Class 10 Science Chapter 13: Our Environment - Notes, Important Questions and MCQs (2026-27)

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These Class 10 Science Chapter 13 PDF Notes explain Our Environment clearly: ecosystems and their components, food chains and food webs, the flow of energy and the 10 per cent law, biological magnification, depletion of the ozone layer, and managing the garbage we produce.

This is a short, scoring chapter. Board papers frequently ask about trophic levels, why food chains are short, biological magnification, ozone depletion and the difference between biodegradable and non-biodegradable substances.

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Chapter Overview

Our environment includes all the living and non-living things around us and the ways they interact. Organisms depend on each other and on the physical surroundings for food and survival.

The chapter shows how energy flows through an ecosystem, why some harmful chemicals build up in top consumers, how human activities have thinned the ozone layer, and what we can do to reduce and manage waste.

Important Topics and Concepts

Ecosystem and its components

An ecosystem is made of biotic components (plants, animals, microorganisms) and abiotic components (temperature, rainfall, wind, soil, minerals) interacting together. Natural ecosystems include forests, ponds and lakes; artificial ones include gardens, crop fields and aquariums.

Producers, consumers and decomposers

- Producers: green plants and blue-green algae that make food by photosynthesis.
- Consumers: organisms that eat producers or other consumers, classified as herbivores, carnivores, omnivores and parasites.
- Decomposers: bacteria and fungi that break down dead remains and wastes into simple substances, returning nutrients to the soil.

Food chains and trophic levels

A food chain is a series of organisms feeding on one another, e.g. grass → deer → lion, or grass → grasshopper → frog → snake → eagle. Each step is a trophic level: producers are the first trophic level, herbivores (primary consumers) the second, small carnivores (secondary consumers) the third, and so on.

Flow of energy and the 10 per cent law

Green plants capture about 1% of the sunlight falling on leaves. At each trophic level, a large part of the food is used for maintenance (digestion, work, heat); on average only about 10% of the food eaten is turned into the consumer’s body and passed to the next level. So energy flow is unidirectional: it moves from producers to higher levels and never goes back. Because so little energy reaches higher levels, food chains usually have only three or four steps, and there are fewer organisms at higher levels.

Food webs

In nature, organisms eat more than one type of food, so food chains interconnect to form a branching food web.

Biological magnification

Pesticides and other chemicals used to protect crops wash into soil and water bodies. They are absorbed by plants and enter food chains. Because these chemicals are not degradable, they accumulate progressively at each trophic level. Humans, often at the top of food chains, end up with the maximum concentration. This is why harmful pesticide residues are found in food grains and other food.

How our activities affect the environment: the ozone layer

Ozone (O_3) is a molecule of three oxygen atoms. At ground level it is a deadly poison, but in the upper atmosphere it forms a layer that shields the Earth from the Sun’s harmful ultraviolet (UV) radiation, which can cause skin cancer. Ozone forms when UV radiation splits O_2 into free oxygen atoms (O), which then combine with O_2 to form O_3. Synthetic chemicals like chlorofluorocarbons (CFCs), used as refrigerants and in fire extinguishers, have depleted the ozone layer. In 1987, the United Nations Environment Programme (UNEP) reached an

Managing the garbage we produce

- Biodegradable substances can be broken down by biological processes (decomposers), e.g. vegetable peels, paper, cotton, wood.
- Non-biodegradable substances are not broken down by biological processes, e.g. plastics, polythene, glass, some chemicals and DDT; they persist and harm the environment.
- Changing lifestyles (more packaging, disposable items) have increased waste.
- Some ways to reduce waste: reuse, recycling, separating biodegradable from non-biodegradable waste, composting, and using environment-friendly items.
- Example from NCERT: Indian Railways once considered replacing plastic cups with disposable clay cups (kulhads), but making them in large numbers would cause loss of fertile topsoil.

