



INDIAN SCHOOL AL WADI AL KABIR



<b>Class: X</b>	<b>DEPARTMENT OF SCIENCE -2025-26</b> <b>SUBJECT: BIOLOGY</b>	<b>DATE: 10/11/25</b>
<b>WORKSHEET NO. 7 WITH ANSWERS</b>	<b>CHAPTER 15</b> <b>TOPIC: OUR ENVIRONMENT</b>	<b>A4 FILE FORMAT (PORTFOLIO)</b>
<b>CLASS &amp; SEC:</b>	<b>NAME OF THE STUDENT:</b>	<b>ROLL NO.</b>

**I a OBJECTIVE TYPE QUESTIONS**

**Multiple choice questions:**

- Which of the following organisms are decomposers?
  - Bacteria and fungi
  - Grass and trees
  - Snake and frog
  - Lion and tiger
- Which one of the following forms the first trophic level in a food chain?
  - Herbivores
  - Carnivores
  - Producers
  - Decomposers
- The percentage of solar energy trapped and utilized by green plants is about:
  - 1%
  - 10%
  - 5%
  - 50%
- In a food chain, energy is transferred from:
  - Producer → Decomposer → Consumer
  - Producer → Consumer → Decomposer
  - Consumer → Producer → Decomposer
  - Decomposer → Producer → Consumer
- The correct sequence of organisms in a food chain is:
  - Grass → Deer → Tiger
  - Tiger → Deer → Grass

- c) Deer → Grass → Tiger
- d) Grass → Tiger → Deer

6. The ozone layer protects us from:

- a) Infrared rays
- b) Ultraviolet rays
- c) X-rays
- d) Gamma rays

7. Which of the following materials is non-biodegradable?

- a) Paper
- b) Plastic
- c) Cotton
- d) Vegetable peels

8. Which is the most stable ecosystem?

- a) Forest
- b) Desert
- c) Ocean
- d) Mountain

9. The flow of energy in an ecosystem is:

- a) Cyclic
- b) Unidirectional
- c) Multidirectional
- d) Reversible

10. Which of the following is a biodegradable waste?

- a) Polythene bag
- b) Glass bottle
- c) Vegetable peel
- d) Metal can

### **Ib. 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 to these questions from the options (i), (ii), (iii) and (iv) as given below:

- (i) Both A and R are true and R is the correct explanation of the assertion.
- (ii) Both A and R are true but R is not the correct explanation of the assertion.
- (iii) A is true but R is false.
- (iv) A is false but R is true.

11. **A:** Decomposers play an important role in the ecosystem.

**R:** They help in recycling of nutrients.

12. **A:** Energy transfer from one trophic level to the next is very efficient.  
**R:** About 90% of energy is lost as heat.

13. **A:** Ozone depletion is mainly caused by chlorofluorocarbons (CFCs).  
**R:** CFCs release chlorine atoms which destroy ozone molecules.

14. **A:** Shorter food chains are more efficient in energy transfer.  
**R:** No energy is lost in transfer between fewer trophic levels.

15. **A:** In a food chain, tertiary consumers are always herbivores.  
**R:** The herbivores directly feed on producers.

**16. Ic. CASE STUDY/PASSAGE-BASED QUESTIONS:**

Ravi noticed that his neighbourhood has started segregating waste into green and blue dustbins. He also observed that many people still burn plastic waste in open areas. Help him understand some key concepts related to the environment by answering the questions given below.

Attempt either subpart A or B.

A. What is the significance of using green and blue dustbins for waste disposal? What types of waste should be put in each? How does this practice help in managing waste effectively?

OR

B. Why is it important to reduce the use of plastic bags in our daily life? What alternatives can be used instead?

C. What are biodegradable and non-biodegradable substances? Give one example of each from household waste.

D. The figure given below shows a simplified food chain. Grass → Grasshopper → Frog → Snake → Eagle Which organism in this food chain will have the maximum concentration of harmful chemicals due to biological magnification? Explain why.

