NCERT – GRADE 9 CHEAT SHEET

EARTH AS A SYSTEM: ENERGY, MATTER AND LIFE

Pumpa

Our planet – a dynamic and interconnected system!

Based on NCERT Exploration – Textbook of Science for Grade 9 | Chapter 13 | Reprint 2026–27 | Pages 252–272

1. Earth as an Interconnected System

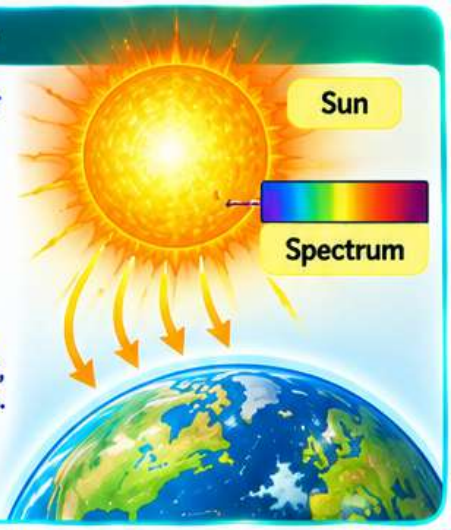
- Earth is a system of five major spheres:
  - Geosphere (solid land)
  - Hydrosphere (water)
  - Cryosphere (ice and snow)
  - Atmosphere (gases)
  - Biosphere (living things)



All the spheres interact with each other.

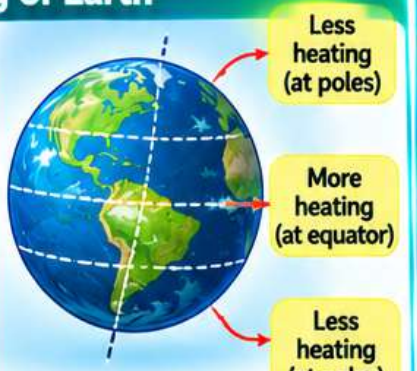
2. Solar Energy

- The Sun is the major source of energy for Earth.
- Solar radiation is electromagnetic radiation (light, heat).
- The Sun's spectrum includes visible light, UV and infrared rays.
- Speed of light: $\approx 3 \times 10^8$ m/s.



3. Uneven Heating of Earth

- Equatorial regions receive more solar energy; poles receive less.
- Earth's spherical shape and axial tilt cause uneven heating.
- Some sunlight is reflected by clouds, ice and land (albedo).
- Atmosphere helps regulate temperature.



This leads to climate and weather changes.

4. Winds and Ocean Currents

- Differential heating causes air movement (winds).
- Sea and land breeze, mountain and valley breeze are local winds.
- Planetary winds: trade winds, westerlies, polar easterlies.
- Ocean currents redistribute heat.



5. Biogeochemical Cycles

- Matter cycles through Earth's system.
- Water, Carbon, Nitrogen and Oxygen cycle continuously.
- These cycles keep life going and maintain balance.



6. Human Impact

- Human activities can disturb Earth's balance.
- Greenhouse gas emissions enhance the greenhouse effect.
- Pollution harms land, water and air.
- Deforestation reduces biodiversity and carbon storage.
- Fertiliser runoff can cause eutrophication.



Adopt sustainable practices: conserve energy, plant trees, reduce waste.

Quick Facts

- ✓ Earth has five interconnected spheres.
- ✓ Matter cycles; energy flows.
- ✓ Atmosphere regulates temperature.

Common Mistakes

- ✗ Sun is the only source of Earth's energy.
- ✗ Cycles mean energy is recycled.
- ✗ Biosphere is not just plants.

Key Takeaway

Earth's systems are interconnected – what we do affects the whole planet!

Pumpa | *Our Earth: One System, One Home!*