





Environmental Ecology

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Ecology

- The scientific analysis and study of interactions among organisms and their environment.
- It is an interdisciplinary field that includes biology, geography, and Earth science.
- Ecology includes the study of interactions organisms have with each other, other organisms, and with abiotic components of their environment.

| | | |
|------------|---|--|
| Biosphere | The part of Earth that contains all ecosystems |  <p>Biosphere</p> |
| Ecosystem | Community and its nonliving surroundings |  <p>Hawk, snake, bison, prairie dog, grass, stream, rocks, air</p> |
| Community | Populations that live together in a defined area |  <p>Hawk, snake, bison, prairie dog, grass</p> |
| Population | Group of organisms of one type that live in the same area |  <p>Bison herd</p> |

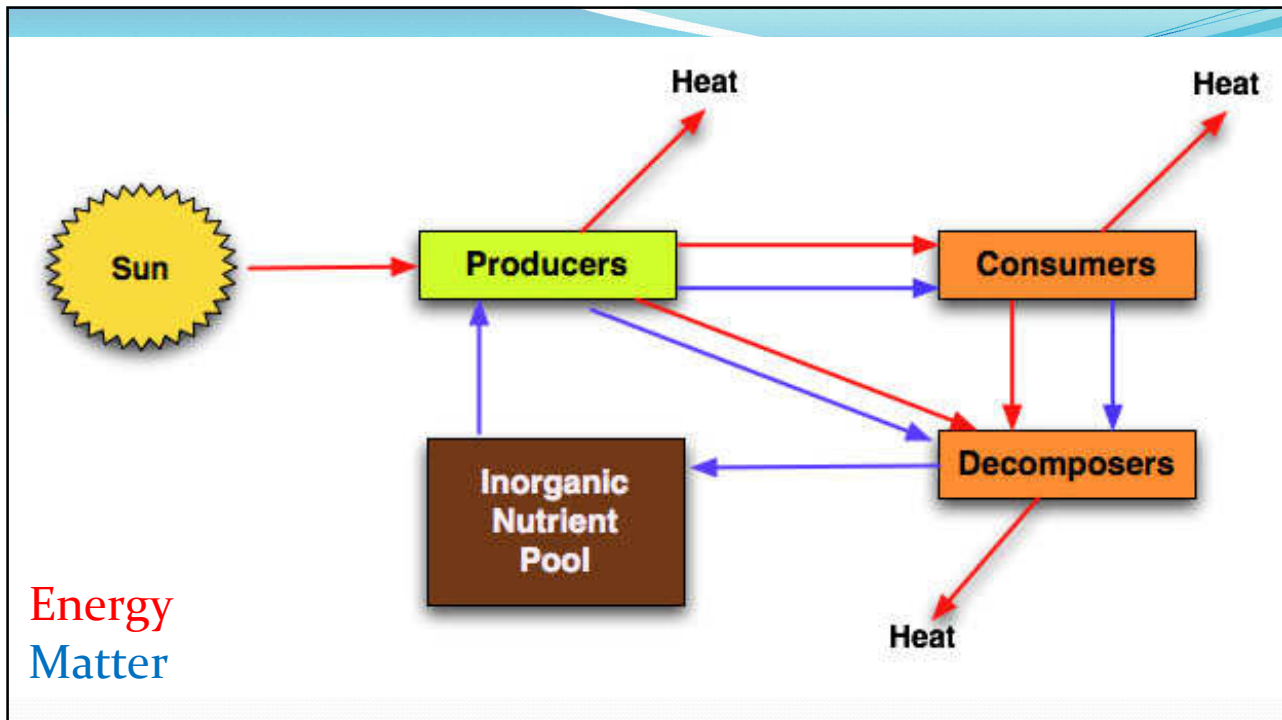
Ecosystem

- An ecosystem is a community of living organisms in conjunction with the nonliving components of their environment (things like air, water and mineral soil), interacting as a system.
- These **biotic** and **abiotic** components are regarded as linked together through **nutrient cycles** and **energy flows**.
- Energy, water, nitrogen and soil minerals are other essential abiotic components of an ecosystem.

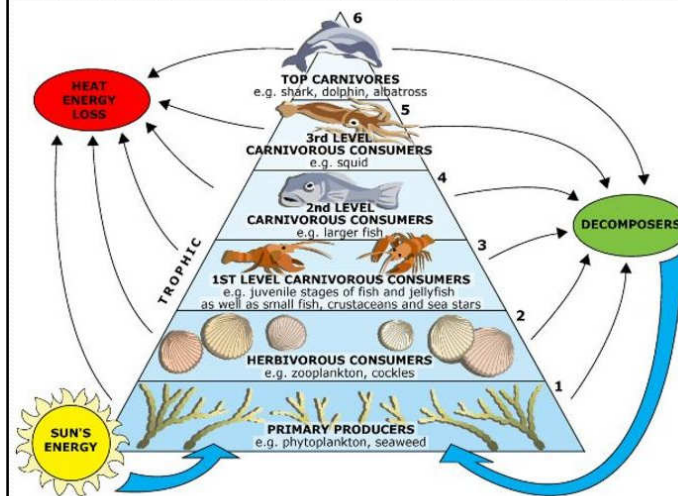
- **Niche** : the role a species plays in a community
- **Habitat** : the place in which an organism lives out its life

Energy Flow

- The energy that flows through ecosystems is obtained primarily from the sun.
- It generally enters the system through **photosynthesis**, a process that also captures carbon from the atmosphere.
- By feeding on plants and on one another, animals play an important role in the movement of matter and energy through the system.



