

Chapter : 13 Our Environment

Questions:

Q.1 What are trophic levels? Give an example of a food chain and state the different trophic levels in it.

Ans: Trophic levels are the steps in a food chain where transfer of food in the form of energy takes place between organisms. At each step in a food chain is an organism that forms the trophic level.

A food chain consisting of four trophic levels

Grass → Grasshopper/insect → Frog → Snake → Peacock

Trophic levels - (Producers) - (Primary consumer) - (Secondary consumer) - (Tertiary consumer)

In this food chain, the grass is a producer (First trophic level). Insect/grasshopper is a herbivore and eats grass. Thus, the insect is at the second trophic level. Insect, in turn, is eaten by frog (Carnivores I). Thus frog is at a third trophic level. The frog is eaten by a snake (Carnivores II). Thus snake is at the fourth trophic level. Snake, in turn, is eaten by peacock (Carnivores III). Thus, the peacock is at the fifth trophic level.

Q.2 What is the role of decomposers in the ecosystem?

Ans: Decomposers play a vital role in the ecosystem as they breakdown the organic components of dead and decaying matter into simple inorganic substances. The organic matter is recycled in the ecosystem thus acting as a cleansing agent for the environment. Also, these inorganic elements return back the mineral elements into the soil to be re-used by plants for growth which helps in maintaining the fertility of the soil.

Nitrifying bacteria break down ammonia in soil to nitrates which act as fertilizer to the soil. The ammonia in soil comes from decomposition of dead plants and animals.

Questions:

Q.1 Why are some substances biodegradable and some non-biodegradable?

Ans:

Substances are classified as biodegradable and non-biodegradable because a few of them can be decomposed by microorganisms and some cannot. Substances that are broken down by microorganisms like bacteria or fungi into simple organic substances are called biodegradable and the substances that cannot be decomposed by microorganisms are known as non-biodegradable.

Q.2 Give any two ways in which biodegradable substances would affect the environment.

Ans:

Two ways in which biodegradable substances would affect the environment are

- The decomposition of biodegradable substance produces foul smell, which can lead to discomfort for people residing nearby.
- The place where all the biodegradable waste is collected can act as a breeding place for various flies, which can carry germs and cause diseases.
- They Increase soil fertility as they convert into simpler substances

Q.3 Give any two ways in which non-biodegradable substances would affect the environment.

Ans: Two ways in which non-biodegradable substances would affect the environment are:

They contaminate the soil and water bodies because Non-biodegradable substances do not get decomposed even in a very long time

Since these substances can not be decomposed, substances like plastic can be eaten by stray animals and cause illness and diseases in them.

Questions:

Q.1 What is ozone and how does it affect any ecosystem?

Ans: Ozone is an isotope of oxygen gas formed by the reaction of ultraviolet radiations with oxygen. It differs from oxygen in having three molecules (O_3) instead of two. Ozone is formed when Ultraviolet radiations act on oxygen molecules. Oxygen molecules O_2 are converted to ozone O_3 when Ultraviolet radiations act upon them.

Ozone layer protects ecosystems by blocking the harmful ultraviolet radiations coming from the sun, reaching the earth and thus protecting from ailments like skin cancer, cataract and immunosuppression which occur when ultraviolet radiations reach humans. Use of chlorofluorocarbon is depleting the ozone layer and making it thinner which is allowing ultraviolet radiations to penetrate the earth and cause cancer, cataract and immunosuppression in humans and is also damaging plant life. It is important to stop the emission of CFC's which are

contributing to depletion of ozone layer, in order to save all forms of life.

Q.2 How can you help in reducing the problem of waste disposal? Give any two methods.

Ans: It is very important to manage waste disposal. Methods used to reduce the problems of waste disposal are as follows-

- Practicing 3R's of waste management- Reduce, Re-use and Recycle. Reduce the use of plastics and polythene bags, and use jute bags more. Throwing biodegradable and non-biodegradable waste into separate dustbins make it easier to be recycled. Making Re-use of plastic containers to fill household items. Using paper bags and recycled paper.
- Composting- Preparing compost by putting the organic matter/ biodegradable waste into compost pits dug in the ground. The compost decomposes the material into fertilizers which help in increasing the fertility of soil.

Exercise

Questions:

Q.1 Which of the following groups contain only biodegradable items?

- (a) Grass, flowers and leather
- (b) Grass, wood and plastic
- (c) Fruit peels, cake and lime juice
- (d) Cake, wood and grass

Ans.: (a) (c) and (d) groups contain only biodegradable items. Plastic in option (b) is non-biodegradable so option (b) does not contain biodegradable items. The groups (a) (c) (d) have grass, flowers, leather, fruit peels, cake, lime juice, wood which are biodegradable.

Q.2 Which of the following constitute a food chain?

- A. Grass, wheat and mango
- B. Grass, goat and human

C. Grass, fish and goat

D. Goat, cow and elephant

Ans: (b) Grass, goat and human constitute a food chain. Grass is an autotroph i.e. it produces its own food. Grass is eaten by goat which is a herbivore. Human beings are omnivores (they eat both meat and plant foods) so they eat meat of goat. Hence this is a food chain.

