

NEET • CBSE eBOOKS

CLASS 11 & 12th



Learning Inquiry
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CLASS 12th

Organisms and Populations

misostudy



01. Introduction

The term ecology was coined and described by **E. Haeckel**. The term ecology was first authentically used by **Reiter**.

Father of ecology – **Reiter**

Father of Indian Ecology – **Prof. Ram Deo Misra**

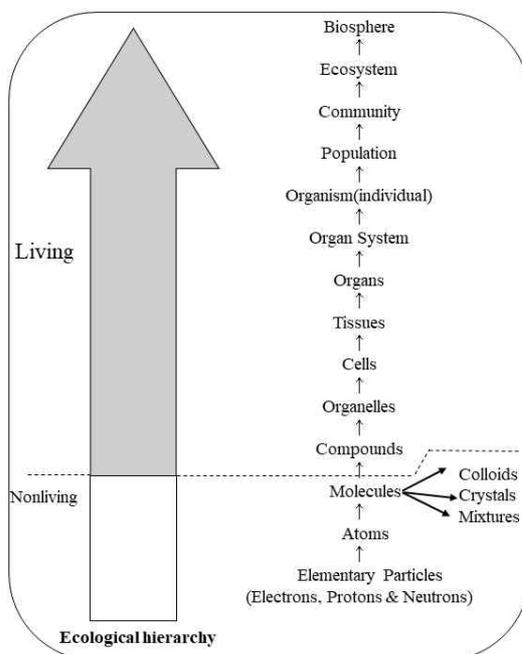
The study of interaction or inter-relationship of organism with their environment is called ecology.

Organism \rightleftharpoons Environment

Branches of Ecology – It is based on organism level

- (i) **Autecology or species ecology** – Study of the relation of a species with its environment is known as autecology
- (ii) **Synecology or Biocoenology or Community ecology** – Study of the relation of the group of different species with their environment. Ex. Community, ecosystem, biome ecology.

Ecological Hierarchy



Some Ecological Terminology

Organism : Basic unit of study of ecology.

Species: Similar organisms having the **Potential fertile** for interbreed and **Producing fertile offspring**.

Population : Group of individuals of a plant or animal species inhabiting a given area or **group of individuals of a species**.

Community : Assemblage of different populations in an area, interacting with each other.

Ecosystem : Biological communities integrated with its physical environment through the **flow of energy** and **recycling of nutrients**.

Land scape : A unit of land with natural boundary having a mosaic of patches, which represents different ecosystems.

Biome : Large regional unit or ecosystem characterized by major vegetation type (flora) and associated found in a specific climatic zone.

02. Environment, Habitat & Niche

Environment:

Environment is the sum total of all biotic (living) and abiotic (non-living) factors that surround and potentially influence an organism. Some components of the environments serve as **resources**, while other act as a **regulatory factor**.

Climate:

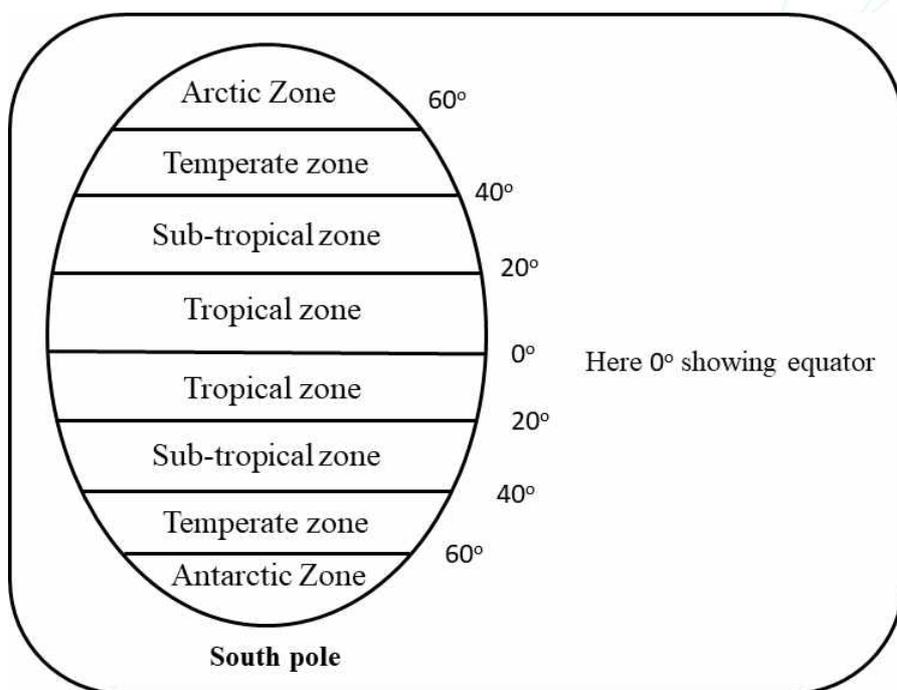
The short-term properties of the atmosphere (such as temperature, pressure, humidity, rainfall, sun- shine, cloud cover and wind), at a given place and time, is called as **weather**. **Climate** is the average **weather of an area**, Including general patterns of atmospheric conditions, seasonal variations and weather extremes averaged over a long period.

