

NCERT Class 10th Science Notes

Chapter 15 - Our Environment

1. What happens to the environment when we add waste to it.

The environment of an organism refers to the physical and biological conditions in which the organism lives. The physical conditions consist of various factors like soil, temperature, light, etc. Whereas the biological conditions include the plants, animals, and microorganisms around it. A slight change in any of these conditions can affect the organism.

When the waste generated is added to the environment it disturbs the ecological balance. The wastes are broadly classified into two categories: -

Substances that can be broken down by biological processes are known as biodegradable. On the other hand, substances that cannot be broken down by biological processes are known as non-biodegradable. These substances can be inert and remain in the environment for a very long-time causing harm to the various members of the ecosystem.

2. What are the components of the ecosystem?

All organisms including plants, animals, microorganisms, and human beings interact with the physical surroundings as well as with each other to maintain balance in our environment.

An ecosystem is a community of organisms with their physical environment interacting with each other as an ecological unit, leading to the flow of energy. An ecosystem is made up of biotic components which include living organisms and abiotic components which include physical factors like temperature, rainfall, wind, soil, and minerals.

An ecosystem can be of two types:

Natural :- Ponds, forests, and lakes are natural ecosystems

Artificial:- garden and crop fields are man-made

In both of the above ecosystems, all living organisms interact with each other and their growth, reproduction, and some of the other activities are affected by the abiotic components of the ecosystem.

Organisms present in the ecosystem can be further categorized into producers, consumers, and decomposers in accordance with the manner in which they obtain their nutrition from the environment.

Producers are organisms that are capable of producing their own food without the help of any other organism. They are also called autotrophs. They synthesize their food from inorganic substances by a process called photosynthesis. Autotrophs are the green plants, phytoplankton, and blue-green algae.

Consumers are the organisms that do not produce food but depend directly or indirectly on producers for their food needs. These are called heterotrophs. Consumers can be further classified into herbivores, carnivores, omnivores, and parasites. For example Humans, snakes. Decomposers are the organisms that feed on dead and decaying matter and break down the complex organic substances into the simple inorganic substances. These simpler substances go into the soil and are used up again by the plants. Eg: Bacteria and fungi.

2.1 Food chains and Webs:

The series of organisms that are taking part at various biotic levels constitute a food chain. Food chains signify the feeding relationship between the organisms in an ecosystem. In the food chain, the flow of energy from one species to another occurs. Every food chain always begins with producers.

The successive levels present in the food chains of a community are known as trophic levels. From autotrophs, the energy is passed to the heterotrophs and decomposers. When this energy is transferred from one level to the other level, some of the energy is lost to the environment in forms that cannot be used again. A common example of food chains are: -

Plants → Deer → Lion

The food chain consists of up to three or four trophic levels. Since the loss of energy at every step is so huge that a very small amount of usable energy remains when it reaches the fourth trophic level. The number of individuals at the lower trophic levels of an ecosystem is generally more therefore the largest number is of the producers.

The length and complexity of food chains differ. Every organism is in general eaten by two or more other kinds of organisms which in turn are eaten by several other organisms belonging to a higher level. This relationship between organisms can be shown by a series of branching lines known as food web. Many cross-linked food chains constitute the food web.

The flow of energy between the trophic levels in any ecosystem is unidirectional. The energy that is captured by the autotrophs is passed to the higher trophic levels and energy does not revert back to the lower level. Some of the harmful chemicals enter our bodies through the food chain. For example, use of several pesticides and other chemicals to protect the crops from diseases and pest's runoff with water in the field which are taken up by the fishes entering in the food chain.

Biological magnification is a phenomenon by which harmful substances or chemicals accumulate from the lower trophic level to a higher one. As human beings are at the top level in any food chain, so the maximum concentration of these harmful chemicals gets accumulated in the body which can cause death of the person.

3. How does the environment affect our activities?

3.1 Ozone layer and its depletion.

Ozone molecule consists of three oxygen atoms. The ozone layer is present in the upper layer of the atmosphere i.e., stratosphere. It is a very deadly poison. It is responsible for causing skin cancer in human beings. Whereas, at the higher levels of the atmosphere, it protects us from harmful UV radiations of the sun which is dangerous to living organisms. Ozone depletion is the marked reduction of ozone molecules in the stratosphere due to chlorofluorocarbons (CFCs) used in refrigerants and other coolants. Oxygen in the presence of ultraviolet rays gets broken down to nascent oxygen molecules. This nascent oxygen further reacts with the oxygen present in the atmosphere and forms ozone molecule.

In order to limit the damage to the ozone layer the release of CFC s into the atmosphere needs to be reduced instead alternatives should be used.

3.2 Managing the garbage produced:

Improvements in the lifestyle have to lead to greater amounts of waste material generation. Changes in the packaging of items have resulted in huge amount of waste becoming non-biodegradable. Increased use of non-biodegradable items has left the environment polluted with them. In order to manage this waste, we can do following:

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1. Use of concept of 3R's (reduce, reuse and recycle).
2. Separation of biodegradable and non-biodegradable waste.