Course No 03 **Environment**, **Ecology**, and **Ecosystems**

1. **Environment:**

The environment refers to the surroundings or conditions in which living organisms (including humans) exist and inter**act**.

 **The environment includes (involves) biotic (living) components such as plants, animals, and microorganisms, as well as abiotic (non-living) components like air, water, soil, and climate.**

The environment can be categorised into:

* **1/ Physical (natural) environment** (natural elements like climate, geology) nature-made
* **2/ Biological environment** (living organisms)
* **3/ Cultural environment** **(human-made elements**)

**2. Ecology:concept definition**

Ecology (science) is the branch of **biology** that studies the relationships between organisms and their environment,

Ecology focuses (emphasises) on how organisms interact with one another and with their non-living surroundings.

 Ecology looks at various levels of interaction, from individual organisms to populations, communities.

**3. Ecosystem:= biotic+abiotic**

An **ecosystem** is a community (group) of living organisms **(biotic components**) **interacting** with each other and with their abiotic environment (like ( such as) water, air, and soil) in a specific area.

Ecosystems are dynamic and can range in size from a small pond to a large forest or desert.

**Relationships and Interactions:**

* **Environment and Ecology**:
* Ecology is the study of how living organisms interact with the environment.
* The environment provides (offers) the conditions and resources (**such as** food, shelter, water) necessary for organisms to live, and organisms, **in turn,** can modify or influence their environment (e.g., plants absorbing CO2 and releasing (emitting) oxygen).
* **Ecology and Ecosystems**:
* Ecosystems are the units studied in ecology.
* **Ecologists** look at how organisms within an ecosystem interact with each other (like predator-prey relationships) and how they interact with the abiotic factors (like sunlight, temperature, and soil nutrients).
* **Environment and Ecosystem**

**The environment (both biotic and abiotic factors) shapes(forms) the structure and function of ecosystems.**

Ecosystems contribute to the environment by maintaining balance through processes like **nutrient cycling**, **energy flow**, and **waste decomposition**= **breakdown**

**Example:**

In a **forest** ecosystem:

* Sunlight (energy) powers the **growth** of **plants** (producers).
* **Herbivores** (primary consumers) eat plants, gaining energy and nutrients.
* **Carnivores** (secondary consumers) eat **herbivores**, transferring energy through the **food chain**.
* **When organisms die, decomposers break them down, recycling nutrients back to the soil for plants to use again, while some energy is released as heat.**
* Noun **death** die **dead(adj)**

This **balance** between **energy flow** and **nutrient cycling** is essential for **sustaining** (enduring) life within ecosystems.

Without the cycling of nutrients, ecosystems would **run out** of essential elements, and without energy flow, organisms couldn’t survive.

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