	INDIAN SCHOOL AL WADI AL KABIR	
CLASS X	**DEPARTMENT OF SCIENCE -2026-27** **SUBJECT: BIOLOGY**	**DATE: 14/11/2026**
WORKSHEET WITH ANSWERS	**CHAPTER 13** **TOPIC: OUR ENVIRONMENT**	**A4 FILE FORMAT (PORTFOLIO)**
CLASS & SEC:	**NAME OF THE STUDENT:**	**ROLL NO.**

I a. OBJECTIVE TYPE QUESTIONS

Multiple Choice Questions:

1. Which organisms convert dead organic matter into simpler substances?
(a) Producers (b) Decomposers (c) Herbivores (d) Top carnivores

2. Which of the following is an abiotic component of an ecosystem?
(a) Bacteria (b) Grass (c) Sunlight (d) Deer

3. In the food chain grass → mouse → snake, the mouse is a:
(a) Producer (b) Primary consumer (c) Secondary consumer (d) Decomposer

4. According to the 10% law, if producers contain 5,000 J of energy, the primary consumers receive approximately:
(a) 5 J (b) 50 J (c) 500 J (d) 4,500 J

5. Which statement about energy flow in an ecosystem is correct?
(a) It is cyclic (b) It is unidirectional (c) It is reversible (d) It begins with decomposers

6. Which of the following is most likely to be biodegradable?
(a) Aluminium foil (b) Plastic wrapper (c) Dry leaves (d) Glass

7. The ozone layer is mainly present in the:
(a) Troposphere (b) Stratosphere (c) Mesosphere (d) Thermosphere

8. Which chemical group is strongly associated with ozone layer depletion?
(a) CFCs (b) Oxygen (c) Nitrogen (d) Water vapour

9. An organism that feeds directly on green plants occupies the:
(a) First trophic level (b) Second trophic level (c) Third trophic level (d) Fourth trophic level

10. Which practice best supports the 3Rs principle?
(a) Using single-use bags (b) Burning mixed waste (c) Repairing and reusing items
(d) Dumping waste in rivers

I b. ASSERTION AND REASONING

For questions 11 to 15, two statements are given—one labelled Assertion (A) and the other labelled Reason (R).
Select the correct answer from the options below:
(i) Both A and R are true, and R is the correct explanation of A.
(ii) Both A and R are true, but R is not the correct explanation of A.
(iii) A is true but R is false.
(iv) A is false but R is true.

11. Assertion: Producers form the base of most food chains.
Reason: Producers trap solar energy and convert it into chemical energy.

12. Assertion: The amount of energy available generally decreases at successive trophic levels.
Reason: A large part of the energy is used in life processes and dissipated as heat.

13. Assertion: Food webs provide greater feeding alternatives than a single food chain.
Reason: Several food chains in an ecosystem may be interconnected.

14. Assertion: Non-biodegradable substances can accumulate in the environment.
Reason: They are readily broken down by decomposers into harmless substances.

15. Assertion: Ozone at ground level and ozone in the stratosphere have the same environmental effect.
Reason: Stratospheric ozone absorbs harmful ultraviolet radiation.

I c. CASE STUDY / PASSAGE-BASED QUESTIONS

A school eco-club surveyed waste generated in the school. They found fruit peels and leftover food mixed with plastic wrappers, while some students were also throwing used batteries into ordinary bins. The club proposed waste segregation, composting and recycling to reduce the environmental impact.

16. Attempt either subpart A or B.

A. Explain how separating biodegradable and non-biodegradable waste at source helps in waste management. Give two examples for each category.

OR

B. Suggest two practical steps the school can take to reduce the amount of plastic waste generated each day.

C. Why should used batteries not be mixed with ordinary household waste? State one possible environmental consequence.

D. Consider the food chain: aquatic plants ® small fish ® large fish ® fish-eating bird. If a persistent pesticide enters
the water, which organism is likely to show the highest concentration? Give a reason.

