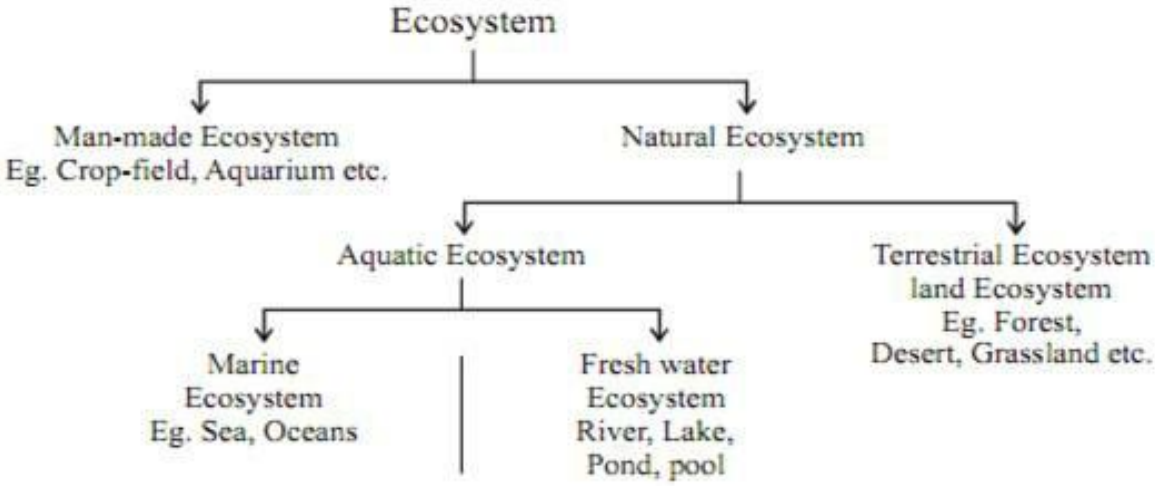
Chapter - 15

Our Environment(Points to understand the chapter)

- Environment means everything which surrounds us. It may include living (biotic) and non-living (abiotic) components.
- Biotic : Plants and animals. Abiotic : Air, water etc.
- Environment affect the life and development of an organism in its natural habitat & vice a versa.
- Substances that can be decomposed by the action of micro-organism like bacteria are called bio-degredable. E.g. organic wastes.
- Substances which cannot be decomposed by the action of microorganisms are called non-biodegradable.
- Example of biodegradable wastes : cattle dung, cotton, jute, paper, fruit and vegetable peels, leaves etc.
- Examples of non-biodegradable wastes : plastics, polythene bags, synthetic fibres, metals, radioactive wastes.

ECO SYSTEM & ITS COMPONENT

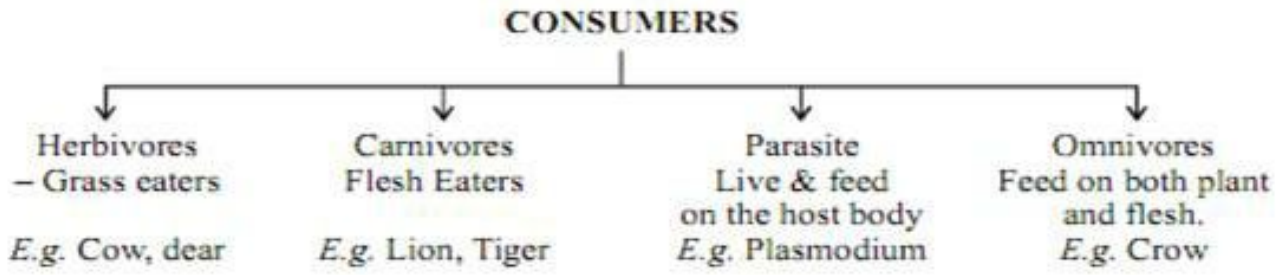
- All the interacting living organisms in an area together with non living components form an ecosystem. So an ecosystem consists of both biotic(living creatures) and abiotic components like temperature, rainfall, wind, soil etc.



- All living organisms are classified on the basis nutrition.

I. **Producers :** All green plants, blue green algae can produce their food (Sugar & starch) from inorganic substance using light energy (Photosynthesis).

II. **Consumers** : Include organisms which depend on the producers either directly or indirectly for their sustenance. Consumers depend on others for food.