Biodegradable vs Non-biodegradable

Feature	Biodegradable	Non-biodegradable
Broken down by	Decomposers (bacteria, fungi)	Not broken down by biological processes
Examples	Vegetable peels, paper, cotton, wood	Plastic, polythene, glass, DDT
Effect	Become part of nutrient cycle	Persist and harm the ecosystem
Management	Composting	Reduce, reuse, recycle

Important Definitions and Terms

Term	Meaning
Environment	All living and non-living things around an organism
Ecosystem	Biotic and abiotic components of an area interacting together
Producer	Organism that makes its own food (green plants)
Consumer	Organism that eats other organisms
Decomposer	Microorganism that breaks down dead matter
Food chain	Sequence of organisms in which each is food for the next
Food web	Network of interconnected food chains
Trophic level	Each step or level in a food chain
10 per cent law	Only about 10% of energy passes to the next trophic level
Biological magnification	Increase in concentration of harmful chemicals at higher trophic levels
Ozone layer	Layer of O_3 in the upper atmosphere that absorbs UV radiation
CFCs	Chlorofluorocarbons; chemicals that deplete the ozone layer
Biodegradable	Can be broken down by biological processes

Short Answer Questions

Q1. What are trophic levels? Give an example of a food chain and state its trophic levels.

Trophic levels are the steps in a food chain where energy is transferred. Example: grass (first, producer) → grasshopper (second, herbivore) → frog (third) → snake (fourth).

Q2. What is the role of decomposers in an ecosystem?

Decomposers break down dead plants, animals and wastes into simple substances that return to the soil and can be reused by plants. They also keep the environment clean.

Q3. Why are some substances biodegradable and some non-biodegradable?

Biodegradable substances can be broken down by enzymes of bacteria and fungi. Non-biodegradable substances such as plastics cannot be broken down by these organisms because the organisms lack enzymes for them.

Q4. Why is damage to the ozone layer a cause for concern?

The ozone layer absorbs harmful UV radiation from the Sun. If it thins, more UV radiation reaches the Earth, causing skin cancer, cataracts and damage to plants and animals.

Q5. Why do food chains usually have only three or four trophic levels?

Only about 10% of energy passes from one level to the next. After three or four levels, too little energy is left to support another level.

Q6. What will happen if we kill all the organisms in one trophic level?

The balance of the ecosystem will be disturbed. Organisms of the level below will increase in number without control, while those of the level above will lose their food and may die out.

Q7. Will the impact of removing all organisms in a trophic level be different for different trophic levels?

Yes. Removing producers would collapse the whole food chain, since all consumers depend on them. Removing a top carnivore mainly causes an increase in the number of herbivores, which can lead to overgrazing.

Q8. Give two ways in which non-biodegradable substances affect the environment.

They pollute land and water bodies for a long time, and harmful chemicals from them can enter food chains and build up in organisms by biological magnification.

Long Answer Questions

Q1. Explain biological magnification with an example. Why is its level different at different trophic levels?

Biological magnification is the increase in the concentration of harmful, non-degradable chemicals at each higher trophic level of a food chain.

Pesticides such as DDT, sprayed on crops, wash into soil and water. Plants and aquatic organisms absorb them. These chemicals are not broken down or excreted easily, so they accumulate in the bodies of organisms.

When a herbivore eats many plants, and a carnivore eats many herbivores, the chemical gets

Example: water → plankton → small fish → big fish → fish-eating birds or humans. The top consumer has the highest concentration. That is why humans, at the top of many food chains, are most affected.

Q2. How is ozone formed in the upper atmosphere? Explain how it is being depleted and the steps taken to protect it.

High-energy UV radiation splits oxygen molecules (O_2) into free oxygen atoms (O). These atoms combine with O_2 to form ozone: $O_2 \rightarrow O + O$; $O + O_2 \rightarrow O_3$.

Since the 1980s, the amount of ozone has fallen sharply. The main cause is synthetic chemicals such as chlorofluorocarbons (CFCs), used as refrigerants and in fire extinguishers.

In 1987, UNEP succeeded in forging an agreement to freeze CFC production at 1986 levels. Today, CFC-free refrigerators and alternatives are used worldwide.

We can also help by avoiding products that release ozone-depleting gases and by spreading awareness.

Q3. Explain the flow of energy in an ecosystem and the 10 per cent law.

