

Local Ecosystems

Ecology is the study of the distribution and abundance of living organisms and how these properties are affected by interactions between the organisms and their environment.

Match up

Match each term with the right definition:

| Term | Definition |
|----------------|---|
| A. Biotic | Both the living (biotic) and non-living (abiotic) surrounding of an organism. |
| B. Organism | Large regional system characterised by a major vegetation type (e.g. desert). Region with similar ecosystems grouped together) |
| C. Habitat | Non-living features - physical and chemical factors (e.g. temperature, rainfall & salinity) |
| D. Environment | Living features - all living things (e.g. numbers, distribution & interactions) |
| E. Population | Group of organisms of the same species living in same area at a particular time. |
| F. Community | The place of a species within a community involving relationships with other species |
| G. Ecosystem | A community together with its environment; any environment containing organisms interacting with each other and the non-living parts of the environment (e.g. rainforest & freshwater pond) |
| H. Ecology | A living thing (e.g. plant & animal) |
| I. Biome | Groups of similar individuals that can reproduce fertile offspring (e.g humans) |
| J. Species | Groups of different populations in an area or habitat |
| K. Niche | The place where an organism lives |
| L. Abiotic | Study of the relationships living organisms have with each other and their environment |

Ecology is studied at different levels as illustrated in Figure 1.1.

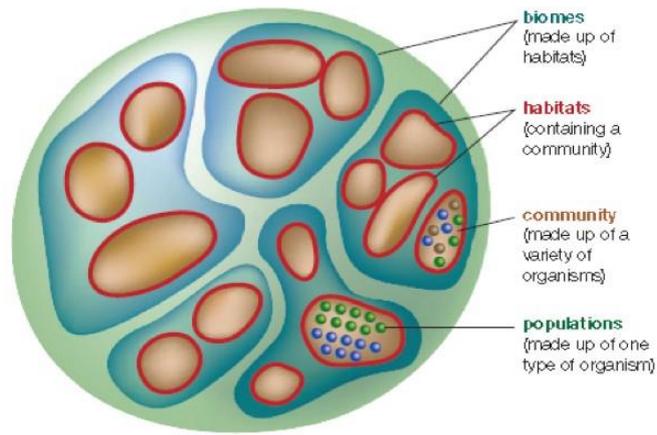


Figure 1.1 Schematic diagram representing the biosphere

Define the following terms and give an example:

