

OBJECTIVES

1. Able to define Biosphere and Ecosystems. Understands the importance of the classification in Ecology
2. Compare the food chain, food web and trophic levels
3. Identifies the reasons for different types of pollution and remedies for control of pollution.

IMPORTANT POINTS

1. Environment consists of biotic and abiotic components
2. Biotic and abiotic components depend upon each other
3. The habitats provide food, shelter, environment for the organisms
4. All the abiotic and biotic components of the world, or all the ecosystems collectively called Biosphere
5. The community of the biosphere consists of different trophic levels like plants, animals and microorganisms
6. Through food chains, we can understand the trophic levels and food relations between living organisms
7. The energy of plants is transferred to different trophic levels by the processes of repeated eatings and being eaten
8. Loss of energy takes place, during the transfer of energy. In a food chain, the initial trophic levels receives more energy
9. In nature, the equilibrium of the different gases is maintained or protected by different cycles like carbon cycle and nitrogen cycle

DEFINITIONS

1. **Habitat** : A place or set of environmental conditions in which a particular organism lives
2. **Adaptations** : The adjustment made by an organism that lives in a specific habitat by acquiring certain important characteristics that helps it to adjust and live successfully .
3. **Biocoenosis** : All the living organisms in a community is constitute Biocoenosis.
4. **Ecosystem**: A functionally independent unit where living organisms interact among themselves as well as with their physical environment.
5. **Biosphere** : A thin layer on and around the earth which sustains life is called Biosphere.
6. **Food chain** : The relationship of eating and and being eaten up at different levels in an ecosystem represented in the form of a chain.
7. **Food web** : A network of species relationship formed by interconnected food chains.

THREE MARKS QUESTIONS

1. What are biotic and abiotic components ?

- Ans : 1. All the living organisms including man constitute the biotic components
e.g., Butterfly, man, cow
2. All the non living things, present around the living organisms together constitute the abiotic components.
e.g., Air, temperature, soil

2. What is meant by adaptation ? What are the advantages of adaptations to the organisms ?

- Ans : The adjustment made by an organism that lives in a specific habitat by acquiring certain important characteristics that helps it to adjust and live successfully is called an **adaptation**. Due to these adaptations, the organisms
- Strive hard to protect themselves from enemies.
 - Obtain favourable conditions for reproduction and company for reproduction.
 - They compete well for food.

3. Mention the adaptations of the hydrophytes.

Plants which live in water shows the following characters

- Ans : 1. Poorly developed roots. They easily absorb water and salts
2. Long and needle like leaves (*e.g., Hydrilla*) or flat and ribbon shaped (*e.g., Vallisnaria*). They withstand the force of water currents.
3. In *Nymphaea*, the leaves are large, have thick cuticle and float on the surface of water.

4. Write the characters of aquatic vertebrates.

- Ans : 1. As the body of fish is spindle shaped, it offers less resistance to water and helps in rapid movement.
2. Gills are useful in respiration.
3. In fishes fins are useful in swimming and also maintains equilibrium.
4. These animals have eye is with large pupil. It allows more light into the eye. So they can see clearly in water.
5. Some fishes have air bladder. It helps the fish to float in water.

5. Write the adaptations of xerophytic plants.

- Ans : 1. Roots are well developed and are useful to absorb the water from the soil.
2. Stem is green, fleshy and flattened stores water and helpful to discharge the duties of leaf.
3. Leaves are modified into spines. Stomata are few in number to reduce the loss of water through transpiration.

6. Describe flight adaptations in organisms.

- Ans : 1. Body in spindle shaped for rapid movement.
2. Fore limbs are modified into wings, which are helpful in flight.
3. There are strong flight muscles.
4. Body is covered by feathers. They keep the body warm and also help in flight.
5. Bones are pneumatic and hence the skeleton is light and also contains less number of bones.

7. What is Biosphere ?

- Ans : 1. The soil, water and air on the earth are essential for the existence of organisms.
All the water bodies on earth form the hydrosphere.
2. The rocks on the earth and in the oceans form the lithosphere.
 3. The air on earth forms the atmosphere.
 4. The Biosphere is formed by the thin strata of hydrosphere, lithosphere and atmosphere.

8. Define food chain, producers and consumers.

- Ans : 1. Transfer of food from the plants (producers) through a series of organisms with repeated eating and being eaten in an ecosystem is called **food chain**.
2. Green plants take raw materials from soil and sun and prepare food materials by the process known as photosynthesis. Hence green plants are called **producers**.
 3. All animals directly or indirectly utilize the food materials produced by the green plants. These are called **consumers**.

