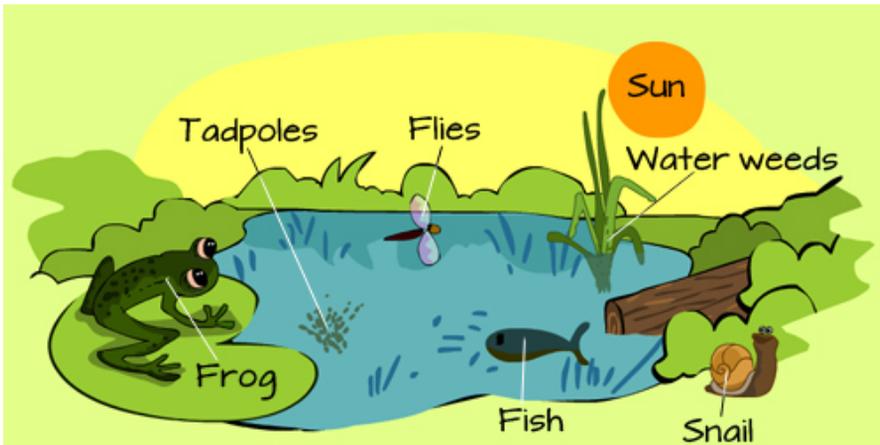


Ecosystems

What is an ecosystem?



It's the **relationship** between the living and non-living things in a specific area. An ecosystem includes all of the living things (plants, animals and organisms) in a given area, interacting with each other, and also with their non-living environments (weather, earth, sun, soil, climate, atmosphere). In an ecosystem, each organism has its' own niche or role to play.

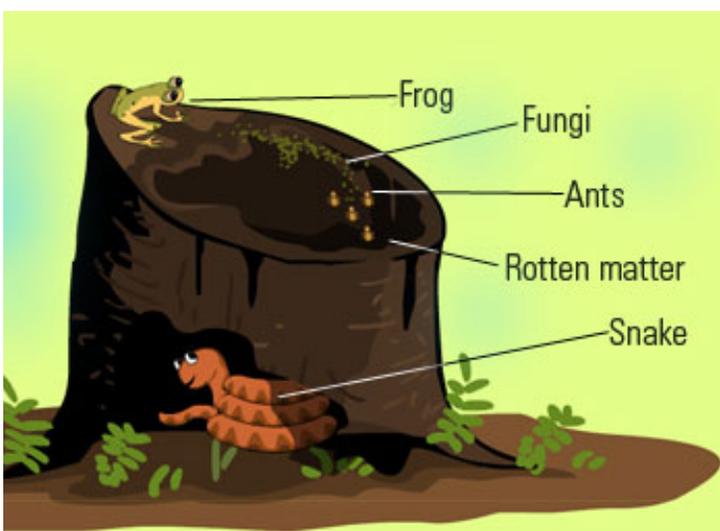
A small ecosystem: a puddle or a pond

Consider a small puddle at the back of your home.

In it, you may find all sorts of living things, from microorganisms to insects and plants. These may depend on non-living things like water, sunlight, turbulence in the puddle, temperature, atmospheric pressure and even nutrients in the water for life.

What is a habitat? It's the place where living and non-living things coexist.

Scales of Ecosystems



Ecosystems come in indefinite sizes. It can exist in a small area such as underneath a rock, a decaying tree trunk, or a pond in your village, or it can exist in large forms such as an entire rainforest. Technically, the Earth can be called a huge ecosystem. Ecosystem boundaries are not marked (separated) by rigid lines. They are often separated by geographical barriers such as deserts, mountains, oceans, lakes and rivers.

The illustration above shows an example of a small (decaying tree trunk) ecosystem

Attending to their size

Micro (small size)	Messo (medium size)	Biome (large size)
A small scale ecosystem such as a pond, puddle, tree trunk, under a rock etc. Even a drop of water.	A medium scale ecosystem such as a forest or a large lake.	A very large ecosystem or collection of ecosystems such as a rainforest.