II. VERY SHORT ANSWER TYPE QUESTIONS CARRYING (2 MARKS EACH)

17. Define a trophic level. Give one example of an organism at the second trophic level.
18. Why are green plants called producers in an ecosystem?
19. State one difference between biodegradable and non-biodegradable waste.
20. What is meant by biological magnification?
21. Why can energy not be recycled in an ecosystem?

III. SHORT ANSWER TYPE QUESTIONS CARRYING (3 MARKS EACH)

22. Explain why food chains usually consist of only three or four trophic levels.
23. Differentiate between a food chain and a food web. Give one example of each.
24. Describe how decomposers help to maintain the balance of an ecosystem.
25. Explain how human activities can disturb the ozone layer and state one harmful effect of

its depletion.

26. Suggest three measures that students can adopt to minimise the environmental impact of waste.

LONG ANSWER TYPE QUESTIONS CARRYING (5 MARKS EACH)

27. With the help of a suitable example, explain the flow of energy through different trophic levels in an ecosystem.
State the 10% law and show the energy transfer if producers have 10,000 J.

28. Explain the formation and importance of the ozone layer. How do chlorofluorocarbons (CFCs) contribute to its depletion? Mention two ways to reduce the release of ozone-depleting substances.

29. Classify wastes into biodegradable and non-biodegradable categories. Explain three environmental problems caused by the accumulation of non-biodegradable waste.

30. Describe the steps involved in an effective school-level waste-management plan. Explain how the principles of Reduce, Reuse and Recycle can be put into practice.

V. BOARD-BASED QUESTIONS

31. If 20,000 J of energy is available at the producer level, the energy available to the secondary consumer will be approximately:
(A) 2,000 J (B) 200 J (C) 20 J (D) 10,000 J

32. Assertion (A): The concentration of certain harmful chemicals may increase at higher trophic levels.
Reason (R): These chemicals are persistent and may not be broken down easily by organisms.
(Choose the correct option using the assertion-reason codes given in Question 1b.)

33. Why is composting kitchen waste considered a better option than dumping it in a landfill? Give two reasons. (2)

34. Explain why top consumers in an aquatic food chain may be more affected by biological magnification than organisms at lower trophic levels. (2)

ANSWERS

I. OBJECTIVE TYPE QUESTIONS

I. a. Multiple Choice Questions

1. (b) Decomposers
2. (c) Sunlight
3. (b) Primary consumer
4. (c) 500 J
5. (b) It is unidirectional
6. (c) Dry leaves
7. (b) Stratosphere
8. (a) CFCs
9. (b) Second trophic level
10. (c) Repairing and reusing items

I b. ASSERTION AND REASON

11. (i) Both A and R are true and R is the correct explanation of A.

12. (i) Both A and R are true and R is the correct explanation of A.

13. (i) Both A and R are true and R is the correct explanation of A.

14. (iii) A is true but R is false.

15. (iv) A is false but R is true.

I c. CASE STUDY / PASSAGE-BASED QUESTIONS

16. A. Segregation keeps organic waste separate for composting and recyclable material separate for recovery.

Biodegradable examples: fruit peels and leftover food. Non-biodegradable examples: plastic wrappers and glass bottles.

OR

B. The school can replace disposable plastic cups and plates with reusable alternatives and encourage students to carry refillable water bottles and lunch containers.

C. Batteries may contain harmful chemicals and heavy metals. If dumped with ordinary waste, these substances can leak into soil or water and cause pollution.

D. The fish-eating bird is likely to have the highest concentration. Persistent pesticides accumulate in organisms and become more concentrated at successive trophic levels; this is biological magnification.

II. VERY SHORT ANSWER TYPE QUESTIONS CARRYING 2 MARKS EACH

17. A trophic level is each step or feeding position in a food chain. Green plants occupy the first trophic level, and herbivores such as deer occupy the second.

18. Green plants are producers because they prepare their own food from carbon dioxide and water using sunlight through photosynthesis.

19. Biodegradable waste can be broken down by microorganisms, whereas non-biodegradable waste is not easily broken down by natural processes.

