

Factors in an ecosystem

Abiotic factors (environmental factors)

According to [biology dictionary](#), abiotic factors are non-living factors in the ecosystem. These factors do affect the living things in it, but they are not living themselves. In this context, we will focus mainly on light, temperature, atmospheric pressure, salinity, humidity, pH and wind

Temperature

This is the hotness or coldness of an area or habitat. It directly affects the distribution and productivity (yield) of populations and communities.

Most organisms are found in areas where temperature is moderate. However, certain plants and animals have adaptations that enable them to live in areas where temperatures are in the extremes such as the hot deserts and the cold Polar Regions. Temperatures not only influence distribution of organisms but also determine the activities of animals. High temperatures usually accelerates the rates of photosynthesis, transpiration, evaporation and the decomposition and recycling of organic matter in the ecosystem.

Light

Light is required by green plants for photosynthesis. Light intensity, duration and quality affect organisms in one way or another.

Atmospheric Pressure

This is the force per unit area of atmospheric air that is exerted on organisms at different altitudes. Growth of plants and activity of animals is affected by atmospheric pressure e.g., rate of transpiration in plants and breathing in animals.

Salinity

This is the salt content of soil or water. Animals and plants living in saline conditions have special adaptations.

Humidity

Humidity describes the amount of moisture (water vapour) in the air. It affects the rate of transpiration in plants and evaporation in animals.

pH

pH is the measure of acidity or alkalinity of soil solution or water, it is very important to organisms living in water and soil. Most organisms prefer a neutral pH.

Wind:

Wind is moving air currents and it influences the dispersion of certain plants by effecting the dispersal of spores, seeds and fruits.

Air currents also modify the temperature and humidity of the surroundings.

Topography:

These are surface features of a place. The topographical factors considered include altitudes, gradient (slope), depressions and hills, all these characteristics affect the distribution of organisms in an area e.g. the leeward and windward sides of a hill.

Biotic factors

These are living components of an ecosystem. These factors affect the ecosystem through enhancing

Inter-relationships between Organisms

The relationships between organisms in a given ecosystem is primarily a feeding one. Organisms in a particular habitat have different feeding levels referred to as trophic levels. There are two main trophic levels:

Producers:

These organisms that occupy the first trophic level, they manufacture their own food hence are autotrophic.

Consumers:

These are the organisms that feed on organic substances manufactured by green plants, they occupy different trophic levels as follows:

Primary consumers:

These are herbivores and feed on green plants.

Secondary consumers:

These are carnivores and feed on flesh. First order carnivores feed on herbivores while second order carnivores feed on other carnivores, i.e., tertiary consumers.

Omnivores:

These are animals that feed on both plant and animal material. They can be primary, secondary or tertiary consumers.

a) Competition between themselves for survival

this describes the situation where two or more organisms in the same habitat require or depend on the same resources. Organisms in an ecosystem compete for resources like food, space, light, water and mineral nutrients. Competition takes place when the environmental resource is not adequate for all.

Intraspecific competition.

This is competition between organisms of the same species, For example, maize plants in a field compete for water and nutrients among themselves.

Interspecific competition.

This refers to competition between organisms of different species, e.g., different species of predators can compete for water and prey among themselves.

b) Preying on others (predators)

Predation is a relationship whereby one animal (the predator) feeds on another (the prey).

c) Saprophytism

- Saprophytism is the mode of nutrition common in certain species of fungi and bacteria, such organisms feed on dead organic material and release nutrients through the process of decomposition or decay.
- Saprophytes produce enzymes, which digest the substrates externally.
- The simpler substances are then absorbed.
- Saprophytes help in reducing the accumulation of dead bodies of plants and animals.
- Harmful saprophytes cause rapid decay of foods such as fruits, vegetables, milk and meat.
- Others damage buildings by causing wood rot.
- Some fungi produce poisonous substances called aflatoxins.
- These substances are associated with cereal crops which are stored under warm, moist conditions.
- If the infected grain is eaten, it may cause serious illness, and death.

d) Parasitism

- This is an association between members of different species.
- The parasite lives on or in the body of another organism, the host.

- The parasite derives benefits such as food and shelter from the host but the host suffers harm as a result.

e) **Symbiosis** refers to a close, long-term interaction between two different species which is either mutualistic, commensalistic, or parasitic. [[Source: Wikipedia.org](https://www.wikipedia.org)]

- Organisms of different species derive mutual benefit from one another.
- Some symbiotic associations are loose and the two partners gain very little from each other.
- Other symbiotic associations are more intimate and the organisms show a high degree of interdependence.