**II. VERY SHORT ANSWERS TYPE QUESTIONS CARRYING 2 MARKS EACH**

17. What is an ecosystem?

18. What is meant by a food chain?

19. State the role of decomposers in the environment.

20. Why is energy flow in an ecosystem unidirectional?

21. What is biological magnification?

**III. SHORT ANSWER TYPE QUESTIONS CARRYING 3 MARKS EACH**

22. Describe the 10% law of energy transfer with an example.

23. Explain the effects of human activities on the environment.

24. Write a short note on ozone depletion.

25. Differentiate between food chain and food web.

26. How does the ecosystem maintain itself in equilibrium?

#### **IV. LONG ANSWER TYPE QUESTIONS CARRYING 5 MARKS EACH**

27 Explain the flow of energy in an ecosystem. Describe how energy transfer is governed by the 10% law.

28. What is ozone? How is it formed and how does it get depleted? Explain its importance.

29. Differentiate between biodegradable and non-biodegradable substances. Discuss the problems caused by non-biodegradable wastes.

30. Describe various methods of waste management in your locality. Explain how the 3Rs principle helps in conserving the environment.

#### **V. BOARD BASED QUESTIONS.**

31. Which of the following groups do *not* constitute a food chain? (2025)

(i) Wolf, rabbit, grass, lion

(ii) Plankton, man, grasshopper, fish

(iii) Hawk, grass, snake, grasshopper, frog

(iv) Grass, snake, wolf, tiger

(A) (i) and (iv)

(B) (i) and (iii)

(C) (ii) and (iii)

(D) (ii) and (iv)

32. The percentage of solar energy which is *not* converted into food energy by the leaves of green plants in a terrestrial ecosystem is about: (2025)

(A) 1%

(B) 10%

(C) 90%

(D) 99%

33. Assertion (A) : The amount of ozone in the atmosphere began to drop sharply in the 1980s.

*Reason (R) :* The oxygen atoms combine with molecular oxygen to form ozone. (2025)

34. Kulhads (disposable cups made of clay) and disposable paper cups both are used as an alternative for disposable plastic cups. Which one of these two can be considered as a better alternative to plastic cups and why? (2) 2022

35. Human beings are most adversely affected by the Biological Magnification. State the reason. Why can ordinary washing of edibles (fruits and vegetables) not reduce the effect of biological magnification? (2) 2022

### ANSWERS

<b>I</b>	<b>OBJECTIVE TYPE QUESTIONS</b>
<b>I a.</b>	<b>Multiple choice questions</b>
1.	a) Bacteria and fungi
2.	c) Producers
3.	a) 1%
4.	b) Producer → Consumer → Decomposer
5.	a) Grass → Deer → Tiger
6.	b) Ultraviolet rays
7.	b) Plastic
8.	c) Ocean
9.	b) Unidirectional
10.	c) Vegetable peel
<b>I b.</b>	<b>ASSERTION AND REASON</b>
11.	(i)Both A and R are true and R is the correct explanation of the assertion.
12.	(iv)A is false but R is true.
13.	(i)Both A and R are true and R is the correct explanation of the assertion
14.	(iii)A is true but R is false
15.	(iv)A is false but R is true
<b>I c.</b>	<b>CASE STUDY/PASSAGE BASED QUESTIONS:</b>
16.	<p><b>A. Significance of Green and Blue Dustbins</b></p> <p><b>Green Dustbin:</b> Used for <b>biodegradable waste</b> like vegetable peels, leftover food, garden waste, etc.</p> <p><b>Blue Dustbin:</b> Used for <b>non-biodegradable waste</b> like plastic, metal, glass, and packaging materials.</p> <p><b>Importance:</b> Helps in <b>segregation at source</b>, making recycling and composting easier.</p>