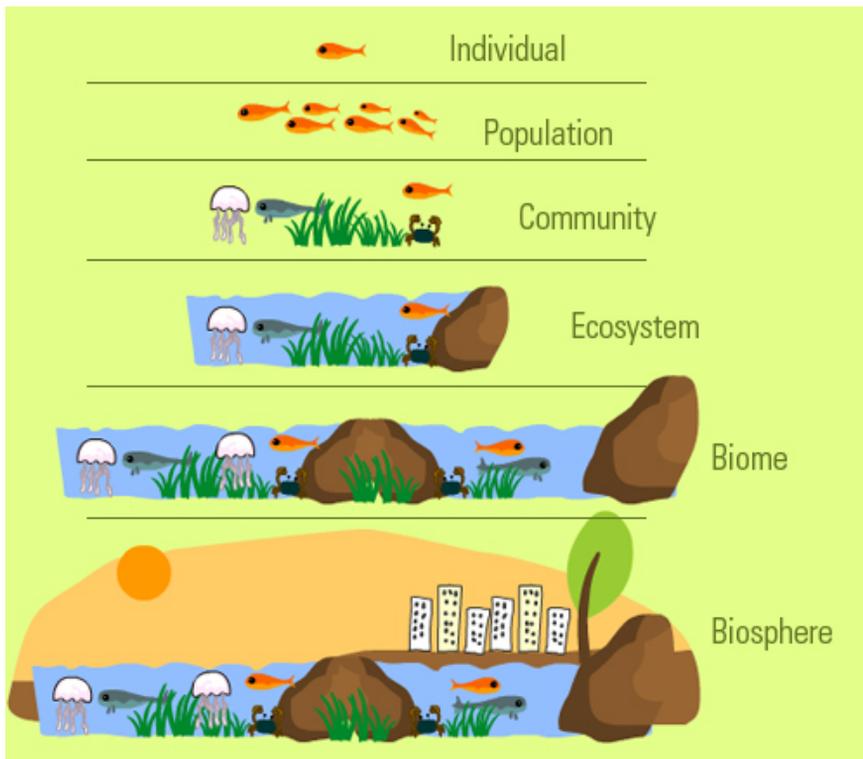
Attending to the presence of water

Aquatic	Terrestrial
If the ecosystem exists in a water body, like an ocean, freshwater or puddle, it is called an aquatic ecosystem.	Those that exists outside of water bodies are called terrestrial ecosystems.

Attending to their origin and man influence

Natural ecosystems	Artificial or man-made
No human influence on them, such as the tundra or a desert.	Humans influenced heavily on them, such as a zoo, an aquarium or a terrarium. Even a city.

Levels of organization in an ecosystem



Individual, Species, Organism: An individual is any living thing or organism.

Population: A group of individuals of a given species that live in a specific geographic area at a given time. An example: the foxes population.

Community: This includes all the populations in a specific area at a given time. A community includes populations of organisms of different species. A great community usually includes biodiversity.

Ecosystem: As explained above, ecosystems include more than a community of living organisms interacting with the environment.

Biome: A biome, in simple terms, is a set of ecosystems sharing similar characteristics with their abiotic factors adapted to their environments.

Biosphere: A biosphere is the sum of all the ecosystems established on Earth.

What is a biome?