9. What is meant by food web ?

- Ans : 1. Biological community consists of many food chains. Organisms of same species of different food chains have interrelationships with each other.
2. Grass land consists of a number of food chains.
 3. Network of food chains which are interconnections which are inseparable is called food web.

10. Why the flow of energy in an ecosystem is unidirectional? Explain.

- Ans : 1. After receiving the energy from the plants, energy is transferred to the animals of the next trophic level in the form of food.
2. Some energy is wasted during this transfer. At every trophic level of food chain the energy received by an organism use it for its own metabolism and maintenance.
 3. While the energy flow is taking place from one trophic level to another trophic level, the required energy for trophic levels decreases. Energy flow to successive trophic levels takes place only in one direction. That means, the animals nearer to the plants obtain more energy.

11. What is the difference between Biosphere and Ecosystem ? Give examples.

- Ans : 1. The complex structure of a habitat with living organisms along with physical and chemical matter is called Ecosystem.
e.g., Pond, lake, forest
2. Biological communities of larger areas with definite tropical conditions is collectively called Biosphere.
e.g., Lakes, ponds, grass lands of forest community.

12. Define food chain and food web.

Ans : 1. **Food chain** : The relationship of eating and and being eaten up at different levels in an ecosystem represented in the form of a chain.

2. **Food web** : A network of species relationship formed by interconnected food chains form the food web.

13. Define the biotic and abiotic components with examples.

Ans : 1. All living organisms, including man constitute biotic components.
e.g., Butterfly, man

2. All the non living components surrounding the organisms are called abiotic components.
e.g., Air, temperature

14. Compare the adaptations of mesophytic plants with that of xerophytic plants.

Ans :

Mesophytes	Xerophytes
1. Roots are well developed and absorb more water from the soil	1. Roots are well developed and are useful to absorb water from the soil
2. Stem is strongly developed and has branches	2. Stem is fleshy and flattened and store water
3. Leaves are large, more in number and have many stomata	3. Leaves are modified into spines. Stomata are few in number to the water loss

15. Compare the adaptations of xerophytes with that of hydrophytes.

Ans :

Xerophytes	Hydrophytes
1. Roots are extensively developed and are helpful for the absorption of water from soil.	1. These plants easily absorb water, and salts. So the roots are poorly developed.
2. Leaves are modified into spines.	2. Leaves are covered with thick cuticle. Leaves are linear, flat or ribbon shaped

16. Compare the adaptations of hydrophytes with that of mesophytes.

Ans :

Adaptations of Hydrophytes	Adaptations of Mesophytes
1. These plants absorb water and salts easily. So roots are poorly developed.	1. Roots are well developed and absorb the water mostly.
2. Leaves are covered by cuticle. Leaves are linear, thin, flattened or ribbon shaped	2. Leaves are large, more in number and consists of numerous stomata.

17. What are xerophytes ? Give two examples.

Ans : Some plants live in dry conditions and in areas where the temperature is high. Such plants are called xerophytes.
e.g., *Opuntia*, *Acacia*.

18. What are mesophytes ? Give two examples.

Ans : Some plants live on land. They require water, temperature to a limited extent. These plants are called mesophytes.
e.g., Neem, mango.

19. What are hydrophytes ? Give two examples.

Ans : Plants which live in water are called hydrophytes.
e.g., *Vallisneria*, *Nelumbium*

20. Define the following terms, giving two examples for each:

a. Biotic factors b. Abiotic factors

Ans : a. All the living organisms including man constitute the biotic components
e.g., Monkey, man, cow

b. All the non living things, present around the living organisms together constitute the abiotic components.
e.g., Air, temperature, water

21. Define Habitat and Adaptation.

Ans : 1. **Habitat** : A place or set of environmental conditions in which a particular organism lives

2. **Adaptation** : The adjustment made by an organism that lives in a specific habitat by acquiring certain important characteristics that helps it to adjust and live successfully .

22. Define Community and Ecosystem

Ans : 1. A group of organisms living together with mutual interaction in a natural area is known as **community**.

2. Ecosystem is a community of organisms and their abiotic environment interactive as a ecological unit.

23. Name any three human activities that destroy the natural habitats.

Ans : 1. Deforestation
2. Excessive use of pesticides and chemicals
3. Industrialisation and lack of control on industrial wastes.

24. Define population and community.

Ans : 1. A group of organisms belonging to the same species living in an area is called a **population**.

2. A group of organisms living together with natural interaction in a natural area is known as **community**.

25. What is meant by photosynthesis ?

Ans : The green pigment of the plant takes energy from sunlight, and with the help of water and CO₂, prepare food materials. This process is called photosynthesis.

