THE VILLAGE
INTERNATIONAL SCHOOL
"We Nurture Dreams"

BIOLOGY QUESTION BANK - 2

CLASS: X Chapter 15: Our Environment

1. Differentiate between biodegradable and non-biodegradable substances with the help of one example for each. List two changes in habit that people must adopt to dispose non-biodegradable waste, for saving the environment.

Biodegradable substances	Non-biodegradable substances
These substances can be broken-down into non-poisonous substances in nature by the action of microorganisms. Example: Vegetable peels.	These substances cannot be broken down into non-poisonous substances by the action of microorganisms. Example: Polythene bags.

Following are the changes in habit, that people should adopt:

(i) Disposal of non-biodegradable waste separately from biodegradable waste.

(ii) To reuse non-biodegradable waste as much as possible. For example reuse of polythene bags.

2. State in brief two ways in which non-biodegradable substances would affect the environment. List two methods of safe disposal of the non-biodegradable waste.

Ans: (i) Non-biodegradable waste may accumulate in the environment and concentrate in the food chain, thereby can harm organisms.

(ii) Non-biodegradable substances may pollute the soil and increase soil temperature.

Two methods of safe disposal of non-biodegradable waste are:

(i) Recycling: The wastes are treated and some value materials are extracted for reuse.

(ii) Incineration: Medical and toxic wastes are burnt at high temperature in incinerators. Incinerators transform the waste into ashes.

3. Give reason to justify the following:

(a) The existence of decomposers is essential in a biosphere.

(b) Flow of energy in a food chain is unidirectional.

Ans: (a) Role of decomposers in the environment:

(i) They return the nutrients to the nutrient pool.

(ii) They help in completing the different bio-geochemical cycles, thus they maintain balance in the ecosystem.

(b) The energy flow through different steps in the food chain is unidirectional. This means that energy captured by autotrophs does not revert back to the solar input and it passes to the herbivores, i.e. it moves progressively through various trophic levels. Thus, energy flow from the sun through producers to consumers is in single direction only.

4. What is an ecosystem? List its two main components. We do not clean natural ponds or lakes but an aquarium needs to be cleaned regularly. Why is it so? Explain.

Ans: Ecosystem: It is the structural and functional unit of biosphere, comprising of all the interacting organisms in an area together with the non-living constituents of the environment. Thus, an ecosystem is a self-sustaining system where energy and matter are exchanged between living and non-living components.

Main components of ecosystem:

Biotic Component: It means the living organisms of the environment–plants, animals, human beings and microorganisms like bacteria and fungi, which are distinguished on the basis of their nutritional relationship.

Abiotic Component: It means the non-living part of the environment–air, water, soil and minerals. The climatic or physical factors such as sunlight, temperature, rainfall, humidity, pressure and wind are a part of the abiotic environment. An aquarium is an artificial and incomplete ecosystem compared to ponds or lakes which are natural, self-sustaining and complete ecosystems where there is a perfect recycling of materials. An aquarium therefore needs regular cleaning.

5. "Energy flow in food chains is always unidirectional." Justify this statement. Explain how the pesticides enter a food chain and subsequently get into our body.

Ans: The energy flow through different steps in the food chain is unidirectional. The energy captured by autotrophs does not revert back to the solar input and it passes to the herbivores, i.e. it moves progressively through various trophic levels. Thus energy flow from sun through producers to omnivores is in single direction only. Pesticides are sprayed to kill pests on food plants. The food plants are eaten by herbivores and along with the food, pesticides are also eaten by the herbivores. Herbivores are eaten by carnivores and along with the herbivore animal, pesticide also enters the body of the carnivore. Man eat both plants and animals and pesticide along with food enters the body of human. Concentration of pesticides increases as we move upward in the food chain and the process is called bio-magnification.

6. What is meant by food chain? "The number of trophic levels in a food chain is limited." Give reason to justify this statement.
   Ans: The series of organisms that take part at various biotic levels form a food chain. At each trophic level in a food chain, a large portion of the energy is utilised for the maintenance of organisms which occur at that trophic level and energy is lost as heat. As a result of this, organisms in each trophic level pass on less energy to the next trophic levels, than they receive. The longer the food chain, the less is the energy available to the final member of the food chain, which will be insufficient for their survival.
7. Explain the phenomenon of 'biological magnification'. How does it affect organisms belonging to different trophic levels particularly the tertiary consumers?

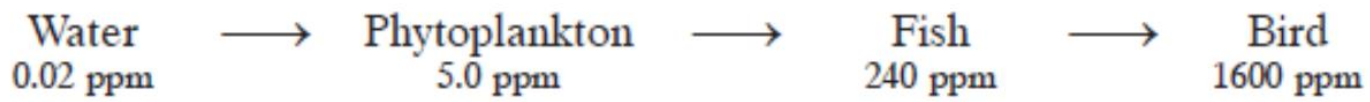
Ans: • The process in which harmful chemicals enter a food chain and get accumulated progressively at each trophic level is called biological magnification.

