

Environmental Systems and Society

Topic 2.1: Species, Population, Communities and Ecosystems



2.1: Biotic and Abiotic.

The components of an ecosystem

Ecosystems are made up of the interactions between the living and non-living components within them.

It is impossible to think of an ecosystem without including these interactions

The living components of an ecosystem are known as the "**biotic factors**" - living biological factors that influence the other organisms or environment of an ecosystem.

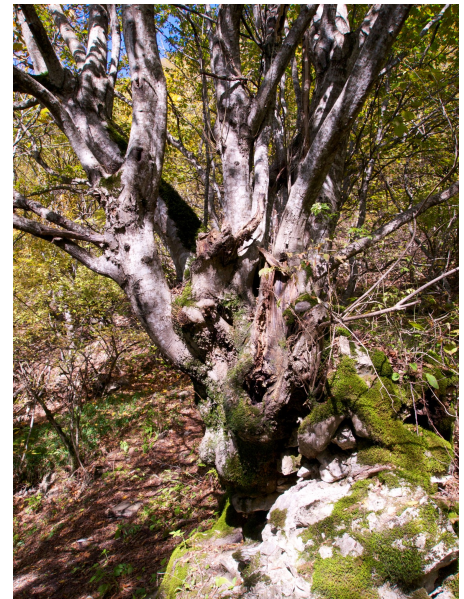
This is a lot more than just listing the plants, animals or micro-organisms found in an ecosystem. It includes the roles played by the organisms.

Biotic factors interact as : Producers, consumers, detritivores, decomposers, parasite, host, predator, competitor, herbivore, symbiont and pathogen.

A tree in a woodland is a producer providing the basic unit of energy for the rest of the ecosystem. But at the same time it competes for light with other trees and may be the host to parasitic plants such as mistletoe or decomposing fungi. During the annual cycle in the wood, the tree will at times take water and mineral nutrients from the soil and at others return nutrients from fallen wood and leaves.

The Physical and Chemical components of an ecosystem are called the "**abiotic factors**" and include:

- The atmosphere
- Climate and water
- Soil structure and chemistry
- Water chemistry
- Seasonality



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These factors operate at a broad scale but within ecosystems smaller component abiotic factors also work.

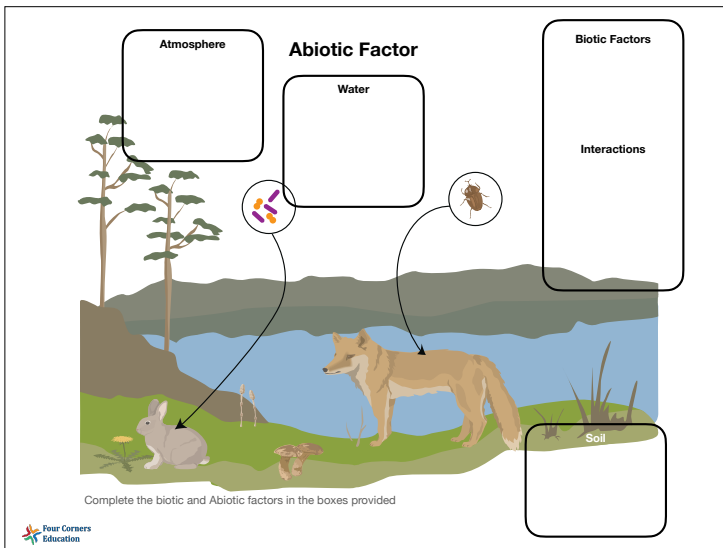


Figure 2: Complete the biotic and abiotic factors

The relative humidity within the bowl of an oak tree is higher than that of a woodland as a whole. This provides the physical and chemical conditions needed for a community of mosses, lichens and ferns to develop.

In a very simplistic form it is the availability of suitable abiotic environment that provides the conditions for a distinct biotic community to exist. Importantly thought, the biotic community can greatly influence and even change the abiotic one.

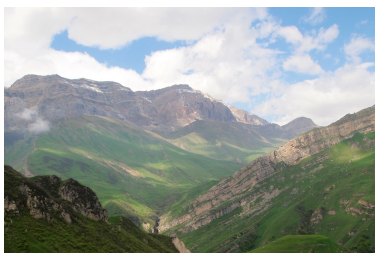
Many different abiotic factors an animal or plant species and also interact and change with time themselves.

e.g. Temperature is dependent upon:
solar radiation, wind speed, time of year, time of day, altitude and aspect.

Temperature affects water loss from organisms and respiration, and for plants the rate of photosynthesis. Changes in temperature affect relative humidity and evaporation from water bodies and soils.

It is the abiotic conditions in an environment which ultimately give rise to the biotic community present.

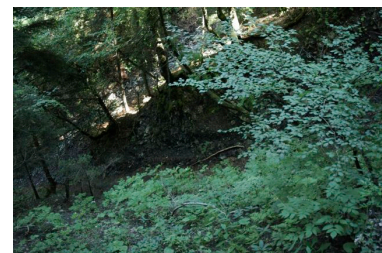
This is illustrated in figure 3 with examples of six different ecosystems, including an ecosystem found on a rock ledge, each of which is the result of the initial controlling abiotic factors which operate.



Alpine Grassland



Acidic Heath



Temperate Deciduous
Forest

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Salt pan ecosystem



Rock ledge ecosystem



Sand dune system

Figure 3: 6 ecosystems

1. Distinguish between the biotic and abiotic components of a named ecosystem.

Ecosystem _____

Biotic components	Abiotic components

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