

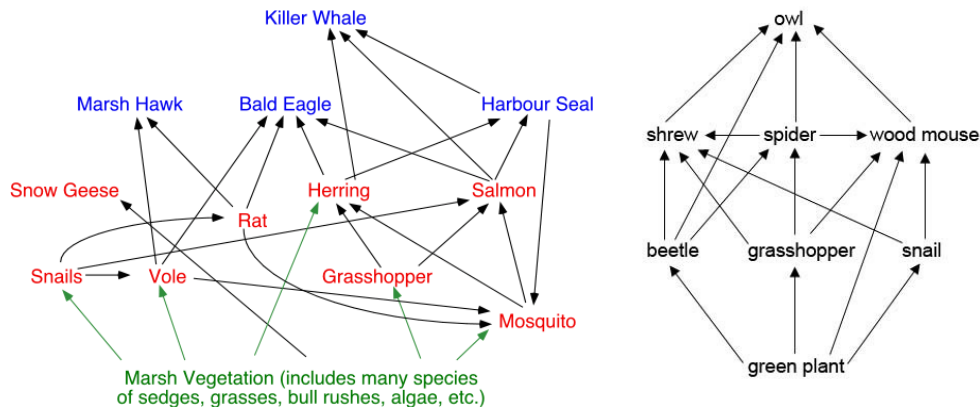
1. **Ecology**

- **Habitat:** a place where an organism (plants or animals) lives.
- **Population:** a group of organism of the same species living in a particular habitat.
- **Community:** all the populations of organisms living and interacting with one another in a particular habitat
- **Eco system:** living organisms interacting with one another and with their abiotic environment make up an ecosystem
- Individual → Population → Community → Eco systems → Biosphere (all parts of earth where life was found)

2. **Abiotic Environment**

- **Light:** plants and animals develop adaptation features to compete for sun-light and foods.
- **Temperature:** seasonal changes affect plant growth rate and animal life cycles.
- **Water:** plants and animals develop adaptation features to conserve water in dessert or to stay floating in wetland.
- **Air (N₂, O₂, CO₂):** in low oxygen content soil or water, plants with special breathing roots and fishes which are air breathers
- **Salinity:**
 - **Salt water fishes** face problem with water loss from cells and salt enter into cells. They adapt by swallow seawater and secret salt out of the gill then absorb water into intestines. They also have water proof body cover to prevent water loss. Their kidneys excrete salt and produces small amount of highly concentrated urine.
 - **Fresh water fishes** face problem with excess water enter the cells and salt loss. Their kidneys absorb salt and produces large amount of diluted urine. Their gills absorb salts from the water.
- Soil or water's **pH** and Nutrient content, Wind and Humidity etc

3. **Biotic Environment**

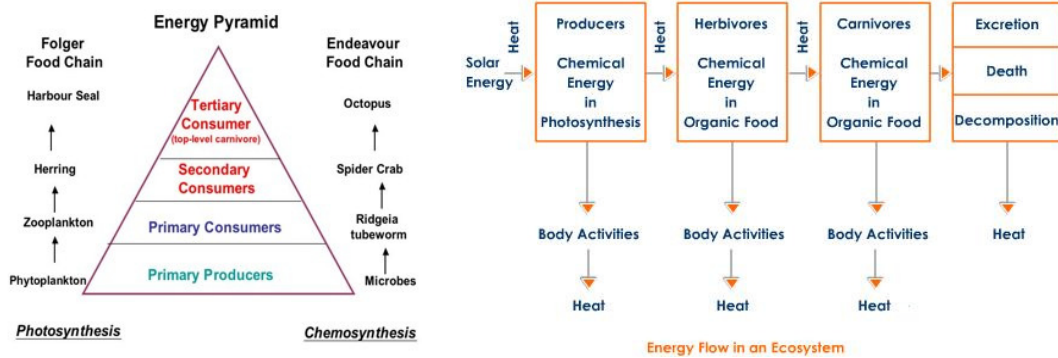


- **Producers** (green plants, algae, some bacteria) → **primary consumers** (herbivores) → **secondary consumers** (carnivores) → **tertiary consumers, parasites & scavengers** (carnivores that feed other carnivores) → **decomposer** (fungi and bacteria)

- A **food chain** is a series of organisms through which energy is transferred in the form of food.
- In a community, food chains are interlinked to form a **food web**. Animal that feed on other animal is a **predator**; those that were eaten are **preys**.