• Harmful and toxic chemicals enter our bodies when they are added to the soil and water. Pesticides are used to protect the food crops from diseases, and pests and chemical wastes of factories are dumped in open or disposed off into rivers.

• These chemicals are washed down into the soil and ultimately to the water table or get absorbed or taken up from the soil by the plants along with water and minerals and in this way harmful chemicals enter the food chain.

• The quantity of these chemicals increase with increase in trophic levels of the food chain because these substances are not degradable and man is at the top of the food chain, so concentration is maximum in human beings.

•Thus, accumulation of DDT has been maximum in man as DDT is used to destroy pests. DDT is accumulated in the following way in the given food chain –



This is the reason why our food grains such as wheat and rice, vegetable and fruits and even meat contain varying amounts of pesticides residues. So, the highest trophic level at the extreme right of food chain has the maximum concentration of harmful chemicals in a food chain.

8. "Damage to the ozone layer is a cause for concern." Justify this statement. Suggest any two steps to limit this damage.

Ans: Ozone layer prevents the harmful ultraviolet radiations, to enter the atmosphere and reach the earth's surface. Depletion of the ozone layer has become a cause of concern because it can cause serious affects on human body and other organisms of the environment like fatal diseases (e.g. skin cancer), changes in genetic material (DNA), eye damage, etc.

Two steps to limit this damage are as follows:

(i) Judicious use of aerosol spray propellants such as fluorocarbon and chlorofluorocarbons which cause depletion or hole in ozone layer.

(ii) Control over large scale nuclear explosions and limited use of supersonic planes.

9. A non-biodegradable toxic chemical has entered into the food chain. Which type of food habit will you suggest to a man, vegetarian or non-vegetarian? Explain with the help of a food chain. The food chain which you would suggest, is advantageous in an another aspect. How?

Ans: Vegetarian food chain will be suggested in case of entry of non-biodegradable toxic chemical into the food chain.

Non-biodegradable chemical gets concentrated at every trophic level by the process of biological magnification. As the concentration increases with the number of trophic level in a food chain, man will get high concentration of the chemical in a non-vegetarian food chain than in a vegetarian food chain, e.g. Vegetarian food chain:

Plants	⟶	Man
5 PPM of DDT		240 PPM of DDT

Non-vegetarian food chain:

Plants	⟶	Goat	⟶	Man
5 PPM of DDT		240 PPM of DDT		1600 PPM of DDT

Vegetarian food chain is advantageous in terms of energy available to man because it has less number of trophic levels. As 90% of energy is lost to the environment, at every trophic level, lesser number of trophic levels will result in lesser energy loss.

10. Write a note on the producers, consumers and decomposers of the biotic environment with examples of each.

Ans:Producers: Those organisms which produce food by photosynthesis, i.e. organisms which can make organic compounds like sugar and starch from inorganic substances using the radiant energy of the sun in the presence of chlorophyll. Producers, therefore are considered as a source of energy for those above it in a food chain. Examples: All green plants also called autotrophs and certain blue-green algae.

Consumers: Those organisms which depend upon the producers for food, either directly or indirectly by feeding on other consumers for their sustenance. Consumers, therefore, feed upon those below it in a food chain and are called heterotrophs. These can be classified into primary consumers or herbivores, secondary consumers or small carnivores, omnivores and parasites, e.g. cows, humans.

Examples of consumers:

- Herbivores are the animals that consume or eat vegetation or plants, e.g. cows, horses.
- Carnivores are the animals that eat flesh of other animals, e.g. tigers, wolves.
- Omnivores are the animals that eat both plants and animals, e.g. humans, cockroaches.
- Parasites are those organisms that live on (ectoparasites) or in (endoparasites), the body of another organism, i.e. host from which it obtains its nutrients, e.g. parasites of man includes fleas and lice (ectoparasites), various protozoans and tapeworms. (endoparasites)
- Decomposers: They are those microorganisms that obtain energy from the chemical breakdown of dead organisms or animal or plant wastes. These microorganisms are the decomposers as they breakdown the complex organic substances into simple inorganic substances that enter into the soil and are again used up by the plants

11. Enlist various categories of consumers giving examples of each.
    Ans. The various categories of consumers are:
    - Herbivores — Grass eating animals, e.g., deer, rabbit.
    - Carnivores — Flesh eating animals, e.g., tiger, lion.
    - Omnivores — Animals that eat both plants and other small animals i.e., flesh e.g., crow, human being.
    - Parasites — Those organisms which depend on other living organisms and harm them for food, e.g., lice, tapeworm.
    - Saprophytes — Organisms that depend on dead and decaying matter for their food, e.g., fungi, bacteria.
12. What three information are obtained from the energy flow diagrams?

