

NCERT Solutions for Class 12 Biology

Chapter 12 – Ecosystem

12.1

Fill in the blanks.

- (a) Plants are called as _____ because they fix carbon dioxide.
- (b) In an ecosystem dominated by trees, the pyramid (of numbers) is _____ type.
- (c) In aquatic ecosystems, the limiting factor for the productivity is _____.
- (d) Common detritivores in our ecosystem are _____.
- (e) The major reservoir of carbon on earth is _____.

Ans:

- (a) Plants are called autotrophs because they fix carbon dioxide.
- (b) In an ecosystem dominated by trees, the pyramid (of numbers) is of inverted type.
- (c) In aquatic ecosystems, the limiting factor for productivity is light.
- (d) Common detritivores in our ecosystem are earthworms.
- (e) A major reservoir of carbon on Earth is the oceans.

12.2

Which one of the following has the largest population in a food chain?

- (a) Producers
- (b) Primary consumers
- (c) Secondary consumers
- (d) Decomposers

Ans: (d) Decomposers

Decomposers consist of microorganisms such as bacteria and fungi. The largest population within a food chain is constituted by these organisms, which acquire nutrients through the decomposition of dead plants and animals.

12.3

The second trophic level in a lake is

- (a) Phytoplankton**
- (b) Zooplankton**
- (c) Benthos**
- (d) Fishes**

Ans: (b) Zooplanktons

Primary consumers occupy the second trophic level. These organisms consume primary producers. Zooplankton is included among them. They serve as primary consumers in aquatic food chains, feeding on phytoplankton and efficiently digesting plant matter for energy.

12.4

Secondary producers are

- (a) Herbivores**
- (b) Producers**
- (c) Carnivores**
- (d) None of the above**

Ans: (d) None of the above.

Plants are the sole producers and occupy the lowest trophic level. Consequently, they are referred to as primary producers. There are no additional producers in the food chain.

12.5

What is the percentage of photosynthetically active radiation (PAR) in the incident solar radiation?

- (a) 100%**
- (b) 50 %**
- (c) 1-5%**
- (d) 2-10%**

Ans: (b) 50%

Approximately fifty percent of all incident solar energy constitutes photosynthetically active radiation (PAR).

12.6

Distinguish between

(a) Grazing food chain and detritus food chain

(b) Production and decomposition

(c) Upright and inverted pyramid

(d) Food chain and Food web

(e) Litter and detritus

(f) Primary and secondary productivity

Ans: (a) While the Detritus Food Chain (DFC) starts with waste products, or dead decaying matter, and finishes with carnivores (tertiary or apex predators), the Grazing Food Chain (GFC) starts from the primary suppliers, or vegetation. In the GFC, the warmth of the sun provided the food supply chain with vitality, while in the DFC, biological remnants or trash provided the same sustenance.

(b) Fabrication is a method that occurs when organic compounds are created using inorganic materials (such as CO₂, H₂O, and materials) using mostly sunlight to generate power. Power is trapped by it. Degradation is the process by which complicated biological material breaks down into less complicated forms. The energy is released.

(c) Within a pyramid that has been flipped upside down (like an arboreal ecological systems), biomass, the total quantity of species, or the volume of energy tends to rise as one moves up the hierarchy of trophic relationship, whereas in an erect pyramid (like a grassland plus farmland environment), these values typically decrease as one moves up those levels of trophic relationships.

(d) A food system is an intricate structure of multiple food networks that are related to one another, while the food chain is a series of distinct organism categories that allow resources to move between a particular trophic level to a different one. Food networks make species more fiercely competitive & highly adaptable to the external environment.

(e) Decaying organic matter, such as leaves, animal corpses, and excrement, that has dropped to the soil's base is known as trash. Dead organic matter that is located under the surface of the ground and is consumed by detritivores or decomposed by decomposing organisms is known as detritus.

(f) The pace at which vegetation synthesizes biomass or stores carbon is known as primary efficiency. It is fairly high in comparison. The pace at which users (herbivores & carnivores) synthesize biomass can be described as second-generation productivity. It fluctuates a little and diminishes as the grade of the trophic level rises.