26. Define producers and consumers.

Ans : 1. Green plants take raw materials from soil, energy from sun, prepare their food materials by the process of photosynthesis. These are called producers.

2. All animals directly or indirectly utilise the food materials produced by the green plants. All the animals are called consumers.

27. What is pyramid of numbers ?

- Ans : 1. The graphical representation of the number of organisms of different trophic levels of a food chain is called pyramid of numbers.
2. In pyramid of numbers, producers are at the base and consumers occupy the top position.

28. What is ammonification ?

- Ans : Proteins of the body broken and converted into urea and ammonia. These are eliminated by urine. In dead bodies also, the proteins are converted into ammonia occurs. This process is called Ammonification.

29. What is nitrification ?

- Ans : The bacteria of soil convert ammonia into nitrates. This process of conversion of ammonia into nitrates is called nitrification.

30. What is denitrification ?

- Ans : 1. The nitrates present in wet soil and pond soil are converted into nitrogen by denitrifying bacteria.
2. This nitrogen again enters into atmosphere. This is called denitrification.

31. Define Hydrosphere, Lithosphere and Atmosphere.

- Ans : 1. **Hydrosphere** : Water containing regions or areas on the earth is called Hydrosphere.
2. **Lithosphere** : The soil and rocks on the earth and on the bottom of the sea form the Lithosphere.
3. **Atmosphere**: It is the gaseous envelope surrounding the earth surface.

32. Define Biosphere and Ecosystem.

- Ans : 1. A thin layer on and around the earth with definite tropical conditions which sustains life is called Biosphere.
2. A biological community along with its physical, chemical complex structure is called Ecosystem.

33. What are the advantages of the adaptations in organisms ?

- Ans : 1. They compete well for food.
2. They fight well to protect themselves from the enemies.
3. Obtain favourable conditions for reproduction and company for reproduction.
4. Respond well accordingly to the atmospheric changes.

FIVE MARKS QUESTIONS

1. What are biotic and abiotic components? Give one example to say that biotic components depend on abiotic components ?

- Ans : 1. All the living organisms including man constitute biotic components.
2. All the non living components present around the living organisms constitute abiotic components.
3. These two components effect on one another. Desert areas are covered on all sides by sand. Due to less rain fall in deserts, water scarcity arises.

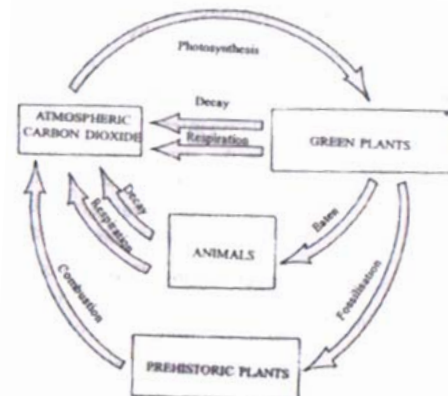
4. In desert areas, during day time, the temperature is very high, and during night time, cold conditions exist.
5. Due to these unfavourable abiotic components, few plants and some animals only live in deserts. e.g., Camel.

2. Using food chain, explain with examples, the energy flow in an ecosystem ?

Ans: 1. In food chain, the energy flows from produces to consumers in one direction only.

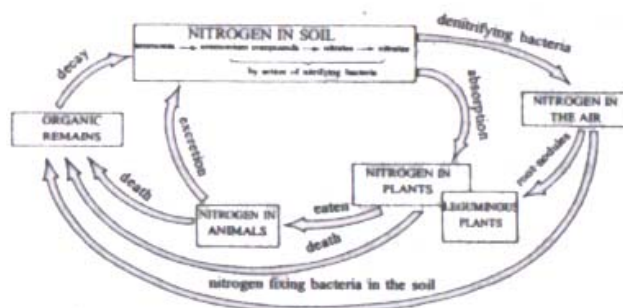
2. If we consider the food chain in a grass land, locust eats grass.
3. Birds eat the locust.
4. By eating or being eaten processes the energy flow takes place from one trophic level to another.
5. In this food chain, grass is the producer and the locust is a herbivore.
6. The bird which eats the locust is a carnivore.
7. The animals which eat both plants and animals are called omnivore.
8. Herbivores, carnivores and omnivores are consumers.

3. With the help of diagram, explain Carbon cycle.



1. Green plants prepare food materials by photosynthesis.
2. Atmospheric CO₂ taken up by plants enters into animals in the form of food.
3. After the death of plants and animals, their dead bodies become food for the decomposers.
4. By burning of fuels and through the respiration of plants and animals, the CO₂ reenters into atmosphere.

