Chapter 15 - Our Environment

1. What happens when we add our waste to the environment?

The environment of an organism means the physical and biological conditions in which it lives. The physical conditions include soil, light, temperature, etc. And the biological conditions include the other plants, animals and microorganisms around it. A change in any of these conditions can affect the organism.

When the wastes are added to our environment it disrupts the ecological balance. Substances or wastes are of two types. Substances that are broken down by biological processes are said to be **biodegradable.** Substances that are not broken down by biological processes are said to be non-biodegradable. These substances may be inert and simply persist in the environment for a long time or may harm the various members of the eco-system.

2. Eco system- What are its components?

All organisms such as plants, animals, microorganisms and human beings as well as the physical surroundings interact with each other and maintain a balance in nature.

The ecosystem is a community of organisms and their physical environment interacting with each other as an ecological unit, involving the flow of energy. An ecosystem consists of biotic components including living organisms and abiotic components, the physical factors like temperature, rainfall, wind, soil and minerals.

An ecosystem can be natural or artificial. Ponds, forests and lakes are natural ecosystems while garden and crop fields are human made or artificial ecosystems. In both the ecosystems all living organisms interact with each other and their growth, reproduction and other activities are affected by the abiotic components of ecosystem.

Organisms in the ecosystem can be categorised into producers, consumers and decomposers according to the manner in which they obtain their substance from the environment.

Producers are the organisms that produce their own food without the help of any other organism. These are also known as autotrophs. They make their food from inorganic substances through a process called photosynthesis. Autotrophs are green plants, phytoplankton and blue green algae.

Consumers are the organisms which cannot produce food but depend directly or indirectly on producers for the same. These are also known as heterotrophs. Consumers can be classified into herbivores, carnivores, omnivores and parasites. Eg: Humans, Snake, Eagle

Decomposers are the organisms which feed on dead and decaying matter. They break down the complex organic substances into simple inorganic substances that go into the soil and are sued up once more by the plants. Eg: Bacteria and fungi

2.1 Food chains and Webs:

The series of organisms taking part at various biotic levels form a **food chain**. Food chains describe the feeding relationship between the organisms of an ecosystem. The flow of energy from one species to another at various biotic levels forms a food chain. A food chain always starts with producers.

The successive levels in the food chains of a community are called as **trophic levels**. From autotrophs the energy goes to the heterotrophs and decomposers. When one form of energy is change to another, some energy is lost to the environment in forms which cannot be used again. Some common food chains are mentioned below.

Plants ⟶ Deer ⟶ Lion

Plants ⟶ Grasshopper ⟶ Frog ⟶ Snake ⟶ Hawk

Algae ⟶ Small animal ⟶ Small fish ⟶ Big fish ⟶ Bird

Food chains generally consist of only three or four steps. The loss of energy at each step is so great that very little usable energy remains after four trophic levels. There are generally a greater number of individuals at the lower trophic levels of an ecosystem; the greatest number is of the producers.

The length and complexity of food chains vary greatly. Each organism is generally eaten by two or more other kinds of organisms which in turn are eaten by several other organisms. The relationship can be shown as a series of branching lines called a **food web**. Food web is a web of cross-linked food chains.

There is a flow of energy in the form of food within an ecosystem. The flow of energy is unidirectional. The energy that is captured by the autotrophs does not revert back to the solar input and the energy which passes to the herbivores does not come back to autotrophs.

Also, some harmful chemicals enter our bodies through the food chain. One of the reasons is the use of several pesticides and other chemicals to protect the crops from diseases and pests through which they enter the food chain.

Biological magnification is a phenomenon by which toxic substances accumulate from one trophic level to another. As human beings occupy the top level in any food chain, the maximum concentration of these toxic chemicals gets accumulated in our body which becomes toxic to us.

3 How do our activities affect the environment?

3.1 Ozone layer and how it is getting depleted.

Ozone (O3) is a molecule formed by three oxygen atoms. There is a layer of ozone in the stratosphere. It is a deadly poison. It is known to cause skin cancer in human beings. However, at the higher levels of the atmosphere, it acts as a natural sun-block and shields us from UV radiations of the sun which are dangerous to living organisms. Ozone depletion is the sharp reduction of ozone in the stratosphere due to chlorofluorocarbons (CFC's) used as refrigerants and in fire extinguishers.

$$O_2 \xrightarrow{\text{U.V}} O + O$$

$$O + O_2 \longrightarrow O_3 \text{ (ozone)}$$

To limit the damage to the ozone layer the release of CFC s into the atmosphere must be reduced. These CFCs should be replaced with environmentally safe alternatives.

3.2 Managing the garbage we produce:

Improvements in our lifestyle have resulted in greater amounts of waste material generation. Changes in packaging have resulted in much of our waste becoming non biodegradable. Increased use of non-biodegradable items have left the environment polluted with them.