Ecosystem

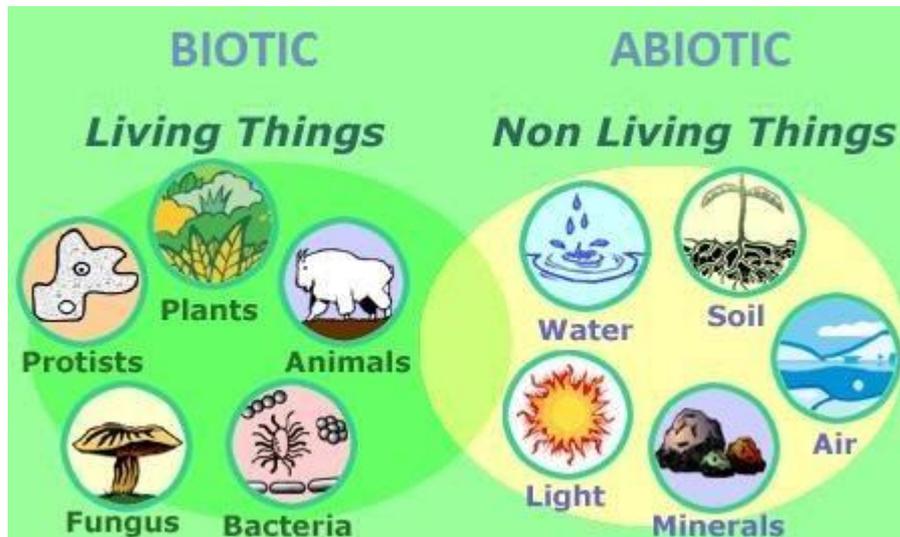
Community

Population

Habitat

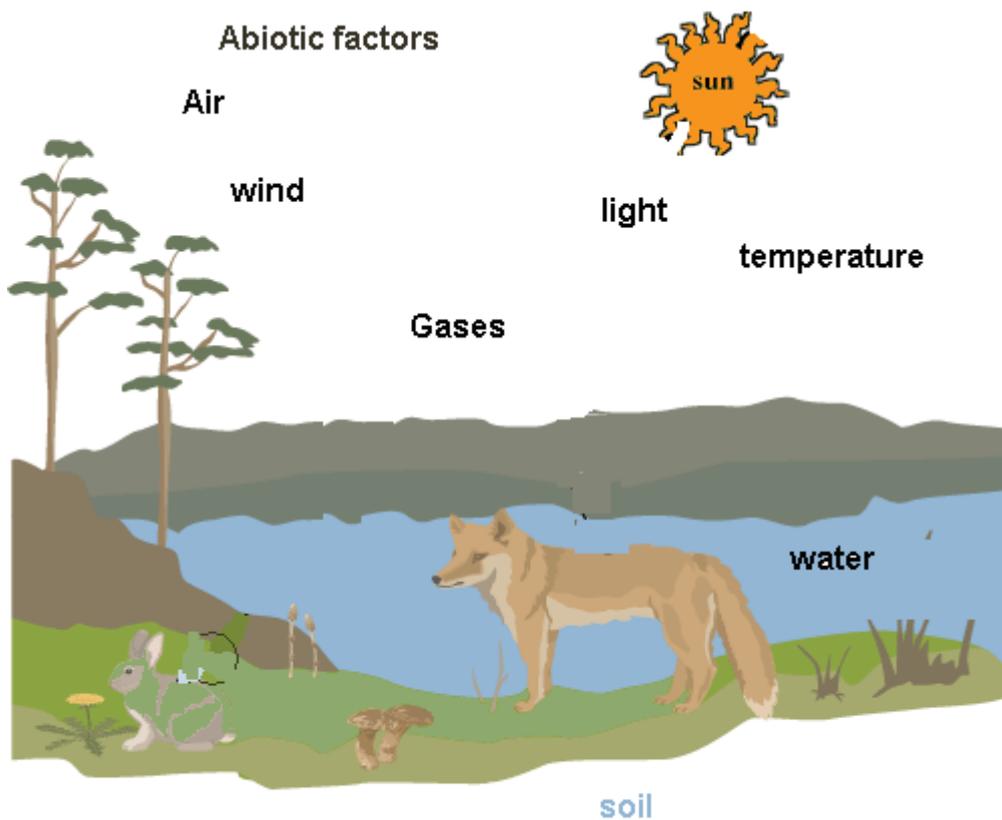
Biotic Factors

The living things in an ecosystem are called biotic factors. Living things include plants, animals, bacteria, fungi and more.



Abiotic Factors

Non-living chemical and physical parts of the environment that affect living organisms and the functioning of ecosystems.



Abiotic Factors in Aquatic and Terrestrial Environments

| | Aquatic | Terrestrial |
|----------------|---|---|
| Temp | Small fluctuations Oceans are more or less constant Easier for aquatic organisms to adapt to constant temp than a changing one | Large fluctuations, daily, hourly, seasonally Land organisms have to be adapted to deal with these fluctuations |
| Pressure | Large fluctuations, daily, hourly, seasonally Land organisms have to be adapted to deal with these fluctuations | Small variations. Highest pressure at sea level compared to vary low e.g. top of Mt Everest Small daily fluctuations can occur due to weather (low pressure often brings rain) |
| Light | Water surface reflects 55% of light and only 1% reaches depths of 100m or more. Light is affected by the angle of the sun in the sky, seasons, time of day, cloud cover, turbidity (cloudiness) of water | Light availability is abundant on land Cloud cover and seasons can affect |
| Slope/Aspect | May affect the temp and light availability as well as the exposure to currents, tides and waves | Direction land faces can affect the temp, light and soil quality. Surface runoff and erosion are BIG problems |
| Gases | O ₂ and CO ₂ are more readily available in faster moving water As the temp of water increases the dissolved gases decreases. | All gases are abundant. |
| Rainfall/Water | Abundant but not readily available. Water is lost or taken in by an organism depending on marine or freshwater environment (osmosis!) | Not freely abundant Depends on seasons, location, etc. Most water comes from soil (plants and insects) or has to be consumed (all animals) |

Food chains & webs

Food Chains

A food chain is a sequence of organisms whereby one is the food for the next organism in the chain. At the beginning of the food chain are usually the producers (plants). These producers have an ability to obtain energy from the sun. The number of organisms in a chain is commonly four and rarely exceeds six. Organisms of each feeding level in the food chain belong to the same trophic level.

