

## OUR ENVIRONMENT

### Gist of the Lesson:

#### 1. Ecology:

The study of the interaction of living organisms with each other and their surrounding is called Ecology.

#### 2. Environment:

Everything that surrounds organisms and influences its life.

- a) Biotic components of environment - The living organisms e.g. Plants and animals.
- b) Abiotic components of environment -the nonliving components like soil, water, air, light, etc.

#### 3. Ecosystem:

All interacting organism in an area together with the nonliving constituents of environment. (Functional unit of an environment)

#### 4. Producers:

Producers are the green plants that synthesise food utilising sun light and make it available to other organisms.

#### 5. Consumers:

Animals cannot manufacture their own food. They are called Consumers.

#### 6. Biodegradable:

Substances that are broken down by the action of bacteria or saprophytes.

E. g. Paper.

#### 7. Nonbiodegradable:

Substances that are not broken down by the action of bacteria or saprophytes.

E.g. Plastic.

#### 8. Food Chain:

The process of one organism eating the other.

GRASS → GRASSHOPPER → FROG → SNAKE

#### 9. Food Web:

It is a network of food links between populations in a community.

## 10. 10% Law of Energy Flow:

The energy available at any trophic level in a food chain is 10% of the previous one.

## 11. Biological Magnification:

Progressive accumulation of non biodegradable waste at various trophic levels of food chain.

### One Mark Questions (One word or one sentence)

#### 1. Name any two non-biodegradable wastes?

A. Two non-biodegradable wastes are: (1) Plastic (2) Tin.

#### 2. What are biodegradable substances? Give two examples?

A. Substances that can be broken down by biological processes are called Biodegradable substances. E.g., wood, food, paper etc.

#### 3. Pick the biodegradable substances from the following:

**Cotton, rubber, leather. Radioactive material.**

A. Cotton, leather.

#### 4. Select from the following substances which have posed a threat to the environment: Aerosols, consumers, bacteria, CFCs?

A. Aerosols, CFCs.

#### 5. What is the physical environment of an ecosystem called? Give one example?

A. Physical environment of an ecosystem is called as the abiotic or non-living components of an ecosystem. This includes physical factors like temperature rainfall, wind, soil and minerals. (Any one)

#### 6. How does concentration of a pesticide change once it enters a food chain?

A. Concentration of pesticides gets accumulated progressively at each trophic level once it enters a food chain.

#### 7. Write one negative effect of affluent lifestyle of few persons on the environment?

A. Affluent lifestyle of few people causes environment degradation by increasing pollution due to the use of non-eco friendly products.

**8. Identify from the following abiotic component of a pond ecosystem.**

**Water, algae, fish, aquatic plant and bacteria?**

A. Water is an abiotic component in an ecosystem as it is non-living.

**9. State the ultimate source of energy in any self-sustaining ecosystem?**

A. The ultimate Source of energy in any self sustaining ecosystem is 'Sun'.

**10. In an ecosystem, rats feed on grains. Name the trophic level to which the rats belong?**

A. Rats come at second trophic levels.

**11. Which one of the following is always at the third trophic level in a food chain? Carnivores, herbivores, producers, decomposers?**

A. Carnivores.

**12. Consider the following two food chains:**

**Food chain-I: Grass → Mouse → Hawk**

**Food chain-II: Grass → Grasshopper → Frog → Snake → Hawk**

**In which of the above food chains, hawk will get maximum energy?**

A. Food chain-I.

**13. Choose one consumer each that belongs to the second and third trophic levels from the organisms given below Eagle, frog, tiger, rabbit, fox?**

A. Second trophic level : Frog.

Third trophic level : Rabbit.

**14. During heavy rain in a village the rain water carried excessive fertilizers to a pond. How will it affect the fish population in the pond in the long run?**

A. The growth of fish will decrease as water gets polluted due to excessive algae growth.

## Two Marks Questions (30 words)

1. Write any two differences between biodegradable and non-biodegradable substances by giving one example of each from our daily life?

A.

Biodegradable Substances	Non-Biodegradable Substances
(a) These are broken down into simple and harmless substances by the action of micro-organisms.	(a) There is no effect of micro-organisms on these substances and hence they cannot be broken down into simpler substances.
(b) They do not cause environmental pollution.	(b) They cause environmental pollution.
(c) Example: Paper, cotton clothes, peel of vegetables etc.	(c) Example: Plastics, glass, DDT etc.