Ans. The information we get are:
(i) The energy flow is unidirectional, it flows from sun → autotrophs → herbivores→ carnivores → decomposers
(ii) The flow of energy is 10% i.e., 90% of the energy is used by a given level of food chain for metabolic activities.
(iii) The unwanted chemicals like pesticides gets accumulated in the highest organism in the food chain.

13. Explain the interlink of biotic and abiotic factors in any ecosystem.
Ans. In ecosystem biotic and abiotic factors are interdependent and interlinked. For example: The grass in grassland will grow only if it gets soil which can hold water and gets sunlight with proper temperature hence the grass grows in a place which has all abiotic factors responsible for its growth but in desert these abiotic factors are not available for the growth of grass.
14. Explain the formation of ozone layer and its importance.
Ans. Ozone is formed when high energy ultra violet radiations split oxygen molecule into oxygen atoms. The oxygen atom combines with oxygen molecules to form a new molecule with three oxygen atoms named ozone.
O2 ——— UV rays→ O + O
O2 + O —→ O3 Ozone
Importance of Ozone: It is very protective when present in stratosphere it does not allow the harmful ultra violet radiations to enter the earth's surface which can cause skin cancer in human beings.
15. What is biological magnification? Explain giving one example.
Ans. The accumulation of chemicals in the top most organism of the trophic level or food chain is called biological magnification.
Example: Farmer sprays pesticides on the crops which enters the food chain, from crops these pesticides enter into the organisms that feed on it. grass —→ grasshopper —→ frog —→ snake —→ hawk
In this food chain the maximum amount of pesticide will be found in the top most organism i.e., in hawk the chemical keeps accumulating.
16. What are decomposers? How are they important for the ecosystem?
Ans. Decomposers are the organisms which act on dead organisms to decompose the body so as to release all the elements back to nature. They act as cleansing agents, hence they are important in the ecosystem.
17. What is the importance of ozone in the environment why is it depleting? What precautions are taken to preserve it?
Ans. Ozone is present in the stratosphere. It protects the earth from harmful ultraviolet radiations. UV ray causes various diseases to organisms e.g. skin cancer, cataract in human beings.
Ozone layer is depleting because of chlorides and fluorides. They act on ozone molecules and deplete it.
Chlorides, fluorides are present in CFC's which are used in refrigerants and fire extinguishers.
CFC —→ Chlorofluorocarbon
The precautions taken to preserve the ozone layer is to ban the use of CFC's.
18. What are food-chains and food webs? Why are smaller food chains better? What is 10% flow?
Ans. Food chain: The flow of food from sun to autotrophs, from autotrophs to herbivores and from herbivores to carnivores is called food chain. A food chain can have two levels or five to six levels also.
Food web: When an organism is eaten by two or more other kinds of organisms, instead of straight chain an interlinked chain is formed, is termed as food web.
Smaller the food chain the energy available for the next level of consumer in such a chain is more. As the loss of energy at each step takes place and very little energy is left after four trophic levels. The green plants in terrestrial ecosystem capture about 1% of the sun's energy and convert it into food energy. When green plants are eaten by primary consumers—a great deal of energy is lost for the life processes and only 10% of the energy is available for the next level of consumers.
19. "Damage to the ozone layer is a cause of concern". Justify this statement suggest any two steps to limit this damage.
Ans. Ozone is a molecule of oxygen with 3 atoms i.e., O3. It is formed due to sunlight at higher levels with higher wavelength.

$$O_2 \xrightarrow[\text{rays}]{\text{UV}} (O) + (O)$$

$$O_2 + (O) \longrightarrow O_3$$

Ozone is found in stratosphere shielding the earth by protecting it and by not allowing UV rays to reach the earth.

If these rays will reach the earth then many harmful diseases are caused like skin cancer, cataract, it also affects the growth of plants and vegetation.

Two steps to limit the damage of this layer are:

(i) Do not use aerosols, or any products which will release CFC (chlorofluorocarbon) in the atmosphere.

(ii) Ban on use of CFC as refrigerant and in fire extinguishers.

20. Distinguish between biodegradable and non-biodegradable substances. List two effects of each of them on our environment.

Biodegradable substance	Non-biodegradable substance
1. Substances can be decomposed by micro-organisms	1. Substances cannot be 2. decomposed by micro-organisms. It gets accumulated in environment.
2. Do not get accumulated in environment.	
3. Do not cause any pollution	3. It causes pollution.

Two effects on environment.

(*i*) Releases foul smell while decomposing in surrounding areas.	(*i*) It gets accumulated causing water and soil pollution and causes biological magnification.
(*ii*) It acts as a breeding ground for insects.	(*ii*) It disturbs the ecosystem by interfering in the food chain and killing many animals.

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