The Sun is the source of energy. Green plants capture about 1% of the sunlight falling on their leaves and convert it into food energy.

When a herbivore eats a plant, much of the energy is used for life activities and lost as heat. On average, only 10% of the energy in the food is converted into the herbivore’s body and becomes available to the next level.

The same happens at every higher trophic level. Energy flow is therefore unidirectional: it passes from producers to herbivores to carnivores and never returns to the Sun or to the plants.

Consequences: food chains are short (three or four levels), and the number of organisms usually decreases at higher levels.

MCQs with Answers

1. Which of the following is an artificial ecosystem?(a) Pond (b) Forest (c) Crop field (d) LakeAnswer: (c) Crop field

2. Producers in an ecosystem are(a) Animals (b) Green plants (c) Fungi (d) BacteriaAnswer: (b) Green plants

3. The percentage of energy passed to the next trophic level is about(a) 1% (b) 10% (c) 50% (d) 90%Answer: (b) 10%

4. Which is non-biodegradable?(a) Paper (b) Cotton (c) Polythene (d) Vegetable peelsAnswer: (c) Polythene

5. Ozone layer protects us from(a) Infrared rays (b) Ultraviolet radiation (c) Visible light (d) Radio wavesAnswer: (b) Ultraviolet radiation

6. The chemicals mainly responsible for ozone depletion are(a) CO_2 (b) CFCs (c) SO_2 (d) NO_2Answer: (b) CFCs

7. In the food chain grass → deer → lion, the deer is at the(a) First trophic level (b) Second

8. Biological magnification is maximum in(a) Producers (b) Herbivores (c) Small carnivores (d) Top consumersAnswer: (d) Top consumers

9. Organisms that break down dead matter are(a) Producers (b) Herbivores (c) Decomposers (d) CarnivoresAnswer: (c) Decomposers

10. The agreement to freeze CFC production was reached in(a) 1980 (b) 1987 (c) 1992 (d) 2001Answer: (b) 1987 – Under UNEP.

Quick Revision Points

- Ecosystem = biotic + abiotic components; natural and artificial.
- Producers → herbivores → carnivores; decomposers recycle nutrients.
- Plants capture about 1% of sunlight; only about 10% passes to the next level.
- Energy flow is unidirectional; food chains are short.
- Biological magnification: highest at the top consumer.
- $O_2 \rightarrow O + O$; $O + O_2 \rightarrow O_3$; CFCs deplete ozone; UNEP agreement in 1987.
- Biodegradable vs non-biodegradable; reduce, reuse, recycle.

Chapter Summary

An ecosystem is the interaction of living organisms with their physical surroundings. Producers make food, consumers eat other organisms and decomposers recycle nutrients. Food chains link trophic levels, and many food chains together form a food web.

Energy enters through producers and flows in one direction, with only about 10% passing to each higher level, which keeps food chains short. Non-degradable chemicals build up through biological magnification, CFCs have damaged the protective ozone layer, and growing waste needs to be reduced, reused and recycled.

Exam Tips and PYQ Pattern

- Expect "why are food chains short" and "biological magnification" as 2- or 3-mark questions.
- The formation and depletion of ozone, with the 1987 UNEP agreement, is frequently asked.
- Classify given items as biodegradable or non-biodegradable in MCQs.
- Case-based questions often give a food chain and ask about trophic levels and energy.

Frequently Asked Questions

Why is energy flow in an ecosystem unidirectional?

Energy captured by plants does not return to the Sun, and energy passed to herbivores does not go back to plants, so it always flows one way.

What is the 10 per cent law?

Only about 10% of the food energy at one trophic level is passed on to the next level.

Why is ozone harmful at ground level?

Conclusion

Our Environment ties science to everyday choices about food, waste and pollution. Learn the trophic levels, the 10% law, biological magnification and ozone depletion carefully. This short chapter can give you easy, reliable marks with focused revision.

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

Freshness Note: These notes follow the NCERT Class 10 Science textbook (Reprint 2026-27) and the CBSE syllabus for the 2026-27 session. Last checked on 7 November 2026.