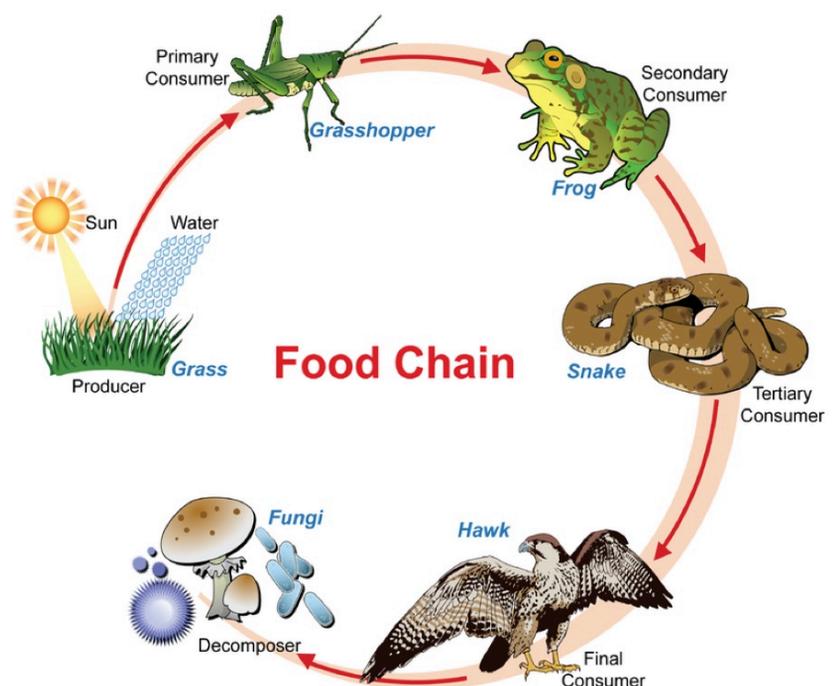
Biomes are very large ecological areas on the earth's surface, with fauna and flora (animals and plants) adapting to their environment. Biomes are often defined by abiotic factors such as climate, relief, geology, soils and vegetation. A biome is NOT an ecosystem, although in a way it can look like a massive ecosystem. You may find many units of ecosystems within one biome.

There are five major categories of biomes on earth.

- **The Desert Biomes:** They are the Hot and Dry Deserts, Semi Arid Deserts, Coastal Deserts and Cold Deserts.
- **The Aquatic Biomes:** Aquatic biomes are grouped into two, Freshwater Biomes (lakes and ponds, rivers and streams, wetlands) and Marine Biomes (oceans, coral reefs and estuaries).
- **The Forest Biomes:** There are three main biomes that make up Forest Biomes. These are the Tropical Rainforest, Temperate and Boreal Forests (also called the Taiga)
- **The Grassland Biomes:** There are two main types of grassland biomes: the Savanna Grasslands and the Temperate Grasslands.
- **The Tundra Biomes:** There are two major tundra biomes—The Arctic Tundra and the Alpine Tundra.

Food chains

All living things need to feed to get energy to grow, move and reproduce. But what do these living things feed on? Smaller insects feed on green plants, and bigger animals feed on smaller ones and so on. This feeding relationship in an ecosystem is called a food chain. Food chains are usually in a sequence, with an arrow used to show the flow of energy.