Climatic zones :

On the basis of variation in mean temperature along latitude, the mean climatic regions are-

- (i) Tropical (0° - 20° latitude)
- (ii) Subtropical (20° - 40° latitude)
- (iii) Temperate (40° - 60° latitude)
- (iv) Arctic and Antarctic (60° - 80° latitude)

The mean temperature declines as we move from tropical to arctic region. A similar climatic zonation occurs with increasing altitude in the mountains. A mountain located in a tropical region will successively have tropical, subtropical, temperate and alpine zones with increasing altitude.



NOTE 📖 The temperature and light values are maximum at the equator, decreases gradually towards the pole. Effect of altitude and latitude are almost same on temperature

Microclimate:

The microclimate represents the climatic conditions that prevail at a local scale, or in areas of limited size, such as the immediate surroundings of plants and animals.

Habitat and Niche:

The place where an organism lives is called its habitat. **Habitat** are characterized by conspicuous physical features, which may include the dominate forms of plant and animal life.

A habitat can contain many ecological niches and support a variety of species. The **ecological niche** of an organism represents the range of conditions that it can tolerate, the resource it utilizes, and its functional role in the ecological system. Each species has a distinct niche, and no tow species are believed to occupy exactly the same niche.

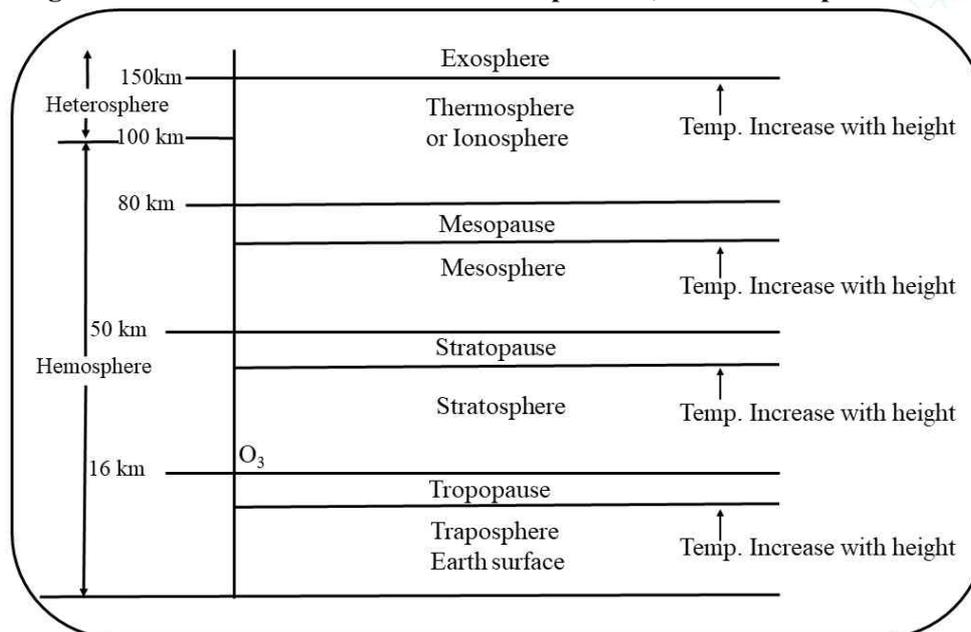
03. Environmental Factor/ Abiotic Components Atmosphere

Atmosphere may be defined as a transparent gaseous envelope surrounding the earth. The vertical profile of the atmosphere shows several concentric layers. These layers vary in **density, temperature,** composition and properties.

The thin layer from the surface of the earth upwards are:

- (i) Troposphere
- (ii) Stratosphere
- (iii) Mesosphere
- (iv) Thermosphere
- (v) Exosphere

Lapse rate : In troposphere, temperature decreases with increase in altitude. The **vertical temperature gradient** over earths surface is called **lapse rate**, it is **6.5°C per 1000m**.



Composition of air-

$N_2 \rightarrow 78.8\%$

$O_2 \rightarrow 20.92\%$

Argon $\rightarrow 0.93\%$

Trace components $\rightarrow 0.04\%$

$CO_2 \rightarrow 0.033\%$