20. Biological magnification is the increase in concentration of persistent harmful chemicals at successive higher trophic levels of a food chain.

21. Energy flows in one direction and is dissipated as heat at each trophic level. It is not returned to the Sun or reused by producers.

III. SHORT ANSWER TYPE QUESTIONS CARRYING 3 MARKS EACH

22. Only a small fraction of energy is transferred to the next trophic level, while much is used in life processes and lost as heat. Therefore, energy becomes insufficient to support many successive levels, so food chains are usually short.

23. A food chain is a linear sequence of organisms through which food and energy pass, e.g. grass, deer, tiger. A

food web is a network of interconnected food chains, offering several feeding pathways within an ecosystem.

24. Decomposers such as bacteria and fungi break down dead plants, animals and organic wastes. They release simpler substances and return nutrients to the environment, where producers can use them again.

25. CFCs released from sources such as some cooling systems and aerosol products can release chlorine in the stratosphere, which destroys ozone molecules. Ozone depletion allows more harmful UV radiation to reach Earth, increasing risks such as skin and eye damage.

26. Students can segregate waste at source, avoid single-use plastics by carrying reusable bags and bottles, and reuse or recycle paper, containers and other suitable materials. Organic waste can be composted.

IV. LONG ANSWER TYPE QUESTIONS CARRYING 5 MARKS EACH

27. Energy enters most ecosystems as sunlight. Producers capture solar energy and store it as chemical energy in food.

Primary consumers obtain energy by eating producers; secondary consumers eat primary consumers, and higher consumers feed on them. Example: grass ® grasshopper ® frog ® snake. Under the 10% law, only about 10% of energy at one trophic level is passed to the next. If producers have 10,000 J, primary consumers receive about 1,000 J, secondary consumers 100 J and tertiary consumers 10 J. The remaining energy is used in life processes or dissipated as heat. Thus, energy flow is unidirectional and decreases at each level.

28. Ozone (O_3) is formed in the stratosphere when ultraviolet radiation splits oxygen molecules (O_2) into oxygen atoms;

These atoms then combine with O_2 to form O_3. The ozone layer absorbs much of the Sun's harmful ultraviolet radiation and protects living organisms. CFCs can reach the stratosphere, where UV radiation releases chlorine atoms that react with and destroy ozone molecules. This thins the ozone layer and allows more UV radiation to reach Earth. Release can be reduced by using ozone-friendly cooling equipment and properly servicing and disposing of refrigerators and air-conditioners to prevent refrigerant leakage.

29. Biodegradable wastes are broken down by microorganisms; examples include vegetable peels, paper and leaves. Non-biodegradable wastes do not decompose easily; examples include plastics, glass and many synthetic chemicals. Their accumulation can pollute soil and water, harm animals that swallow or become trapped in plastic, and block drains. Persistent toxic substances can enter food chains and undergo biological magnification. Such waste may remain in the environment for a long time and disturb ecosystem functioning.

30. An effective plan begins with segregation of wet, dry and hazardous waste at source. Kitchen and garden waste can be composted. Clean paper, glass, metals and suitable plastics should be sent for recycling. Batteries and electronic waste should be collected separately for safe handling. The 3Rs support the plan: Reduce by avoiding unnecessary packaging and single-use items; Reuse containers, folders and other usable materials; Recycle paper, glass and metals into new products. These steps reduce pollution, conserve resources and minimise the amount of waste sent to landfill.

V. BOARD-BASED QUESTIONS

31. (B) 200 J. Producers: 20,000 J; primary consumers: 2,000 J; secondary consumers: 200 J.

32. (i) Both A and R are true, and R is the correct explanation of A.

33. Composting converts kitchen waste into nutrient-rich manure that can improve soil. It also reduces the amount of organic waste sent to landfills and helps avoid the problems associated with mixed waste disposal.

34. Persistent chemicals are passed along food chains and accumulate in organisms. Their concentration increases at higher trophic levels, so top consumers receive the greatest concentration and may be most severely affected.

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