Class X: Biology

Chapter 15: Our environment

Chapter Notes

Key learning:

1) Our environment is composed of various biotic and abiotic factors which interact with each other.

2) Human activities have a great impact on the functioning of the environment.

3) The wastes generated by the various human activities may be biodegradable or non- biodegradable.

4) The enzymes present in the body of decomposers are capable of breaking down the biodegradable substances, but not the non- biodegradable materials.

5) The non-biodegradable materials like plastic and synthetic pesticides persist in the environment for a long duration and may harm its biotic factors.

6) In an ecosystem, the abiotic and biotic factors interact to form a stable unit.

7) The size of an ecosystem ranges in size from as small as a pond or a backyard garden to as large as an entire rain forest.

8) An ecosystem may be natural (like lakes and forests) or artificial (like crop-fields and aquarium).

9) The biotic factors may be classified as producers, consumers and decomposers depending on their mode of nutrition.

10) The food manufactured by the producers from simple inorganic substances is utilized directly or indirectly by the consumers.

11) Herbivores, carnivores, omnivores and parasites are the various types of consumers.

12) The decomposers break down the dead bodies and wastes of organisms and help in nutrient recycling.

13) Food chains are present in every ecosystem. Each food chain is composed of three to five trophic levels.

14) There is flow of energy between the various trophic levels.

15) Producers convert solar energy into chemical energy, which is then utilized by the consumers and decomposers.

16) About 1% of solar energy falling on leaves is utilized by plants in photosynthesis to produce food.

17) A large amount of energy loss occurs when the organisms of the higher trophic level feeds on the lower trophic level organisms.

18) There is only 10% flow of energy from one trophic level to the next higher level. Due to this energy loss, only 4 or 5 trophic levels are present in each food chain.

19) The number of individuals in a trophic level decreases as we go up the food chain.

20) Food webs, consisting of several interconnected food chains, are more common in mature.

21) Flow of energy is unidirectional and cannot be utilized by the previous trophic levels.

22) The non-biodegradable chemicals like pesticides and insecticides enter the food chains in land and aquatic ecosystems and then accumulate progressively at each trophic level. This is known as biological magnification.

23) Human activities can cause several environmental problems like ozone layer depletion and waste disposal.

24) Ozone, composed of three oxygen atoms, is a toxic chemical. It is formed by the combination of free oxygen atom with molecular oxygen.

25) The atmospheric ozone layer prevents the entry of solar ultraviolet rays and thus protects all organisms on Earth.

26) Use of chemicals like chlorofluorocarbons has greatly depleted the atmospheric ozone layer, which could endanger the environment.

27) The disposal of large amounts of garbage produced in any human settlement, especially in cities and towns is causing major environmental problems.

28) Changes in our lifestyle and attitude have created many disposable items, many of which are non-biodegradable.

29) Effective methods of waste disposal should be found in order to reduce the harmful effects on our environment.

Top definitions

1) Biodegradable substances – Substances that are broken down by biological processes.

2) Non- biodegradable substances – Substances that are not broken down by biological processes.

3) Ecosystem – A unit formed by all the interacting organisms in an area together with their physical environment.

4) Biotic factors – The living components of the environment such as plants, animals, which interact with each other as well as with the abiotic factors of the ecosystem.

5) Abiotic factors - The nonliving components of the environment such as water, temperature, soil and light that influence the composition and growth of an ecosystem.

6) Producers- Organisms like plants and blue green algae that produce complex organic compounds from simple inorganic molecules using energy from sunlight in presence of chlorophyll.

7) Consumers - Organisms that feed directly or indirectly on producers and cannot synthesize their own food from inorganic sources.

8) Decomposers – Organisms that feed on the dead remains and waste products of organisms and carry out nutrient cycling by breaking down the complex organic materials into simple inorganic ones.

9) Herbivore - An animal that feeds chiefly on plants.

10) Carnivores – Organisms that mainly feed on the flesh or meat of animals.

11) Omnivore - An animal that feeds on both animal and vegetable substances.

12) Parasite - An organism that lives off or in another organism, obtaining nourishment and protection while offering no benefit in return

13) Food chain - A succession of organisms in an ecological community that constitutes a continuation of food energy from one organism to another as each consumes a lower member and in turn is preyed upon by a higher member

14) Trophic level – Each step or level of the food chain.

15) Food web - Complex network of many interconnected food chains and feeding relationships.

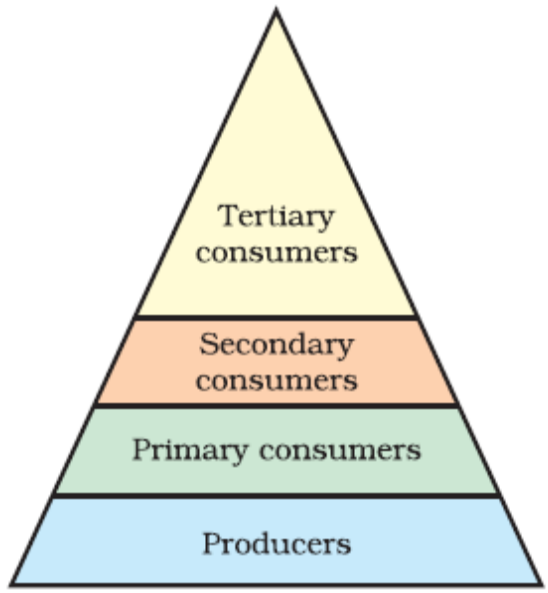
16) Biological magnification – A cumulative increase in the concentrations of a persistent substance in successively higher levels of the food chain.