	<p>Reduces the amount of waste sent to landfills. Promotes <b>efficient waste management</b> and reduces environmental pollution.</p> <p style="text-align: center;">OR</p> <p><b>B. Importance of reducing plastic use:</b> Plastic bags are <b>non-biodegradable</b> and persist in the environment for hundreds of years. They <b>clog drains</b>, pollute water bodies, and harm animals who may ingest them. Burning plastic releases <b>toxic gases</b>, contributing to <b>air pollution</b> and health hazards. <b>Alternatives:</b> Use <b>cloth bags</b>, <b>jute bags</b>, or <b>paper bags</b> which are <b>biodegradable</b> and <b>eco-friendly</b>. Reuse containers and bags to minimize waste.</p> <p>C. Biodegradable vs Non-Biodegradable Substances</p> <table><tr><th>Type</th><th>Definition</th><th>Example</th></tr><tr><td><b>Biodegradable</b></td><td>Substances that can be broken down by natural decomposers (bacteria, fungi)</td><td>Fruit peels</td></tr><tr><td><b>Non-Biodegradable</b></td><td>Substances that do not decompose easily and persist in the environment</td><td>Plastic bottles</td></tr></table> <p>D. Biological Magnification in a Food Chain Food Chain: Grass → Grasshopper → Frog → Snake → Eagle The Eagle will have the maximum concentration of harmful chemicals. This is due to biological magnification, where non-biodegradable chemicals (like pesticides) accumulate and increase in concentration at each trophic level. Top consumers (like eagles) receive the highest dose, which can affect their health and reproduction.</p>	Type	Definition	Example	<b>Biodegradable</b>	Substances that can be broken down by natural decomposers (bacteria, fungi)	Fruit peels	<b>Non-Biodegradable</b>	Substances that do not decompose easily and persist in the environment	Plastic bottles
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II	<b><u>VERY SHORT ANSWERS TYPE QUESTIONS CARRYING 2 MARK EACH</u></b>									
17.	An ecosystem is a system formed by the interaction between living organisms (biotic components) and their physical environment (abiotic components).									
18.	A food chain is a sequence showing how energy and nutrients are passed from one organism to another in an ecosystem.									
19	Decomposers break down dead organisms and waste materials, recycling nutrients back into the environment.									
20	Because energy is lost as heat at each trophic level and cannot be reused by plants.									
21	It is the increase in the concentration of harmful substances (like pesticides) in organisms at higher trophic levels.									
III.	<b><u>SHORT ANSWER TYPE QUESTIONS CARRYING 3 MARKS EACH</u></b>									
22.	Only 10% of energy is transferred from one trophic level to the next. Example: If plants have 1000 J energy, herbivores receive 100 J, and carnivores get 10 J.									
23.	Activities like deforestation, pollution, and use of plastics lead to global warming, ozone depletion, and habitat destruction.									
24.	Ozone layer depletion is caused by CFCs that release chlorine, which reacts with ozone molecules, thinning the layer and increasing UV radiation on Earth.									