12.7

Describe the components of an ecosystem.

Ans: The following are the elements that make up the structure of an ecological system:

- Non-biological/inanimate constituents: These consist of biological materials, inorganic materials or mineral compounds (standing condition or standing grade), and other meteorological factors such as light, pH, temperature & so forth.
- The live or biotic elements are:

(a) Manufacturers or autotrophs that can transform solar radiation into chemical power or make food for themselves, such as photosynthetic bacteria & green vegetation.

(b) Heterotrophs, or users, who rely on other species for sustenance because they are incapable of producing their own nourishment. These come in three different varieties:

- Herbivores or primary users that rely on makers or edible plants for sustenance.
- Carnivores or supplementary consumers that feed on vegetarians.
- Those that thrive on second-tier customers are known as top consumers or meat eaters.

(c) Decomposing organisms, also known as microconsumers, such as bacteria, fungi, actinomycetes, etc., break down the deceased organic materials of both manufacturers and consumers as simpler compounds, hence sustaining mineral phases.

12.8

Define ecological pyramids and describe with examples, pyramids of number and biomass.

Ans: A diagrammatic representation of the quantity of living things, biomass, or fuel existing at various trophic ranks is called a pyramid of ecology.

1. **Pyramid of numerical values:** A pyramid represents the total number of people at every trophic stage. For instance, the grassland's numerical pyramid is erect. According to the main producers (plants) to the most important consumers (carnivores), the total number of species decreases within this process.
2. **Pyramid of total biomass:** Through producers beginning at the lowest and highest point of top-ranged carnivores during the apex, the hierarchical structure of biomass shows the

total quantity of biomass for each surface area within ascending levels of trophic relationships. The amount of biomass in a woodland and prairie ecological system is shown standing up, while the total biomass of an aquatic environment is shown turned upside down.

12.9

What is primary productivity? Give brief description of factors that affect primary productivity.

Ans: The quantity of energy locked or cellulose produced by the primary generators of green vegetation per surface area for each time frame throughout photosynthesis is known as an ecosystem's initial productivity. The types of plants that grow in a given location are among the variables influencing primary yields. Here are some notable factors like the frequency of sunshine, total warmth experienced, soil & water minerals found. Thus, the availability of water molecules & nutrients becomes the vital constraint in these kinds of demographics.

12.10

Define decomposition and describe the processes and products of decomposition.

Ans: Decomposition consists of an extensive procedure that happens when challenging biological remnants, such as deceased vegetation, animal remains & excretions, are broken down via decomposing organisms from inorganic materials like water, carbon dioxide, and micronutrients. The processes of disintegration, corrosion, degradation, moisture retention & mineralization carry vital importance during the decomposition phase. Detritus is broken into thousands of tiny fragments by detritivores, such as earthworms. We refer to the method as splintering.

- Leaching is a method by which water-soluble inorganic matters descend into the earth's boundary and accumulate, forming salts that are not accessible.
- Detritus is broken down into smaller inorganic compounds by bacterial & fungal digestive enzymes. This systematic approach is often called as catabolism.
- On the trash, all of the aforementioned degradation processes work concurrently. As the earth's structure breaks down, moisture retention & mineralization take place.
- A dark-colored, amorphous material known as humus forms as a result of moisture retention. It is very refractory to microbial activity & decomposes very slowly. It functions as something of a nutrition store due to its colloidal structure.
- Certain microorganisms proceed to break down the humus, and a phenomenon known as mineralization releases substances that are inorganic.

12.11

Give an account of energy flow in an ecosystem.

Ans: An ecosystem's transfer of energy remains independent. The rays of the sun are the greatest source of power. Green vegetation uses the vitality that it receives from the sun to create food for itself. When herbivores eat vegetation that is green, the power that they produce becomes available to them. Upper levels of trophic structure (carnivores) subsequently receive the nutrients. A significant quantity of physical power goes unused with each process. Just 10% of the total amount of power kept within a specific trophic level gets moved to the subsequent trophic stage in a food chain, per the 10% rule.