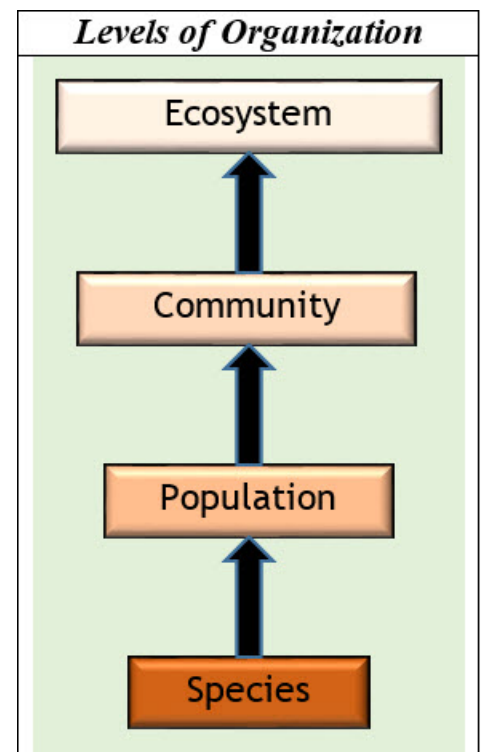


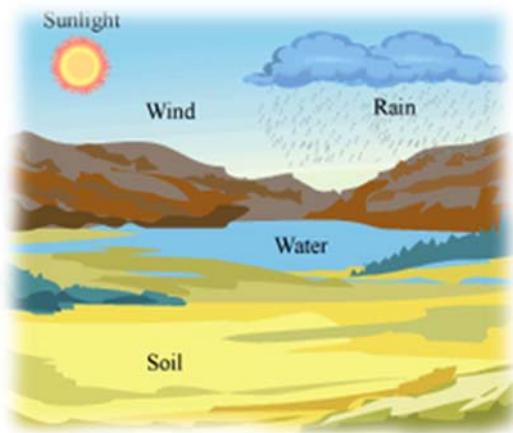
ECOSYSTEMS



At this point in the course, we will now begin to study the diversity and interdependence of life. Whenever you travel through a natural environment you see a variety of living things and nonliving things. At that particular moment in time you may not have the opportunity to see how many of these organisms interact. All organisms, including humans, that live together depend on each other in some way and are therefore said to be interdependent. We will examine how organisms interact with other organisms and with their environment. In this study of the diversity and interdependence of life, we will examine ecology to better understand Ecosystems. **Ecology** is the study of the interactions of living organisms with one another and with their environment. Each organism on Earth depends in some way on other living and nonliving things in its environment. Do not confuse ecology with environmental science. **Environmental science** is the study of the air, water, and land surrounding an organism or a community. An **Ecosystem** includes a community of organisms and their abiotic environment.

Community

A **species** is a group of organisms of a single type that are capable of producing fertile offspring. A species is a specific type of organism, such as a northern cardinal (*Cardinalis cardinalis*). To only say that a “bird” is a species is incorrect, because there are so many different types of birds. A **population** is all of the members of a species that live in one place at one time. The physical limits determining the size of a population vary. A population can be defined as the number of northern cardinals that live in a tree in your backyard, in your city or town, or in your state. A **community** is a term used to describe the different types of species that all live in the same habitat and interact with one another. A **habitat** is the place where an organism usually lives.



Within a community there are biotic and abiotic factors. A **biotic factor** is any living factor or any factor resulting from the activities of a living thing within an ecosystem. Biotic factors are any type of animal, plant, fungus, protist, and/or bacteria which live within that location. A biotic factor may also include any once-living organism, such as dead organisms and the waste of organisms. An **abiotic factor** is any physical nonliving factor within the environment. Examples of abiotic factors include rocks, water, sunlight, temperature, and climate.

