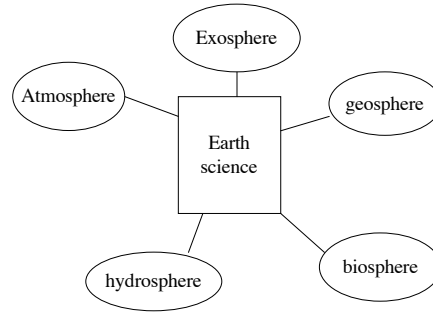
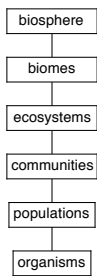


Biosphere

Earth's living things
and
their environment

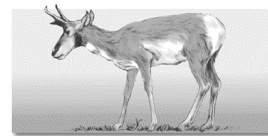


Levels of organization



Biological organization

- Biosphere
- Ecosystem
- Community
- Population
- Organism

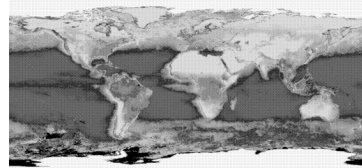


An organism is a single individual of any form of life. It may be single-celled or multicelled. Organisms can be classified into species, which are groups of organisms that resemble one another in appearance, behavior, and genetics. Click the buttons at the left to explore the other levels of biological organization.

Ecology *oikos*

- The study of connections in nature

- relatively thin life-supporting stratum of the Earth's surface, extending from a few kilometres into the atmosphere to the deep-sea vents of the ocean. The biosphere is a global ecosystem composed of living organisms (biota) and the abiotic (nonliving) factors from which they derive energy and nutrients.



The **biosphere** includes all parts of the Earth where life exists.

- The biosphere is composed of **ecosystems**. It involves the interactions between **living (biotic)** and **non-living (abiotic)** factors.

The ecosystem may be self-sustaining (balanced) if it has:

- a constant supply of energy
- living things present that can incorporate this energy into organic matter
- a means for recycling materials between organisms and their environment

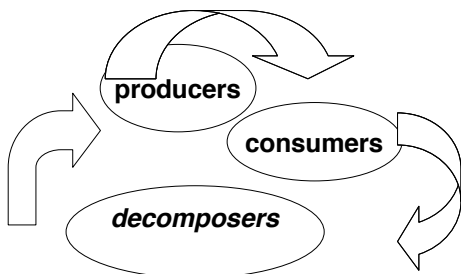
Each individual living thing is called an **organism** .

- An organism must be able to use energy, grow, respond to environmental changes, and reproduce among other things.
- The non-living factors in an ecosystem include:
 - light intensity
 - range of temperatures
 - amount of moisture
 - type of soil and rock
 - availability of inorganic substances such as minerals
 - supply of gases such as oxygen (O₂), carbon dioxide (CO₂) and nitrogen (N₂).

Role of organisms in ecosystem

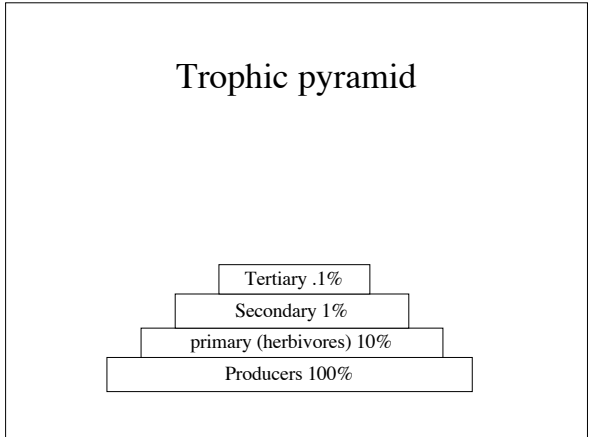
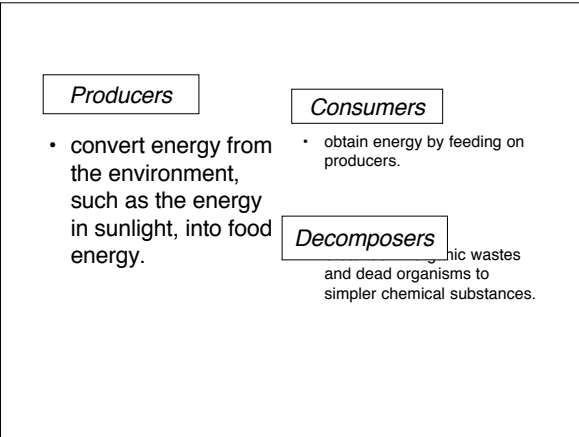
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In terms of energy flow through an ecosystem, organisms are either



Energy flows

Please wait, loading



Ecosystem modeling

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The place where an organism lives is its **habitat**.

- In all ecosystems materials cycle between living things and the environment.
- The main substances involved in these cycles are **water, carbon, oxygen and nitrogen**.

Although ecosystems may appear stable, they undergo changes with time.

- Eventually a new community replaces the original community in an ecosystem. Another one gradually replaces the new community. This process is called **ecological succession**.

- Plants determine the type of community that develops because they are the **producers**.
- The type of animals that survive are directly or indirectly dependent on the type of plants present.

Earth's spheres of life

- Atmosphere
- Troposphere- mostly nitrogen 78% and oxygen 21% up to 17km
- Stratosphere-17-48 km
- Hydrosphere
- Lithosphere
- Biosphere-where biota is located

Cycles of life on earth

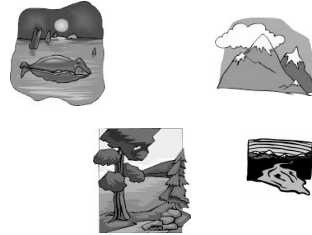
- Carbon
- Phosphorous
- Nitrogen
- Water
- oxygen

Biomes

regulated by climate (hot-dry, semiarid, humid-cold, humid-mild, humid-tropical)

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Name an ecosystem



Range of tolerance

- Each population in an ecosystem has a range of tolerance to variations in its physical and chemical environment.
- Genetic makeup amongst individuals within a population can have slightly different tolerance thus the **law of tolerance (example highly tolerant species can live in a variety of habitats with widely different conditions).**

Biodiversity

- A renewable resource
- **Genetic diversity** (within a species)
- **Species diversity** (# of species in different habitats)
- **Ecological diversity** (variety land and water)
- **Functional diversity** (energy flow and matter cycling needed for survival of species, communities and ecosystems)

Sustaining biodiversity

- Loss and degradation of biodiversity is the most important environmental problem we face

1.3 - 2 billion years ago

- Cells with nuclei developed...
- The atmosphere had only about 1% of its present oxygen.
- 700 million yrs. Ago 6 - 7% of its present level
- Time of dinosaurs 9% richer than oxygen today (oxygen is removed, CO₂ added)

- Before modern times it was result of intense volcanism or meteorites....
- Today with human activity, including deforestation, and fossil fuel consumption has increased the CO₂ content in our atmosphere.

At sea level..

- About 2 tons of air is directly above our heads and atmosphere extends to approx. 100 kilometers.....
- Nearest the surface of the Earth it is denser, compresses by its own weight.
- Half of the weight of atmosphere is in the lowest 6.5 km, and nearly 99% in 30 km of earth's surface.

Recreating the biosphere