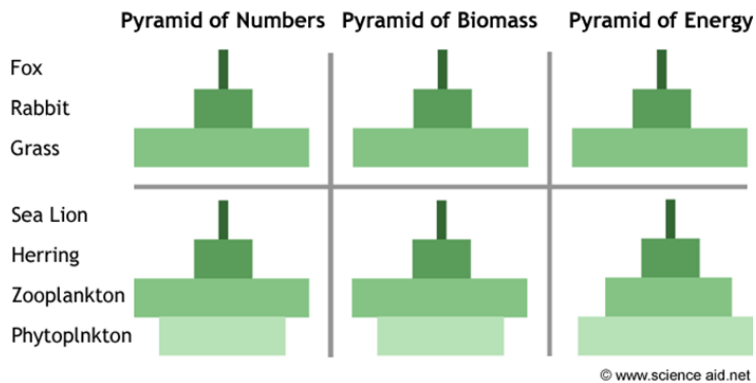
4. Non-cyclic energy flow (energy pyramid)

- Solar energy is converted into organic energy and flow through the ecosystem.
- **90%** of the energy is lost when it is transferred from one trophic level to the next.
- Short food chains are more efficient in energy transfer than long food chains.
- Eventually all the solar energy that enter the biotic part of ecosystem is lost as **heat energy which is not recyclable**.



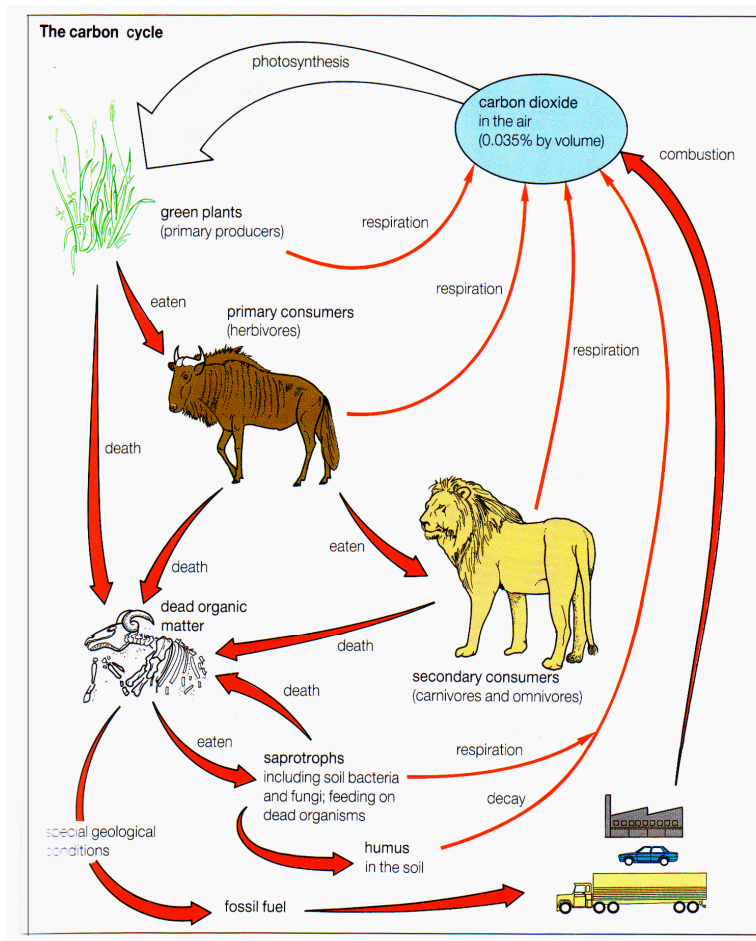
5. Ecological pyramids

- Pyramid of **Numbers**: to compare the number of organisms in each trophic level at a particular time
- Pyramid of **Biomass**: to compare the dry mass of organisms present in each trophic level at a particular time which does not take into account the rate of reproduction of organisms
- Pyramid of **Energy**: to compare the total energy level in each trophic level over a certain period of time (e.g. 1 year) thus it took into account the reproduction rate of organisms.



6. Nutrient cycling (Carbon cycle, Nitrogen cycle, Oxygen cycle, Water cycle)

- CO₂ removed from environmental air by green plants during **photosynthesis**.
- Solar energy stored as **Carbohydrates, fats, amino acids and proteins**.
- CO₂ is released into atmosphere through (a) **Respiration from all living organisms** (b) **Combustion of fuels** (c) **Decay or decomposition from bacteria & fungi**.



- Carbon cycle is important (a) to maintain balance of CO₂ in the atmosphere, (b) to enable the solar energy to flow through the ecosystem food chains.