A food web

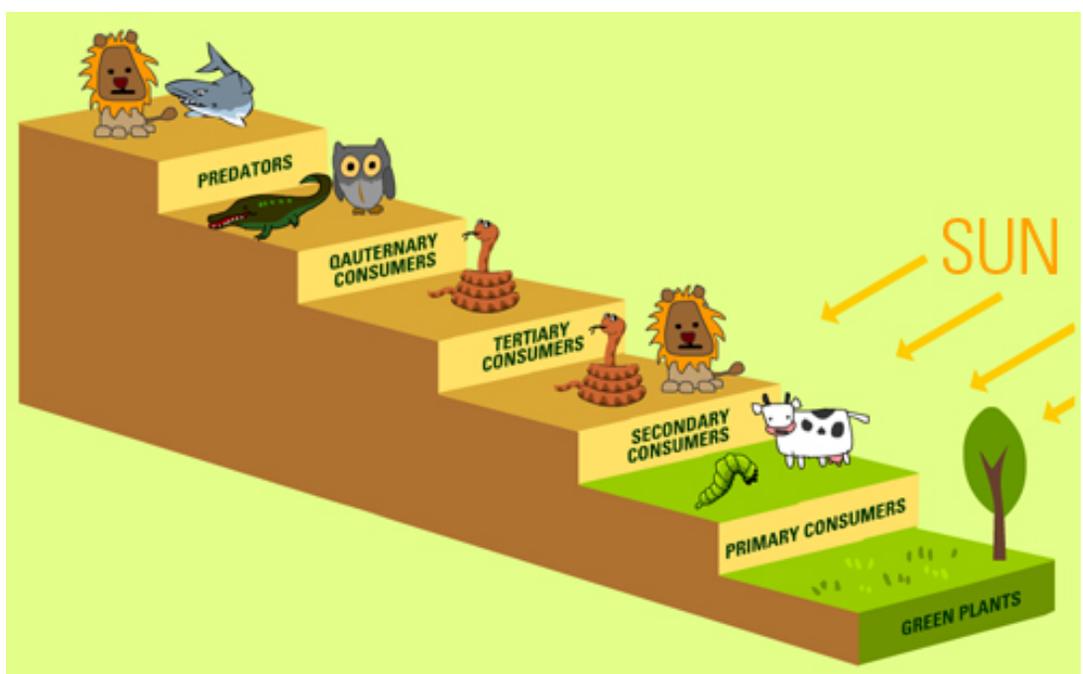
A food chain is not the same as a food web. A food web is a network of many food chains and is more complex.

Energy transfer:

Energy is transferred along food chains from one level to the next. Some of the energy is used up in growth, reproduction repair, movement and other ways, and not made available to the next level.