Top diagrams

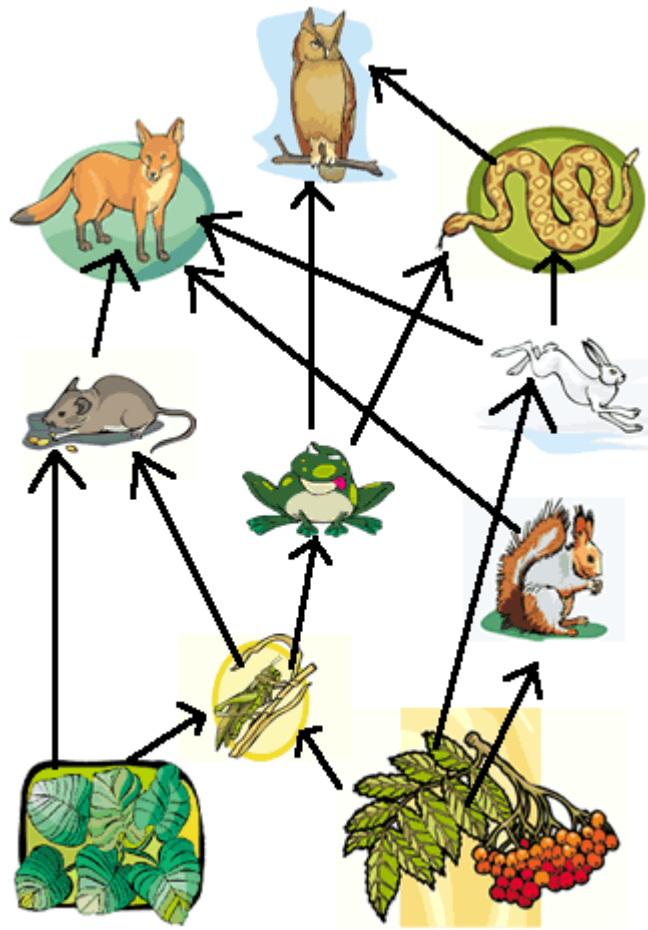
Food chain in forest

Food chain in grassland

Food chain in a pond



Trophic levels in a food chain

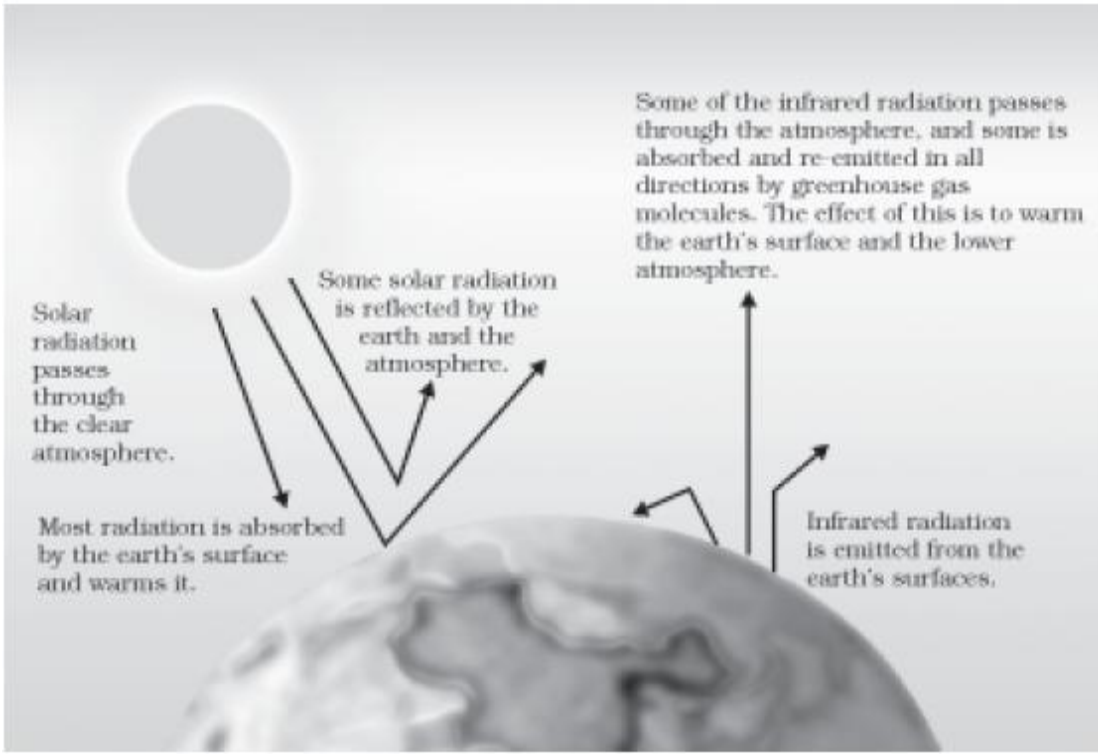


A food web

$$O_2 \xrightarrow{UV} O + O$$

$$O + O_2 \rightarrow \underset{\text{(Ozone)}}{O_3}$$

Ozone formation in atmosphere



Flow of energy in an ecosystem