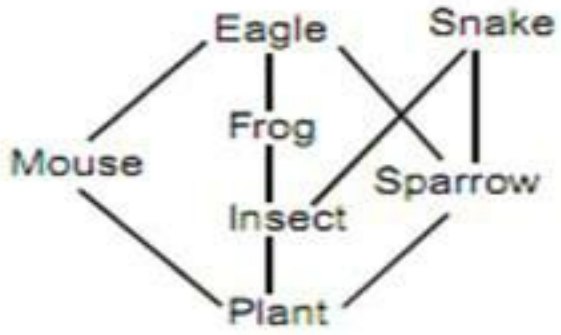


III. **Decomposeres** : Fungi & Bacterias which break down(decompose) the dead plant, animals complex compounds into the simpler one. Thus decomposeres help in the replenishment

$$for\ Eg. \quad \underset{Grass}{T_1} \quad \underset{\rightarrow Dear}{T_2} \quad \underset{\rightarrow Lion}{T_3}$$

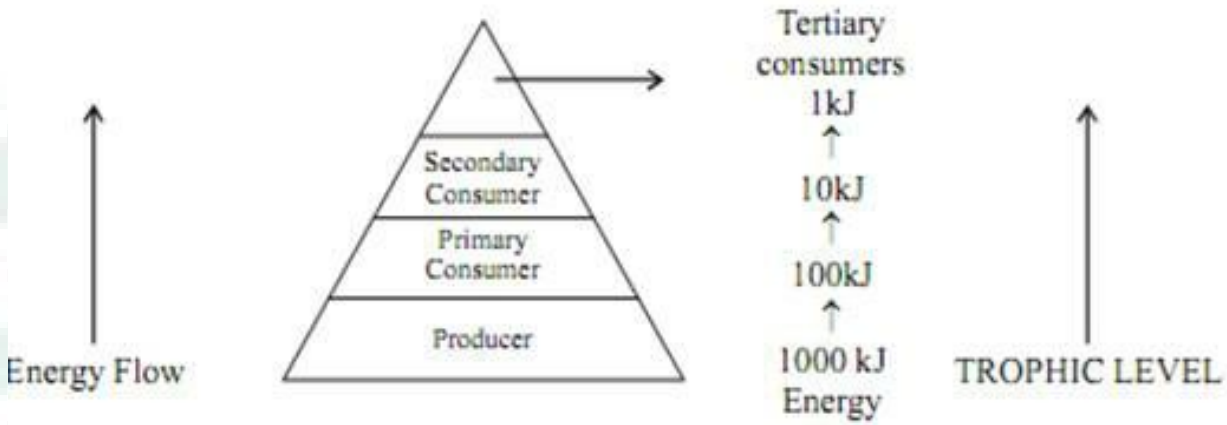
A 3- Step Food Chain

- **Food Chain** : It is the sequence of living organisms in which one organism consumes another organism for energy. It is unidirectional(single directional).



- In a food chain, various steps where transfer of energy takes place is called a trophic level.

- The green plants capture 1% of sun's energy.
- The flow of energy is unidirectional in a food chain.
- There is gradual decrease in the amount of energy from one trophic level to next trophic level in a food chain.



- **10 Percent Law :** The energy available at each successive trophic levelis 10% of the previous level.

So only 10% of Energy is transferred to next trophic level while 90%of energy is used by present trophic level in its life processes.

- The concentration of harmful chemical increases with every next trophic level in a food chain. It is called Bio-magnification
- Maximum concentration of such chemicals get accumulated in human bodies. Since humans occupy the top level in any food chain.

ENVIRONMENTAL PROBLEMS

- Changes in environment affect us and our activities change the environment around us. Environmental problems caused by humans:

(a) depletion of the Ozone Layer and waste disposal.
(b) pollution due to mismanagement of waste disposal.

I. Depletion of Ozone Layer

- Ozone (O3) layer is largely found in the stratosphere which is a part ofour atmosphere from 12 km – 50km above sea level.
- Ozone is a deadly poison at the ground level.

- Ozone is formed as a result of a following photochemical reaction.

$$O_2 \xrightarrow[(1800^0A \text{ to } 2000^0A)]{UV} O + O \ (\textit{Splitting of molecular oxygen})$$

$$O_2 + O \rightarrow O_{3(Ozone)}$$

- Ozone layer is a protective blanket around earth which absorbs most of the harmful U.V. (Ultraviolet) radiation of the Sun, thus protecting the living beings of the earth from health hazards like skin cancer, cataract in eyes, weaken immune system, destruction of plants etc.
- The decline of Ozone layer thickness in Antartica was first observed in 1985 and was termed as **OZONE HOLE.**

Reason of Ozone Depletion

Excessive use of CFCs (Chloro Flouro Carbon) a synthetic, inert chemical E.g. Freon which are used as refrigerants and in fire extinguishers, caused Ozone depletion in the upper atmosphere. A single chlorine atom can destroys 1,00,000 Ozone molecules. U.N.E.P. (United Nation Environment Programme)did an excellent job in forging an agreement to freeze CFC production at 1986 levels (KYOTO Protocol) by all countries.