4. Sketch the nitrogen cycle.



5. Describe the human activities like deforestation, industrial effluents which destroy the natural habitats ?

Ans : **I. Deforestation :** The area required for the growth of wild plants and animals is becoming insufficient, several animals are becoming extinct.

1. Rainfall is decreases.
2. Due to soil erosion, the fertility of the soil decreases.
3. Ground water level decreases after level decreases.
4. Due to the deficiency of greenary, deserts are formed and CO₂ in atmosphere increases.

II. Waste materials emitted from the industries.

1. Sulphur compounds emitted from the electric industries cause respiratory problems in human beings.
2. Hydrocarbons emitted from the petroleum industries cause respiratory problems and the cancer..
3. Due to textile and carpet industries, cause lung diseases.

FILL IN THE BLANKS

1. Plants trap sun light and transfer the energy to the next trophic levels in the form of
2. In a food chain, the tertiary trophic level consists of
3. In a food chain, the energy flow takes place from to consumers only in one direction.
4. The habitat we live is called
5. Due to the presence of, fish float in water
6. In xerophytic plants, the leaves are modified into
7. In deserts, during day time
8. In deserts,during night time
9. In an area, having more plants, the air contains more
10. In an area having more plants, are few in air
11. In *Nymphaea*, the leaves contain thick
12. help the animals to respire in water
13. Whale swim with the help of
14. Some plants grow in the areas having high temperatures and xeric conditions. Such plants are called
15. Snakes are the examples for the
16. All terrestrial vertebrates respire with
17. Birds and insects useas a medium for transport

18. The body of birds isfor fast movement in air
19. In birds the fore limbs are modified into
20. Group of organisms of the same species living in a particular place and in particular time is called
21. There are different steps in a food chain and energy transfers from one step to the other. each of these steps in a food chain is called.....
22. If you compare the number of organisms living at each trophic level in a food chain, then you can represent the chain by a
23. The base of the pyramid occupied byand the top by
24. bacteria convert nitrates into nitrogen
25. Conversion of Ammonia into nitrates is called

MULTIPLE CHOICE QUESTIONS

1. Which one of the following is helpful for burning ? (A)

A. Oxygen	B. Nitrogen
C. Water vapour	D. O ₂
2. The mechanism of conversion of atmospheric nitrogen into nitrates (A)

A. Nitrification	B. Denitrification
C. Nitrogen nutrition	D. Nitrogen loss
3. The methods by which the CO₂ recycles back into air (A)

A. Burning and respiration	B. Photosynthesis and respiration
C. Decomposers	D. Photosynthesis
4. The climax stage in an ecosystem (A)

A. Population	B. Phosphates
C. Biosphere	D. Herbivores
5. In pyramid of numbers, the top position is occupied by (C)

A. Producers	B. Small carnivores
C. Larger carnivores	D. Herbivores
6. In which of the following habitats, the root system is extensively developed(C)

A. Water	B. Terrestrial
C. Desert	D. Amphibians
7. Special features in bones of birds (D)

A. Small and flexible joints	B. Circulation of materials through small pores
C. Possessing hard substances for strength	D. Less number of hollow bones to make the body light

Match the following :

- | | |
|--------------------------|--|
| 1. Aquatic organisms | A. Depends on other living organisms for food |
| 2. Terrestrial organisms | B. Complete a part of life cycle in water and the other part on land |
| 3. Aerial organisms | C. Organisms choose air as medium to move from one place to another |
| 4. Amphibians | D. Live on land |
| 5. Parasites | E. Live in water |

ANSWERS

Fill in the Blanks

- | | |
|-----------------------------|----------------------------|
| 1. Chemical energy | 2. Carnivores |
| 3. Producers | 4. Environment |
| 5. Air bladder | 6. Spines |
| 7. Temperature is very high | 8. Temperature is very low |
| 9. Moisture | 10. Dust particles |
| 11. Cuticle | 12. Gills or branchiae |
| 13. Flippers | 14. xerophytes |
| 15. Fossorial animals | 16. Lungs |
| 17. Air | 18. Spindle shaped |
| 19. Wings | 20. Population |
| 21. Trophic level | 22. Pyramid of numbers |
| 23. Producers; consumers | 24. Denitrifying |
| 25. Nitrification | |

Multiple choice questions

1. A 2. A 3. A 4. A 5. C 7. C 8. D

Match the following

1. E 2. D 3. C 4. B 5. A