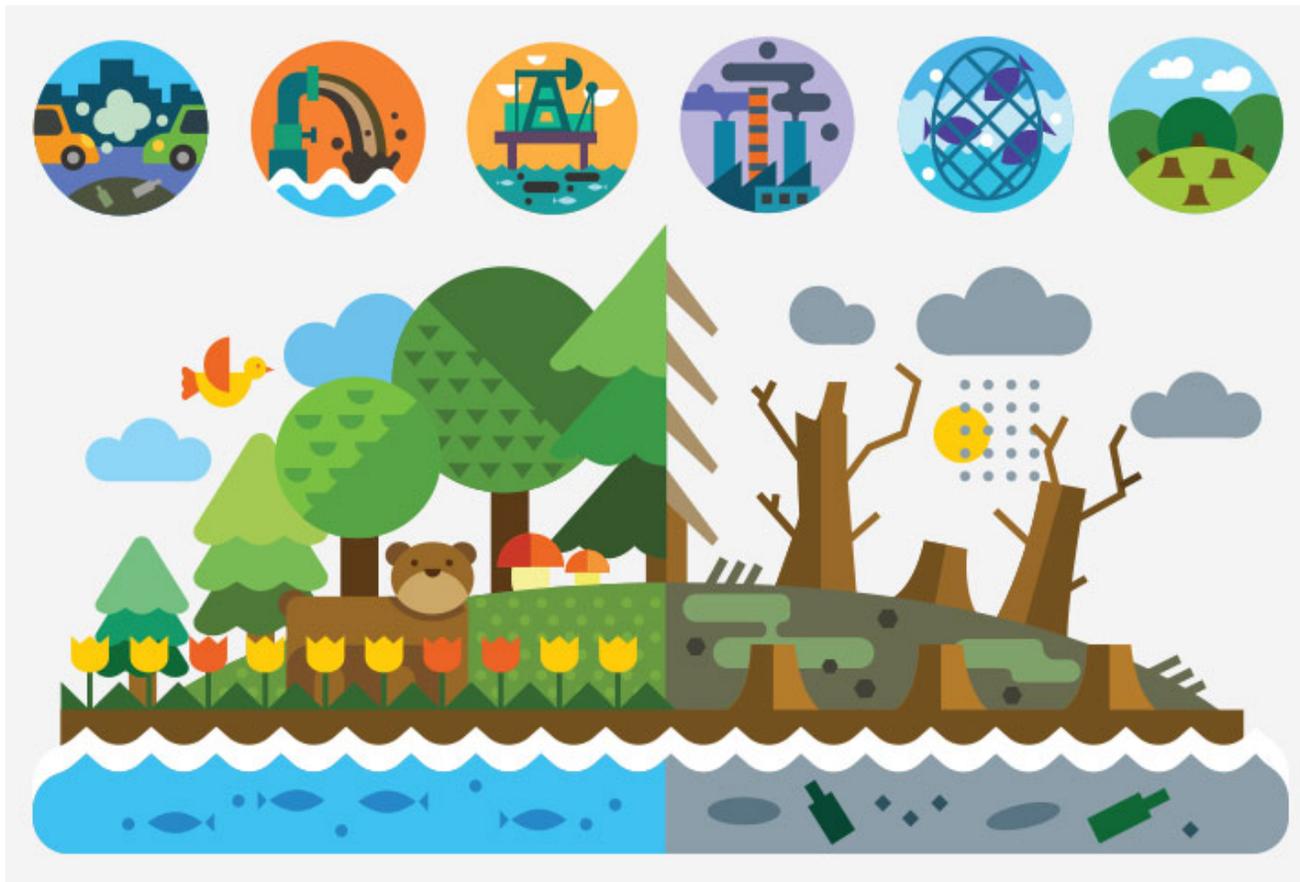
Trophic levels of food chains

The levels of a food chain (food pyramid) is called Trophic levels.



- Producers:** The sun is the source of all the energy in food chains. Green plants, usually the first level of any food chain, absorb some of the Sun's light energy to make their own food by photosynthesis. Green plants are known as 'Producers' in a food chain.
- Primary Consumers:** The second level of the food chains is called the Primary Consumer. These consume the green plants. Animals in this group are usually herbivores. Examples include insects, sheep, caterpillars and even cows.
- Secondary Consumers:** The third in the chain are Secondary Consumers. These usually eat up the primary consumers and other animal matter. They are commonly called carnivores and examples include lions, snakes and cats.
- Tertiary Consumers:** The fourth level is called Tertiary Consumers. These are animals that eat secondary consumers.
- Quaternary Consumers:** Quaternary Consumers eat tertiary consumers.
- Predators:** At the top of the levels are Predators. They are animals that have little or no natural enemies. They are the 'bosses' of their ecosystems. Predators feed on preys. A prey is an animal that predators hunt to kill and feed on. Predators include owls, snakes, wild cats, crocodiles and sharks. Humans can also be called predators.
- Detritivores and decomposers:** When any organism dies, detritivores (like vultures, worms and crabs) eat them up. The rest are broken down by decomposers (mostly bacteria and fungi), and the exchange of energy continues. Decomposers start the cycle again.

Threats to Ecosystems



Anything that attempts to alter the balance of the ecosystem potentially threatens the health and existence of that ecosystem.

Habitat Destruction

Economic activities such as logging, mining, farming and construction often involve clearing out places with natural vegetative cover. It can cause a lot of animals and insects that depended on the shade and moisture

from the tree to die or migrate to other places.

Pollution

Water, land and air pollution all together play a crucial role in the health of ecosystems. Pollution may be natural or human caused.

Eutrophication

This is the enrichment of water bodies with plant biomass as a result of continuous inflow of nutrients particularly nitrogen and phosphorus.

Invasive species

Any foreign specie (biological) that finds its way into an ecosystem, either by natural or human introduction can have an effect on the ecosystem.

Overharvesting

Fish species, game and special plants all do fall victim from time to time as a result of overharvesting or humans over dependence on them.

UV Radiation

The sun's rays play an important role in living things. Some type of rays are not good for living things. Ozone depletion is one way that exposes living things to UVB and UVC and the harm caused can wipe lots of species, and affect ecosystems members including humans.