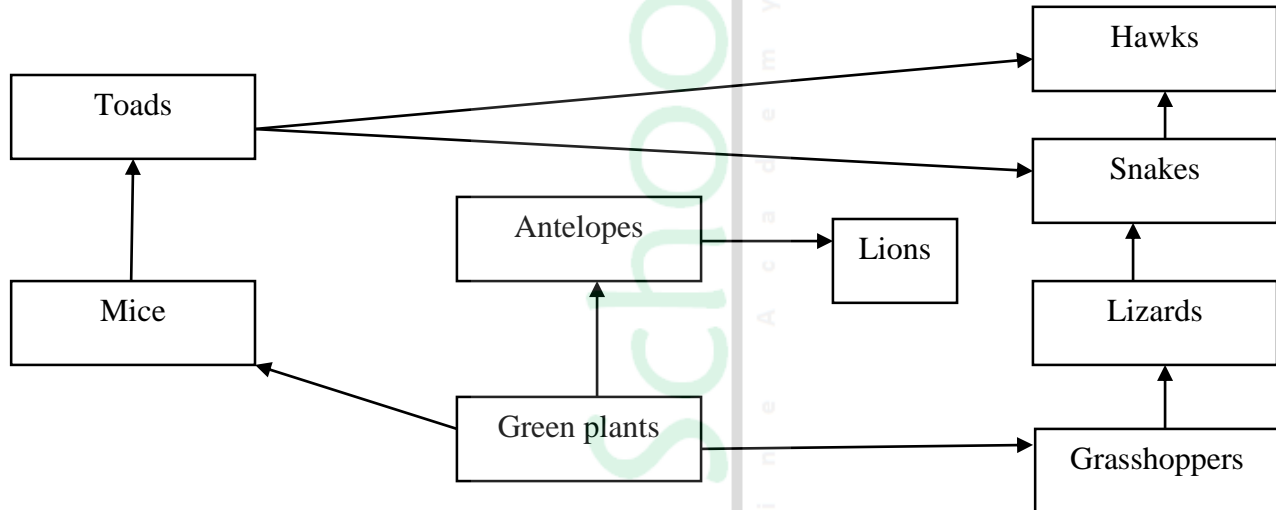
f) Human activities such as deforestation also affects the ecosystem

Nitrogen cycle

- Is the interdependence of organisms on one another and the physical environment as nitrogen is traced from and back into the atmosphere
- Although nitrogen is abundant in the atmosphere, most organisms are not able to utilize it directly.
- Some bacteria are capable of converting atmospheric nitrogen into forms which can be used by other living organisms.
- These bacteria are referred to as nitrogen fixing bacteria.
- Symbiotic nitrogen fixing bacteria live in the root nodules of leguminous plants such as beans and peas.
- Non-symbiotic nitrogen fixing bacteria live in the soil.
- Nitrifying' bacteria convert ammonia into nitrites and nitrates.
- Denitrifying bacteria convert nitrates into atmospheric nitrogen.

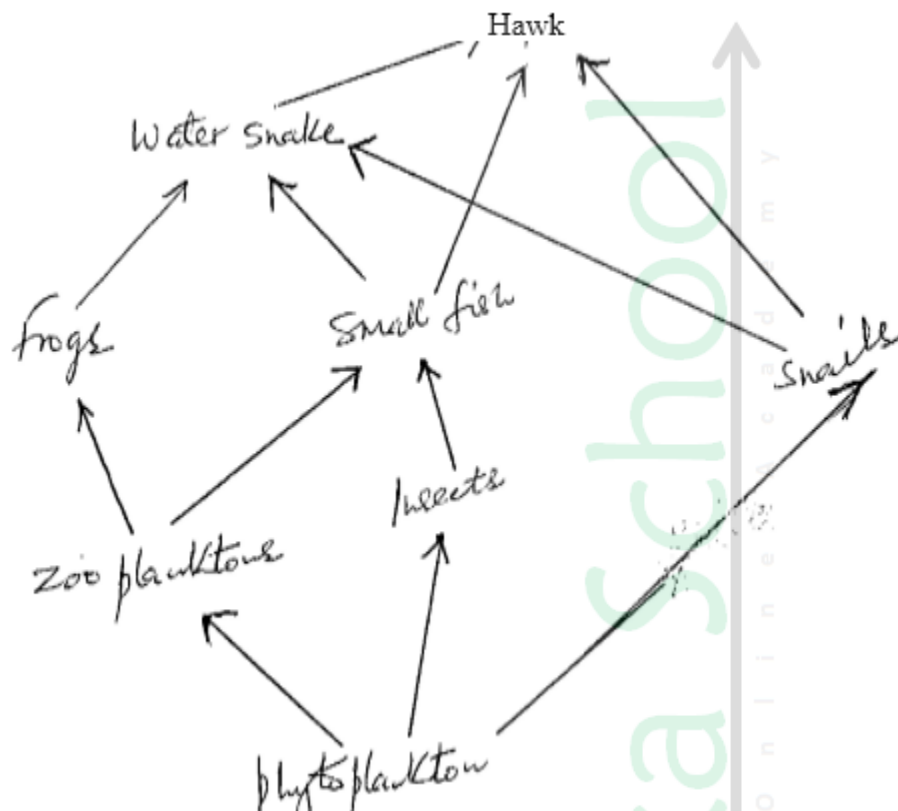
Questions on Topic

1. The flow chart below shows a food web in a terrestrial ecosystem.



- a. From the food web construct a food chain with the hawk as
 - i. a tertiary consumer
 - ii. a quaternary consumer
- b. Name the trophic level occupied by the toads
- c. What would happen if leopards were introduced into the ecosystem

2. The food web represents a feeding relationship in an ecosystem



- a. Name two organisms which are both secondary and tertiary consumers (2mks)
 - b. State the short term effect of immigration of insects in the ecosystem. (2mks)
 - c. Which organism has the least biomass in the food web? Give reasons (2mks)
 - d. Explain the disadvantages of using synthetic pesticides over biological control in agriculture (2mk)
3. State four abiotic factors in an ecosystem
4. The following organisms were found in a grassland ecosystem; caterpillars, aphids, praying mantis, spiders, grass, acacia trees, rabbits, wild dogs, hyenas, carnivorous beetles and gazelles.
- a. Name two organisms from the list that can be classified as:
 - i. producers (1mk)
 - ii. tertiary consumers (1mk)
 - b. Construct a food chain ending with a secondary consumers (1mk)