2. Pesticides like DDT which are sprayed to kill pests on crops are found to be present in the soil, ground water, water bodies etc. Explain how they reach these places?

A. **Soil:** Pesticides are used to protect plants from insects. They, consequently, get settled into soil particles, when used on plants.

**Ground water:** Through irrigation in the fields, these pesticides present in soil passes into lower layers of soil and reaches ground water.

**Water Bodies:** When the waste water or other agricultural waste is thrown in water bodies like river, canals, ponds etc., the pesticides affect water bodies.

3. Aquariums need to be cleaned once in a while whereas ponds or lakes do not require any cleaning. Explain?

A. There is a need to clean aquarium because it is not a 'self-sustained' ecosystem. Waste in aquarium cannot be decomposed as micro-organisms in it are not active.

Ponds and lakes are nature, and self-sustained ecosystem in which micro-organisms help in decomposing the waste matters.

**4. Explain how do harmful chemicals enter our body. Write name given to such a phenomenon?**

A. Harmful chemicals enter into our bodies through food chain.

For example, pesticides are used in agricultural fields. These pesticides reaches the water bodies. When human beings consume agricultural products and water, these get accumulated in their bodies.

This phenomenon is called 'Biological magnification.

**5. State with reason any two possible consequences of elimination of decomposers from the Earth?**

A. Two possible consequences of elimination of decomposers from the earth would be:

(1) Increase in complex organic substances will cause land and water pollution as well as air pollution.

(2) It may disturb ecosystem as without decomposition, soil will not be replenished. Which is essential for 'plants', which forms the basis of an ecosystem.

**6. What is ozone? How does it affect any ecosystem?**

A. Ozone (O<sub>3</sub>) is a molecule formed by three atoms of oxygen.

Ozone layer protects earth from ultraviolet radiations, which are so harmful for every organism. If ozone layer will disappear, no organism can survive. Hence, it has a significant role in saving an ecosystem.

**7. Recycling is considered as a welcome practice to deal with the environmental problems. Justify this statement with two arguments?**

A. Recycling is considered as a welcome practice to deal with the environmental problems because

**Prevent Pollution:** It prevent land, water and soil pollution.

**Conserve Resources:** It also helps in conserving resources as resources are used again and again in different forms.

**8. Why is depletion of ozone layer a cause of concern to us? What two steps can be taken to limit the damage to the ozone layer?**

**A.** Depletion of ozone layer is a cause of concern because

(1) UV radiations will directly reach earth's surface and cause damage to the eco-system.

(2) Stronger UV rays can cause 'skin-cancer'.

(3) This can also cause 'cataract'.

Two steps that can be taken to limit the damage to the ozone layer are:

(1) Limiting the use of chlorofluorocarbons as it depletes the ozone layer.

(2) Avoid using fire extinguishers with halogenated hydrocarbons since it is very aggressive substance for the ozone layer.

**Three Marks Questions (50 words)**

**1. (a) Distinguish between biodegradable and non-biodegradable pollutants.**

**(b) Choose the biodegradable pollutant from the list given below: Sewage, DDT, radioactive waste, agricultural waste.**

**(c) What is biological magnification? Explain with the help of an example.**

**A. (a) Biodegradable Pollutants:** These are the pollutants which can be broken down by the action of bacteria or these are those substances that causes pollution to the environment but can be broken down into simpler substances by the action of micro-organisms.

E.g. vegetable peels, agricultural wastes, paper etc.

**Non-Biodegradable Pollutants:** These are those substances that cause pollution in the environment as they cannot be decomposed.

**E.g.,** plastic, tin, etc. These substances remain inert and persist in the environment for a long time or harm the ecosystem.

(b) 'Agricultural waste' is a biodegradable pollutant.

(c) Biological magnification is the phenomenon in which harmful chemicals get accumulated progressively at each trophic levels in a food chain.

For example, pesticides and other chemicals used to protect crops are either washed down into the soil or into the water bodies from where these are absorbed by the plants and by aquatic plants and animals and thus enter into the food chain. These chemicals are not degradable and so get accumulated progressively at each trophic level especially in human beings because they occupy the top level in any food chain.