Garbage Disposal

Industrialization and rise in demand of consumer goods have created a major problem in the form of wastes/garbage accumulation and its disposal specially in urban area.

The different methods of solid wastes disposal commonly used around

the world are.

1. **Open dumping** : A conventional method in which solid wastes dumped in selected areas of a town. It actually cause pollution

2. **Land fillings** : Wastes are dumped in low living area and are compacted by rolling with bulldozers

Composting : Organic wastes are filled into a compost pit (2m × 1m× 1m). It is then covered with a thin layer of soil. After about three months the same garbage filled inside the pit changes into organic manure.

4. **Recycling** : The solid wastes is broken down into its constituent simpler materials. These materials are then used to make new items. Even non-bio degradable solid wastes like plastic, metal can be recycled.

5 **Reuse** : A very simple conventional technique of using an item again& again. For e.g. paper can be reused for making envelops etc.

What you have learnt

- The various components of an ecosystem are interdependent.
- The producers make the energy from sunlight available to the rest of the ecosystem.
- There is a loss of energy as we go from one trophic level to the next, this limits the number of trophic levels in a food-chain.
- Human activities have an impact on the environment.
- The use of chemicals like CFCs has endangered the ozone layer. Since the ozone layer protects against the ultraviolet radiation from the Sun, this could damage the environment.
- The waste we generate may be biodegradable or non-biodegradable.
- The disposal of the waste we generate is causing serious environmental problems.

Textual question -answer to write

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

Ans. Substances which can be acted upon by micro-organism (decomposer) are called biodegradable. For example- vegetable wastes, paper, cotton etc.

On the other hand, materials which are not acted upon by decomposers are called non-biodegradable. For example- plastic, glass, polyethene etc.

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

Ans. (a) They will serve as breeding ground for flies and mosquitoes which are carriers of
disease like cholera, malaria etc.

(b) They produce foul smell, thus causing air pollution.

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

Ans. (a) Excess use of non-biodegradable pesticide and fertilizers run off with rain water to water bodies causes water pollution.

(b) They may choke the sever system of city or town that may overflow over roads.

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

Ans. Each step in a food chain constitutes a trophic level. For example,

Grass →	Dear →	Lion
Trophic level I	Trophic level II	Trophic level III

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

s. They decompose dead remains of plants and animals and their wastes organic products into simple inorganic substances which are released into the atmosphere for reuse by the plants. Thus, they help in recycling of materials.

Page No. 264

1. What is a ozone and how does it affects any ecosystem?

Ans. Ozone is a form of oxygen. It has the molecular formula O_3. It is present at a higher level in the atmosphere. It protects the ecosystem from the harmful effects of ultraviolet rays coming from the Sun. UV rays may cause skin cancer, cataract to us.

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

Ans. The following measures can be adopted for reducing the problem of waste disposal:

(i) Reduce the volume of wastes by burning in incinerator.

TEXTBOOK EXERCISES

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. Groups (a), (c) and (d).

2. Which of the following constitute a food chain?

(a) Grass, wheat and mango

(b) Grass, goat and human

(c) Goat, cow and elephant

(d) Grass, fish and goat.

Ans. (b) Grass, goat, human

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

(a) Carrying cloth-bag 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. (d) All of the above.

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, the number of individuals in the next trophic level will decrease due to non-availability of food. Also, the number of individuals in the previous trophic levels will increase because there is no one to feed on them. This will

cause imbalance in the environment.

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 of a trophic level will be different for different trophic levels. The effect will be time related. If we remove all the producers, primary consumers will be affected instantly. Secondary consumers will affect after a gap and tertiary consumers after a longer gap.

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

Ans. The phenomenon of progressive increase in concentration of certain harmful non-biodegradable chemicals such as DDT at different trophic levels of food chain is called biological magnifications.

The concentration of harmful chemicals will be different at different trophic levels. It will be lowest in the first trophic level and highest in the last trophic level of the food chain.

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

Ans. (a) Non-biodegradable pesticides and fertilizers run off to water bodies to cause water pollution.

(b) Some of the non-biodegradable pesticides like DDT enter the food chain and cause biomagnifications in humans and other animals.

8. If all the wastes we generate is biodegradable, will this have no impact on the environment?

Ans. It will have only short term impact on environment, the action of decomposers will slow down and some air/water pollution will be caused. However, in longer term, there will be no impact of biodegradable wastes on the environment.

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

Ans. Ozone layer prevents ultraviolet radiations from the Sun from reaching the earth. Ultraviolet rays cause cancer, cataract and damage to the immune system of human beings.

In 1987, United Nations Environment Programme (UNEP) succeeded I forging an agreement between nations to freeze chlorofluorocarbons (CFCs) production to 1986 levels. CFCs are the main cause of ozone layer depletion.