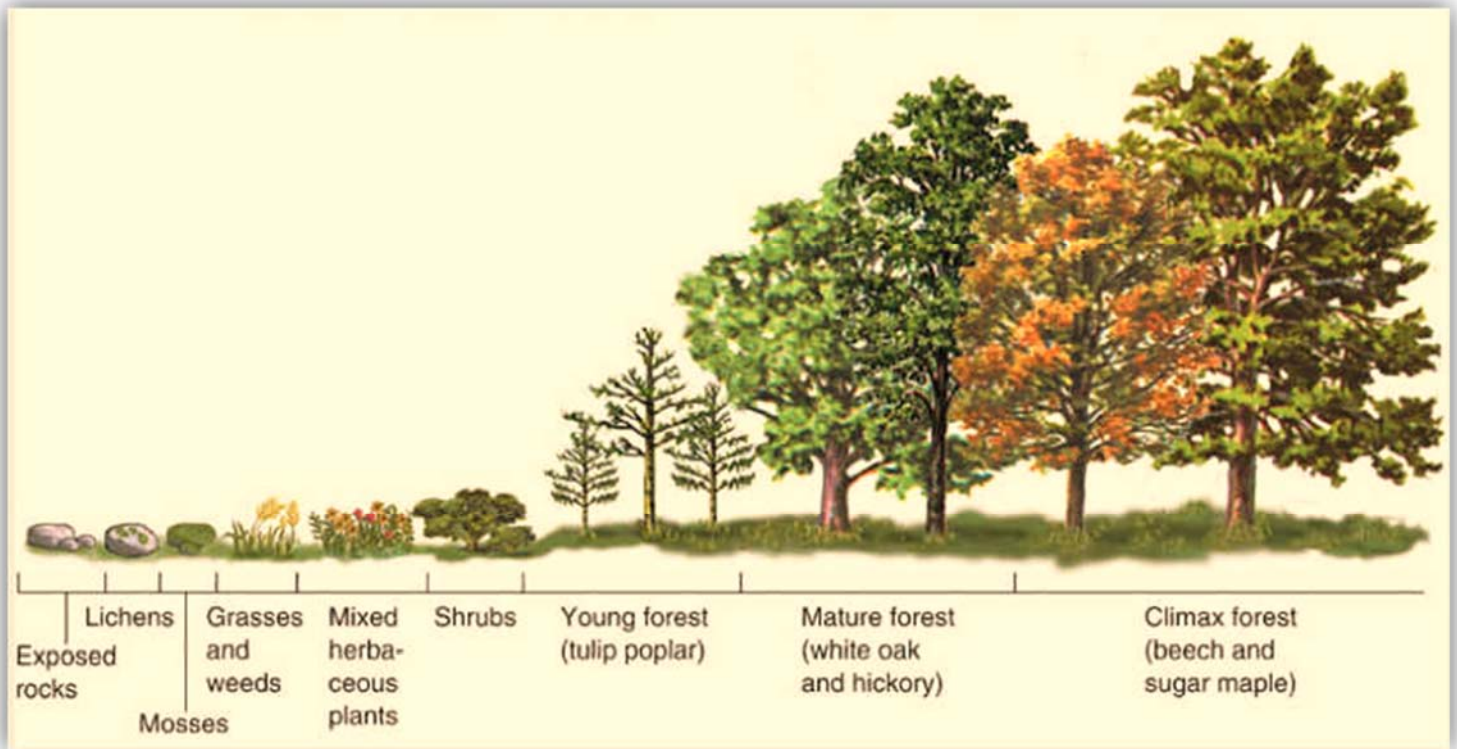
Abiotic factors have a direct effect on biotic factors, therefore, these two factors are not independent of each other. As abiotic factors change so do the biotic factors. Looking at the abiotic factor of water with plants demonstrates the effect of an abiotic factor. The availability of water determines how plants will grow. If a garden has a good supply of water, a gardener can expect tomato plants to grow better and produce more tomatoes than tomato plants in a drier garden. You can also see an effect with animals and water. If an ecosystem has a limited supply of water it would be difficult to find larger animals living in that habitat, because there would not be enough water for the larger animals to survive.

Biodiversity describes the variety of organisms living in a given area. The number of different types of organisms living in a specific area is directly related to the abiotic factors available. The more abiotic resources that are available (water, ideal temperature, protected places to live, etc.), the better the opportunity to have high biodiversity, therefore, observing many different types of living organisms in the same area. An example of an area with high biodiversity would be a rain forest, an example of an area with low biodiversity would be the North Pole. Ecosystems with a high biodiversity are better able to respond to damage to the ecosystem as with severe weather and human activities. Ecosystems with a low biodiversity will be greatly affected by a dramatic change in the ecosystem as a result of severe weather or human activities. Biotic factors are greatly affected by abiotic factors, therefore, abiotic and biotic factors are considered interdependent.

Succession

Many times it seems like an ecosystem never changes, however, all ecosystems change. An ecosystem changes as the species within the ecosystem change as a result of the resources available. **Succession** is the replacement of one kind of community by another at a single place over a period of time. There are two types of succession: primary succession and secondary succession.





Primary Succession tends to be a slow process which involves the development of a community in an area that has not previously supported life. Examples of areas that have not previously supported life would be new islands formed from erupted volcanoes, or land exposed after a glacier has receded. Primary succession always begins with pioneer species. *Pioneer species* are organisms that break down rock into soil with few nutrients for other organisms to utilize later.

Pioneer species are often small, fast-growing plants that



reproduce quickly. The most common pioneer species is an organism known as *lichen*, which is actually a combination of algae and/or bacteria, and a fungus. The role of the algae or bacteria is to undergo photosynthesis and produce food for the fungus, while the fungus provides protection for the algae or bacteria from the environment. The role of the fungus is

to break down the rock of which the lichen is attached. After the pioneer species begin to form some sort of soil, the next organisms to develop are grasses and small shrubs. As more soil becomes available, trees and animals will begin to inhabit the new ecosystem.

