, rain and storms occur in it.

Q3. Distinguish between weather and climate.

Weather is the short-term state of the atmosphere; climate is the average weather of a place over many years.

Q4. Why are hill stations cooler?

Temperature decreases with increasing altitude.

Q5. Why does Thiruvananthapuram have an equable climate?

It lies near the sea, which moderates temperature.

Q6. Name the four seasons according to the IMD.

Winter, Summer, Monsoon and Post-monsoon.

Q7. When does the south-west monsoon reach Kerala?

Around 1 June.

Q8. Suggest two ways to reduce your carbon footprint.

Save electricity and use public transport or cycles.

Long Answer Questions

Q1. Describe the layers of the atmosphere.

Troposphere – lowest, about 12 km, weather occurs.

Stratosphere – up to 50 km, ozone layer, calm for aircraft.

Mesosphere – meteors burn, coldest layer.

Thermosphere – temperature rises, ionosphere reflects radio waves.

Exosphere – outermost thin layer with light gases.

Q2. Explain the factors that affect the climate of a place.

Latitude – insolation decreases towards poles.

Altitude – higher places are cooler.

Distance from sea – coastal areas equable, interior extreme.

Ocean currents warm or cool coasts.

Relief and winds – mountains block or force rain-bearing winds.

Q3. What is climate change? Explain its causes, effects and solutions.

Long-term changes in temperature and weather patterns.

Causes: burning fossil fuels, deforestation, industrial emissions.

Solutions: renewable energy, saving energy, afforestation.

Individuals can reduce their carbon footprint through daily choices.

MCQs with Answers

1. Weather occurs in the(a) stratosphere (b) troposphere (c) mesosphere (d) exosphereAnswer: (b) troposphere

2. Ozone layer is in the(a) troposphere (b) stratosphere (c) thermosphere (d) exosphereAnswer: (b) stratosphere

3. Nitrogen in the atmosphere is about(a) 21% (b) 78% (c) 50% (d) 1%Answer: (b) 78%

4. Meteors burn up in the(a) mesosphere (b) troposphere (c) exosphere (d) stratosphereAnswer: (a) mesosphere

5. Climate is the average weather of about(a) 1 week (b) 1 year (c) 30 years (d) 1 dayAnswer: (c) 30 years

6. Monsoon reaches Kerala around(a) 1 May (b) 1 June (c) 15 July (d) 1 AugustAnswer: (b) 1 June

7. IMD divides the year into(a) two seasons (b) four seasons (c) six seasons (d) three seasonsAnswer: (b) four seasons

8. Coastal places have(a) extreme climate (b) equable climate (c) no climate (d) arctic climateAnswer: (b) equable climate

9. Varṣhā ṛtu corresponds to(a) spring (b) summer (c) monsoon (d) winterAnswer: (c) monsoon

10. Rivers that flooded Punjab in 2025 include(a) Ganga and Yamuna (b) Satluj, Beas and Ravi (c) Godavari and Krishna (d) Narmada and TapiAnswer: (b) Satluj, Beas and Ravi

Quick Revision Points

- N_2 78%, O_2 21%; ozone absorbs UV.
- Five layers: tropo, strato, meso, thermo, exo.
- Weather vs climate; elements of weather.
- Factors: latitude, altitude, sea, currents, relief, winds.
- Monsoon: Kerala ~1 June; four IMD seasons; six ṛtus.
- Climate change: causes, effects, carbon footprint.

Chapter Summary

The atmosphere is mainly nitrogen and oxygen and is divided into the troposphere, stratosphere, mesosphere, thermosphere and exosphere. Weather happens in the troposphere, while the ozone layer in the stratosphere protects life.

Weather is daily atmospheric condition and climate is its long-term average, shaped by latitude, altitude, distance from the sea, ocean currents, relief and winds. India has a tropical monsoon climate with four IMD seasons and a tradition of six ṛtus. Climate change, driven by human activity, is causing extreme events, and each of us can help by reducing our carbon

Exam Tips and PYQ Pattern

- Draw and label the atmosphere layers diagram.
- Weather vs climate is a frequent 2-mark question.
- Learn monsoon onset and retreat dates.
- Use the Punjab 2025 floods as a case-study example.
- Know the six ṛtus with months for MCQs.

Frequently Asked Questions

Is this chapter in the 2026-27 CBSE syllabus?

Yes. It is part of the new NCERT Class 9 Social Science textbook “Understanding Society: India and Beyond” (Part 1), prescribed for the 2026-27 session.

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What are the layers of the atmosphere?

Troposphere, stratosphere, mesosphere, thermosphere and exosphere.

What is the difference between weather and climate?

Weather is the short-term state of the atmosphere; climate is the average weather over a long period.

Conclusion

Atmosphere and Climate explains the air around us and the seasons we live by. Learn the layers and seasons tables, practise the Q&A here and save the free PDF for revision.

More Notes: Class 9 Social Science Chapter 2: Shaping of the Earth’s Surface notes | Class 9 Social Science Chapter 4: Early Humans and Beginning of Civilisation notes | All Class 9 Social Science notes

Author Bio: Written and reviewed by the Nextoper Editorial Team, a group of CBSE social science educators who build chapter notes directly from the NCERT textbook and past board paper patterns.

Freshness Note: These notes follow the NCERT Class 9 Social Science textbook, Understanding Society: India and Beyond (Parts 1 and 2, first edition 2026, NCF-SE 2023), and the CBSE syllabus for the 2026-27 session. Last checked on 23 November 2026.