**2. State in brief two ways in which non-biodegradable substances would affect the environment. List any two methods of safe disposal of the non-biodegradable waste?**

**A.** Two ways in which non-biodegradable substances would affect the environment are

**(1) Water Pollution:** As they cannot be decomposed by the action of microbes, they pollute water bodies. They block sewage and also affect marine or terrestrial ecosystem.

**(2) Land Pollution:** When non-biodegradable resources are disposed on land, they degrade the top and most fertile layer of the soil and causes land pollution.

Two methods of safe disposal of non-biodegradable wastes are:

- Use of dustbins: Dustbins should be used to throw such substances so that they does not cause environmental degradation.
- Recycling and reuse Instead of throwing away non-biodegradable resources like plastic, tin cans, etc., should be recycled or reused.

**3. (i) What is meant by garbage management?**

**(ii) Suggest four methods to manage the garbage.**

**A.** (i) The disposal of waste that we generate in such a manner that it does not affect our environment adversely is known as garbage management.

(ii) Biodegradable and non-biodegradable wastes should be collected separately.

- They should be disposed off at municipal disposal centres.
- Hazardous materials like electronic items should not be thrown in open ground.
- Non-biodegradable wastes should be either recycled or dumped inside the ground.

### Five Marks Questions (70 words)

#### 1. What is meant by food chain? "The number of trophic levels in a food chain is limited" Give reason to justify this statement?

A. **Food Chain:** A food chain is a linear sequence of links in a food web. A food chain may be defined as chain which shows how the organisms are related to each other by the food they eat.

For E.g., Plants → Deer → Tiger (in forest)

Plants → Grasshopper → Frog → Snake → Eagle (in grasslands)

Plants → Scorpio → Fish → Swan (in water bodies)

Each step or level in a food chain forms a trophic level. The number of trophic levels in a food chain is limited because of the decrease in 'energy' transfer from one trophic level to another.

Only 10% of the energy at one trophic level is passed or transferred at another trophic level.

This has been explained with the help of an example:

Plants → Deer → Tiger

1000 J    100 J    10 J

In this food chain 10% of the energy produced by plants is transferred to deer and its 10% is transferred to tiger. Consequently, tiger gets so less energy that any organism at fourth trophic level will be unable to survive as it would get just 0.1% of the energy taken by tiger.

#### 2. What role organisms play in?

(i) Water Cycle    (ii) Oxygen Cycle    (iii) Nitrogen Cycle.

A. (i) **Water Cycle:** Organisms take water from the environment and return it in the atmosphere as water vapor. Animals mainly evaporate water from their body surface. Transpiration in plants is the major source of water evaporation in the

atmosphere. The water vapor condenses into droplets and precipitates as rain and snow.

**(ii) Oxygen Cycle:** Organisms use molecular oxygen in respiration and release  $\text{CO}_2$ . These organisms also use oxygen in compound form,

**E.g.,**  $\text{H}_2\text{O}$ . Green plants release  $\text{O}_2$  in the atmosphere as by-product of photosynthesis. Thus organisms play major role in balancing oxygen and carbon dioxide cycles in nature.

**(iii) Nitrogen Cycle:** The molecular nitrogen present in the atmosphere cannot be utilised by living organisms until it converted into usable form, e.g., nitrates. Microorganisms do fixation and assimilation of free atmosphere nitrogen. In this way, molecular nitrogen enters into the living component of the biosphere. De-nitrification of nitrates by denitrifying bacteria (such as, monas) causes escape of free nitrogen in the atmosphere by decaying dead bodies of plants and animals.

### 3. What is meant by Biological Magnification?

A. Biological magnification is a phenomenon which explains the increasing concentration of harmful chemicals (like DDT) with each increase in trophic level. From the soil the chemicals (mainly pesticides, heavy metals, etc.) are absorbed by the plants. The primary consumers eat these plants and the harmful chemicals come to reside in their bodies. As these chemicals are not degradable, they accumulate in the bodies of the organisms and the top level of the food chain gets the highest concentration of these harmful chemicals.

Most of the plants products which we eat are grown in fields in which pesticides and fertilisers have been used. These are absorbed by the plants and cannot be removed by washing or other means. As humans are at the top level of the food chain these chemicals get accumulated in our bodies and cause various disorders.

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