25.	<table border="0"> <thead> <tr> <th style="text-align: left;"><b>Food chain</b></th><th style="text-align: left;"><b>Food-web</b></th></tr> </thead> <tbody> <tr> <td>1. A sequence of living organisms that shows inter-dependence of organisms for their food is called food-chain.</td><td>1. The network of inter-connected food-chains in an ecosystem is called food-web</td></tr> <tr> <td>2. It shows only one path of transfer of producer to ultimate consumer.</td><td>2. It shows a number of paths of transfer of food from producer to ultimate consumer</td></tr> <tr> <td>3. Position of an organism is fixed.</td><td>3. Position of an organism may change.</td></tr> </tbody> </table>	<b>Food chain</b>	<b>Food-web</b>	1. A sequence of living organisms that shows inter-dependence of organisms for their food is called food-chain.	1. The network of inter-connected food-chains in an ecosystem is called food-web	2. It shows only one path of transfer of producer to ultimate consumer.	2. It shows a number of paths of transfer of food from producer to ultimate consumer	3. Position of an organism is fixed.	3. Position of an organism may change.
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26.	<p>An ecosystem maintains equilibrium through the <b>interdependence</b> of its components — <b>producers, consumers, and decomposers</b>. Each group plays a specific role that keeps the system balanced:</p> <p><b>Producers (plants)</b> use sunlight to make food through photosynthesis.</p> <p><b>Consumers (animals)</b> eat plants or other animals to obtain energy.</p> <p><b>Decomposers (bacteria and fungi)</b> break down dead plants and animals, returning nutrients to the soil.</p> <p>This <b>continuous flow of energy</b> and <b>cycling of nutrients</b> ensures that no component overgrows or disappears completely, maintaining a natural balance.</p> <p><b>Example:</b> In a <b>forest ecosystem</b>:</p> <p><b>Trees and plants (producers)</b> make food using sunlight.</p> <p><b>Deer (primary consumers)</b> eat the plants.</p> <p><b>Tigers (secondary consumers)</b> eat the deer.</p> <p>When plants and animals die, <b>decomposers</b> like fungi and bacteria break them down, releasing nutrients back into the soil.</p> <p>These nutrients are then reused by plants, completing the cycle and keeping the forest ecosystem in equilibrium</p>								
IV.	<b><u>LONG ANSWER TYPE QUESTIONS CARRYING 5 MARKS EACH</u></b>								
27.	<p>Energy flow in an ecosystem is <b>unidirectional</b>, starting from the <b>Sun</b> and moving through <b>producers → consumers → decomposers</b>.</p> <ol style="list-style-type: none"> <li><b>Producers (plants)</b> trap solar energy and convert it into chemical energy through <b>photosynthesis</b>.</li> <li><b>Primary consumers (herbivores)</b> eat the producers and obtain energy.</li> <li><b>Secondary and tertiary consumers (carnivores/top predators)</b> feed on other animals.</li> <li><b>Decomposers</b> break down dead organisms and return nutrients to the soil, though they do not recycle energy.</li> </ol>								

	<p>According to the <b>10% Law (Lindeman's Law)</b>, only <b>10% of the energy</b> available at one trophic level is transferred to the next level; the rest is lost as heat.</p> <p><b>Example:</b> If plants capture <b>1000 J</b> of energy:</p> <ul style="list-style-type: none"> <li>• Herbivores get <b>100 J</b></li> <li>• Primary carnivores get <b>10 J</b></li> <li>• Top carnivores get <b>1 J</b></li> </ul> <p><b>Thus</b>, the amount of energy decreases at each trophic level, limiting the length of food chains and maintaining balance in the ecosystem.</p>		
28.	<p>Ozone (O<sub>3</sub>) is a molecule made up of three oxygen atoms. It forms a thin layer in the stratosphere known as the ozone layer, which protects life on Earth.</p> <p><b>Formation:</b> Ozone is formed naturally when ultraviolet (UV) radiation from the Sun splits oxygen molecules (O<sub>2</sub>) into single oxygen atoms (O).  <math display="block">O_2 \rightarrow 2O</math> <math display="block">O_2 + O \rightarrow O_3</math> These single atoms then combine with O<sub>2</sub> molecules to form ozone:  <math display="block">O + O_2 \rightarrow O_3</math></p> <p><b>Depletion:</b></p> <ul style="list-style-type: none"> <li>• Certain man-made chemicals like Chlorofluorocarbons (CFCs), used in refrigerators and aerosol sprays, release chlorine atoms into the atmosphere.</li> <li>• Each chlorine atom can destroy thousands of ozone molecules by converting O<sub>3</sub> into O<sub>2</sub>.</li> </ul> <p><b>Importance:</b> The ozone layer <b>absorbs harmful UV rays</b> from the Sun, preventing skin cancer, cataracts, and damage to plants and aquatic life. We can conclude saying that to protect the ozone layer, international agreements like the <b>Montreal Protocol (1987)</b> were adopted to reduce CFC emissions.</p>		
29.	<p><b>Aspect</b></p> <p><b>Definition</b></p> <p><b>Examples</b></p> <p><b>Effect on Environment</b></p> <p><b>Problems caused by Non-Biodegradable Wastes:</b></p> <ol style="list-style-type: none"> <li>1. <b>Soil and Water Pollution:</b> Plastics and chemicals contaminate soil and water bodies.</li> <li>2. <b>Bio-magnification:</b> Harmful chemicals enter food chains and increase in concentration at higher trophic levels, affecting animals and humans.</li> <li>3. <b>Wildlife Hazard:</b> Animals may ingest plastics, causing injury or death.</li> </ol>	<p><b>Biodegradable Substances</b></p> <p>Can be broken down by microorganisms.</p> <p>Vegetable peels, paper, wood.</p> <p>Eco-friendly, return nutrients to soil.</p>	<p><b>Non-Biodegradable Substances</b></p> <p>Cannot be decomposed by natural processes.</p> <p>Plastic, glass, metals, polythene.</p> <p>Harmful, accumulate and pollute environment.</p>