Secondary Succession tends to be a faster process than primary succession, and involves the development of a community in an area that already sustained life. Examples of areas that have previously sustained life would be areas that experienced forest fires or a severe storm such as a hurricane. Secondary succession normally does not have the need to begin with pioneer species because soil is already established. Therefore, secondary succession normally begins with the grasses and small shrubs. The fact that soil is already present and the possibility that there may be some seeds or roots still present in the soil helps make secondary succession a faster process than primary succession.

Biomes


When looking at the particular places species live, it is important to recognize the climate of the area. **Climate** is the average weather conditions in an area over a long period of time. Paying attention to climate can help us identify the different terrestrial biomes where organisms can live. A **biome** is a large region characterized by a specific type of climate and certain types of plant and animal communities. The two important features that determine the different types of biomes are temperature and precipitation. Most organisms are adapted to a particular temperature and precipitation range, therefore, you normally would not find the organisms of one type of biome in another biome. The different biomes on Earth can be grouped into three groups according to latitude: tropical, temperate, and polar.



Terrestrial Biomes

Tropical Biomes:

- *Located at low latitudes near the equator.*
 - *Have warm temperatures.*
 - *Have a wide range of rainfall.*

Biome	Characteristics	Biome Organisms
Tropical Rain Forest	<ul style="list-style-type: none"> ✓ Receives large amounts of rain. ✓ Warm all year long. ✓ Greatest biodiversity of all land biomes. 	Sloth, Parrots, Monkeys, Snakes, Broad-leaved evergreen trees
		<i>Tropical Rain Forest</i>
Savannas (Tropical Grasslands)	<ul style="list-style-type: none"> ✓ Long dry seasons. ✓ Short wet season. 	Zebras, Lions, Elephants, Tall grasses, Scattered trees



*TROPICAL
GRASSLANDS*

Tropical Deserts
(also known as hot deserts)

- ✓ Very little rain (less than savannas).
- ✓ Fewer plants and animals.

Camel,
Lizards,
Snakes,
Cactus



*TROPICAL
DESERT*

Temperate Biomes:

- *Located at mid-latitudes.*
- *Have a wide range of temperatures.*
- *Have a wide range of rainfall.*

Biome	Characteristics	Biome Organisms
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Temperate Grasslands

(also known as prairie, steppes, pampas, and veldt)

- ✓ Moderate rainfall.
- ✓ Cooler temperatures than tropical grasslands.
- ✓ Few trees.

Bison, Prairie dogs, Wolves, Tall grasses



TEMPERATE GRASSLANDS


Temperate Forests

- ✓ Moderate rainfall (slightly more than grasslands).
- ✓ Temperate deciduous forest have trees that lose their leaves every fall.
- ✓ Temperate evergreen forest have trees that do not lose their leaves or needles.

Deer, Beavers, Raccoons, Broad-leaved trees (oak, maple), and Conifers (needle-leaved evergreen trees with cones)



TEMPERATE FOREST

<p>Temperate Deserts (also known as cold deserts)</p>	<ul style="list-style-type: none"> ✓ Very little rainfall. ✓ Very similar to Tropical Desert, main difference is latitude and temperate desert has a lower average annual temperature. 	<p>Camel, Lizards, Snakes, Cactus</p>
		<p><i>TEMPERATE DESERT</i></p>

<p>Polar (High-Latitude) Biomes:</p> <ul style="list-style-type: none"> • <i>Located at high-latitudes.</i> • <i>Have cold temperatures.</i> • <i>Have low amounts of rainfall</i> 		
Biome	Characteristics	Biome Organisms
<p>Taiga</p>	<ul style="list-style-type: none"> ✓ Cold, wet climate. ✓ Most precipitation occurs in summer. ✓ Winters are long and cold. 	<p>Moose, Wolves, Bears, Conifers</p>



TAIGA

Tundra

- ✓ Very cold and very little rain.
- ✓ Most of the water in the soil is frozen (known as the permafrost).

Arctic foxes, Caribous,
Mosses, Lichens
(treeless)



TUNDRA

AQUATIC ECOSYSTEMS

The bodies of water where organisms can be found are not called biomes, they are called aquatic ecosystems. Aquatic ecosystems do not recognize climate as in temperature and precipitation as a distinguishing feature.

Aquatic Ecosystems

Freshwater

- ✓ Bodies of freshwater (ex. lakes, ponds, rivers, streams).



Wetlands


- ✓ Land saturated with water (ex. swamps, marshes, bogs).



Estuary

- ✓ Where freshwater, from rivers or streams, mix with salt water from the ocean (ex. Chesapeake Bay).



Marine	✓ Salt water of the oceans (ex. oceans and locations within them).	
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[Unit 27 Worksheet Ecosystems](#)

UNIT VOCABULARY REVIEW

Click on the **Quizlet icon** below to access the quizlet.com vocabulary flash cards. Review the vocabulary before completing your assessment.



Now answer questions 1 through 20.