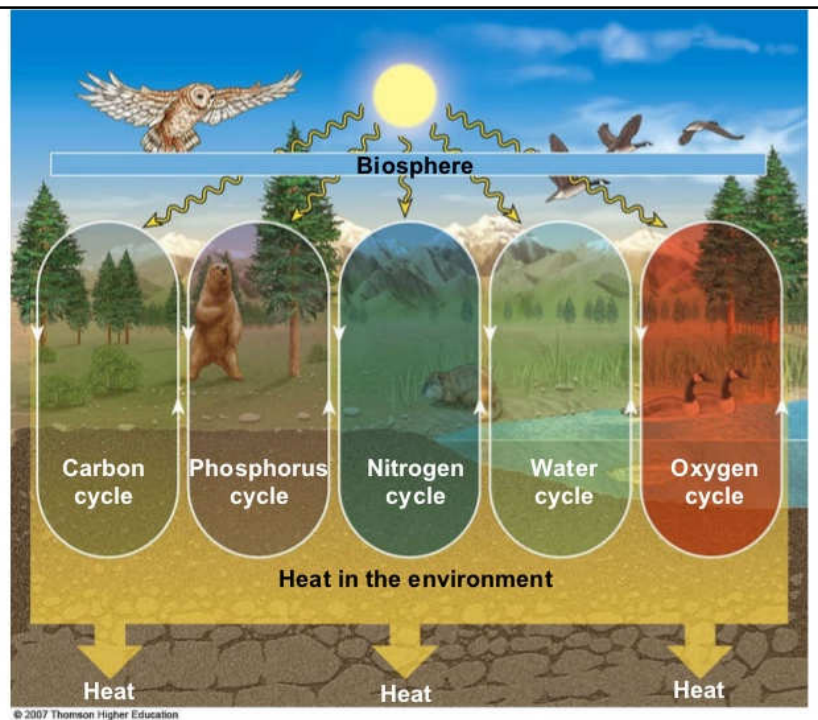
Food Chain & Bioaccumulation



- Bioaccumulation refers to the accumulation of substances, such as pesticides, or other chemicals in an organism.

Biogeochemical Cycles

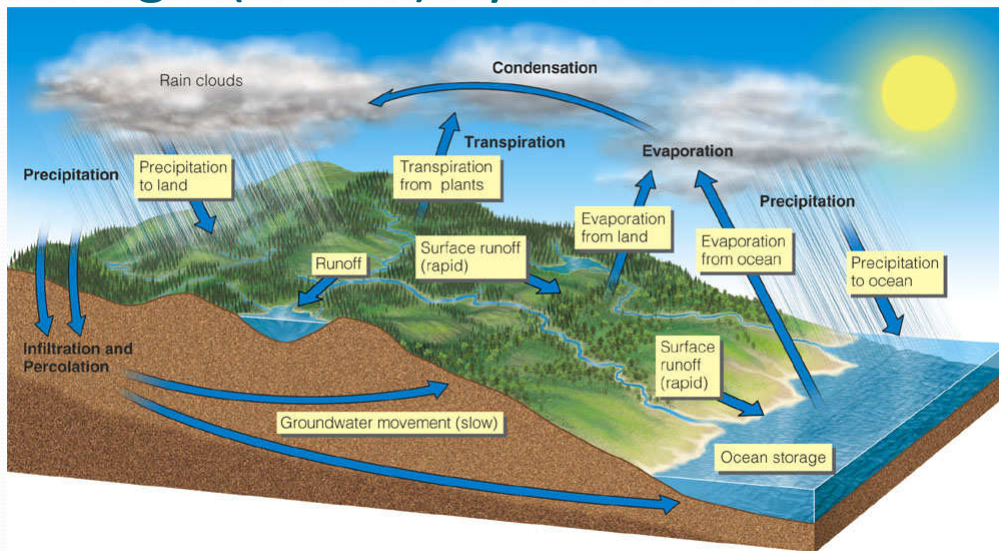
- Carbon cycle
- Water cycle
- Nitrogen cycle
- Phosphorus cycle
- Sulphur cycle



Reservoirs in Matter Flow

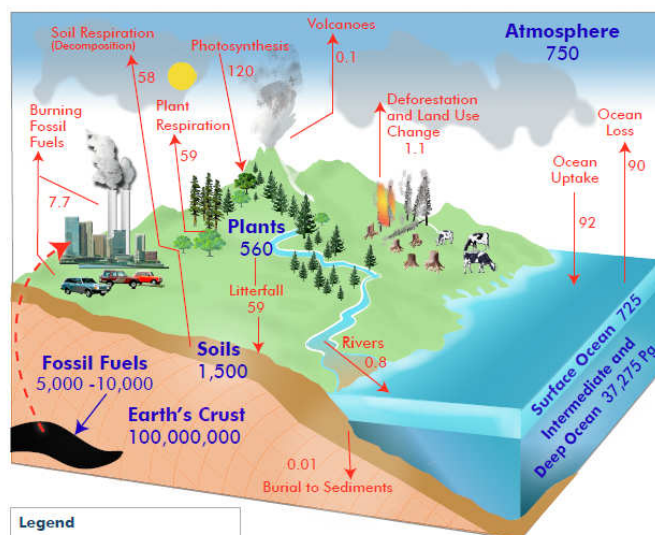


Hydrologic (Water) Cycle



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Global Carbon Cycle



Legend
 Units: Petagrams (Pg) = 10^{15} gC
 ● Pools: Pg
 ● Fluxes: Pg/year

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 Data Sources: Adapted from Houghton, R.A. Balancing the Global Carbon Budget. Annu. Rev. Earth Planet. Sci. 007.35:313-347, updated emissions values are from the Global Carbon Project: Carbon Budget 2009.