	<p>4. <b>Blockage of Drains:</b> Polythene clogs drains leading to waterlogging and spread of diseases.</p> <p>5. <b>Ecosystem Imbalance:</b> Accumulation of such waste disturbs natural cycles and harms organisms.</p> <p><b>Conclusion:</b> We can manage waste by following the <b>3Rs – Reduce, Reuse, and Recycle</b>, using biodegradable materials, and avoiding plastics.</p>
30.	<p><b>Methods of Waste Management:</b></p> <ol style="list-style-type: none"> <li>1. <b>Segregation of Waste:</b> Separating biodegradable (kitchen waste) and non-biodegradable (plastics, glass) waste at source.</li> <li>2. <b>Composting:</b> Converting organic waste into manure.</li> <li>3. <b>Recycling:</b> Reprocessing materials like paper, glass, and metals.</li> <li>4. <b>Incineration:</b> Burning waste materials under controlled conditions.</li> <li>5. <b>Landfilling:</b> Disposal of solid waste in low-lying areas.</li> </ol> <p><b>The 3Rs Principle:</b></p> <ul style="list-style-type: none"> <li>• <b>Reduce:</b> Minimize use of disposable items (e.g., carry cloth bags instead of plastic).</li> <li>• <b>Reuse:</b> Use items multiple times (e.g., glass jars, containers).</li> <li>• <b>Recycle:</b> Process used materials into new products (e.g., recycling paper to make new sheets).</li> </ul> <p><b>Importance:</b></p> <ul style="list-style-type: none"> <li>• Reduces pollution and conserves resources.</li> <li>• Minimizes waste accumulation.</li> <li>• Saves energy and reduces greenhouse gas emissions.</li> </ul> <p>Thus, practicing the <b>3Rs</b> and adopting effective waste management helps in achieving a <b>clean, sustainable, and eco-friendly environment</b>.</p>
	<b>BOARD BASED QUESTIONS.</b>
31.	D / (ii) and (iv)
32.	(D) 99%
33.	B / Both Assertion (A) and Reason (R) are true, but Reason (R) is <b>not</b> the correct explanation of Assertion (A).
34.	Making Kulhad made of clay on a large scale resulted in the loss of fertile top soil. Now, <b>disposable paper cups are used because the paper can be recycled, it is biodegradable and is an eco-friendly material which does not cause harm to the environment.</b>
35.	<p>Biomagnification <b>makes humans more prone to cancer, kidney problems, liver failure, birth defects, respiratory disorders, and heart diseases.</b></p> <p>Ordinary washing of edibles (fruits and vegetables) does not reduce the effect of biological magnification because <b>there is a concentration of harmful chemicals (say pesticides) in them. These were sprayed over the plants to protect them from pests and insects.</b></p>

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