Grass → Goat → Human

(Producer) (Herbivore) (Omnivore)

The other options are not proper food chains.

Q.3 Which of the following are environment- friendly practices?

A. Carrying cloth bags to put purchases in while shopping

B. Switching off unnecessary lights and fans

C. Walking to school instead of getting your mother to drop you on her scooter

D. All of the above

Ans.: All of the three activities a, b and c are environment friendly. Carrying cloth bags and not plastic bags is environment friendly because plastic is non-biodegradable and causes pollution after it has been discarded, whereas cloth is degradable and also it lasts longer than plastic.

Q.4 What will happen if we kill all the organisms in one trophic level?

Ans: If we kill all the organisms in one trophic level then the transfer of energy to the next trophic level will stop because of which the organisms at next trophic level will die gradually due to unavailability of food. Also it will cause over population of the organisms belonging to previous trophic level because their predators (consumers) will be killed. Thus, it will disturb the food chain completely. For example- In a food chain = grass → deer → lions.

If all of the deer population is removed, no energy and food will be transferred to lion population (lion is carnivorous i.e. it obtains energy by eating flesh of other animals), as a result the lion population will either gradually die due to starvation or move into city and attack humans. Also, due to death of all deer population, the grass vegetation will increase because there will be no deer to eat them. The entire food chain and hence

the ecosystem will be disturbed.

Q.5 Will the impact of removing all the organisms in a trophic level be different for different trophic levels?

Can the organisms of any trophic level be removed without causing any damage to the ecosystem?

Ans.: Yes the impact of removing all the organisms in a trophic level will be different for different trophic levels.

No, the organisms of any trophic level cannot be removed without causing any damage to the ecosystem.

This can be explained with the help of following example of a simple food chain-

Grass, Deer, Lion

- If all the deer population from this food chain is removed, the lions will die out of starvation and the grasses will increase in number and turn the land into forests This is because there will be no deer to feed on, the lions will die; and there will be no deer to eat the grasses, the grasses will keep on growing.
- If we remove all the lions from this food chain, the population of deer will increase in number and eat out all the grasses present, thus turning the land barren.

Q.6 What is biological magnification? Will the level of this magnification be different at different levels of the ecosystem?

Ans: The increase in the concentration of harmful chemical substances in the body of the living organism at each trophic level of a food chain is called as biological magnification

Chemicals, pesticides and heavy metals move up the food chain, get into aquatic bodies and are eaten by organisms like fishes which are in turn eaten by hawks/eagles. This process where the chemical enters the food chain and increase in concentration with increasing trophic level is known as biological magnification.

Yes, this magnification level will be different at different trophic levels in

the ecosystem. Taking an example of a food chain
Plant → Goat → Man.

Plant grows by consuming pesticides from soil and water. These pesticides pass from plants to goats when goats eat the plant. Man is an omnivore and when the man eats goat meat, the pesticides get transferred from goats to human. The level of pesticides is lowest in plants and maximum in man because an increase in accumulation of pesticide increases with increasing trophic level.

Thus the maximum concentration will be formed at the highest trophic level i.e Man.

Q.7 What are the problems caused by the non-biodegradable wastes that we generate?

Ans.: The non-biodegradable waste that we generate has the following problems on environment-

- Biological magnification- Non biodegradable wastes like pesticides enter into the food chain and accumulate with increase in trophic levels and thus harm the organisms.
- These pesticides and chemicals also reduce the soil fertility when they penetrate into it, the soil either becomes too acidic or too alkaline.
- Non-biodegradable materials like plastics/polythene bags when burned by Incineration also release toxic chemicals into the environment thus causing air pollution.

Q.8 If all the waste we generate is biodegradable; will this have no impact on the environment?

Ans: If all the waste we generate is biodegradable, it will have an environment friendly impact as pollution by non-biodegradable substances will reduce but it will definitely have an impact on the environment. This is because a lot of biodegradable waste cannot be decomposed all together by micro-organisms at once which will lead to

piling up of the wastes and thus giving out foul odor. The place will also become a breeding ground for mosquitoes thus leading to spread of diseases.

Q.9 Why is the damage to the ozone layer a cause for concern? What steps are being taken to limit this damage?

Ans: The ozone layer is very important for the existence of life on earth. It prevents the harmful ultraviolet radiations coming from the sun and prevents them from reaching the surface of earth which are extremely harmful for human beings, other animals as they causes:

1. When fall on the skin causes skin cancer.
2. When get in contact with eye causes eye disease called cataract.
3. They are responsible for altering DNA structure causing decrease in the immune system of the body. The main cause of Ozone layer depletion is mainly because of chlorofluorocarbon emitted by refrigerators and air-conditioners. In 1987, UNEP signed an agreement to stop the CFC

production at 1986 level, amongst its member countries. Montreal Protocol was signed in September 1987 which states to reduce the consumption and production of ozone depleting substances (CFC's) in order to reduce their quantity in the environment thus protecting the fragile ozone layer. Also, hydro fluorocarbons are being developed as a substitute of CFC's because HFC's do not damage the ozone layer.

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