What is a trophic level:

Define the following terms:

Producers

Consumers

Primary Consumer

Secondary Consumer

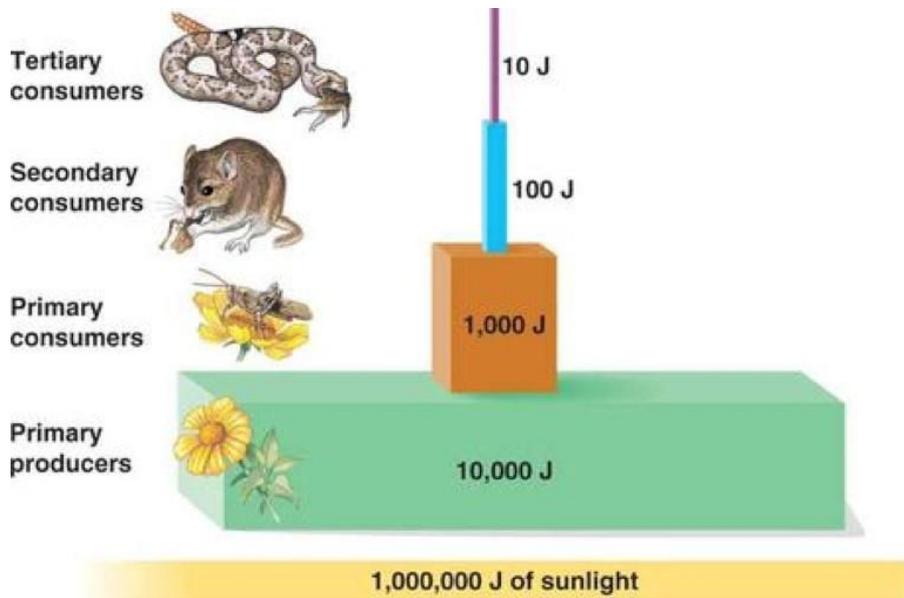
Herbivore

Carnivore

Draw out 3 different food chains, one with three organisms, one with 4 and one with 5 (if you can think of one), try and include one that ends with a human:

Energy Loss in Food Chains

What do the arrows in food chains represent?

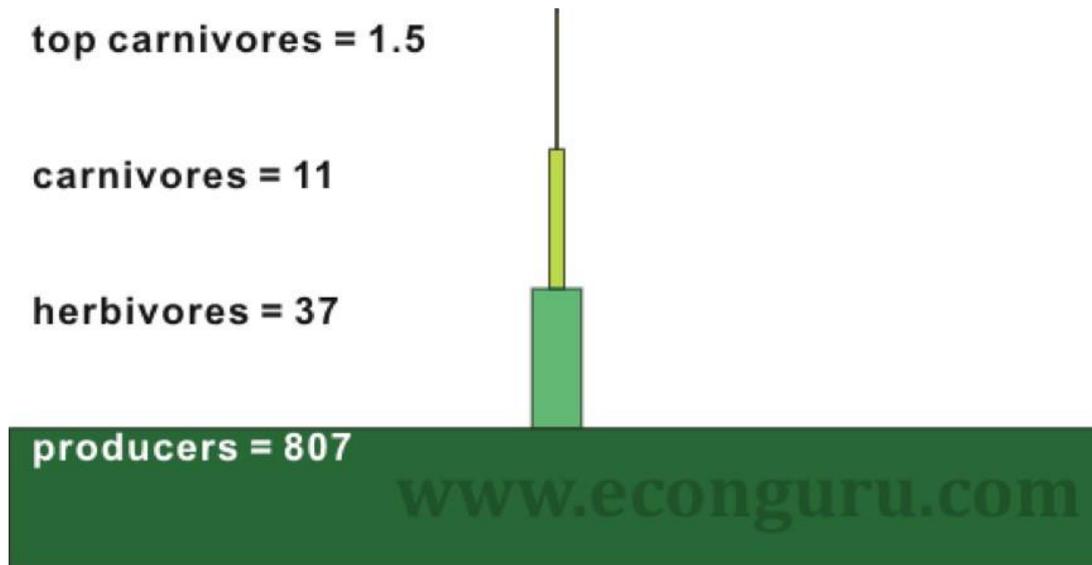


1. What is the main source of energy loss in food chains

2. What other reasons are there for an incomplete transfer of energy from one part of the food chain to the next part?

3. Why is it very rare to find food chains with more than 5 organisms?

Pyramid of numbers



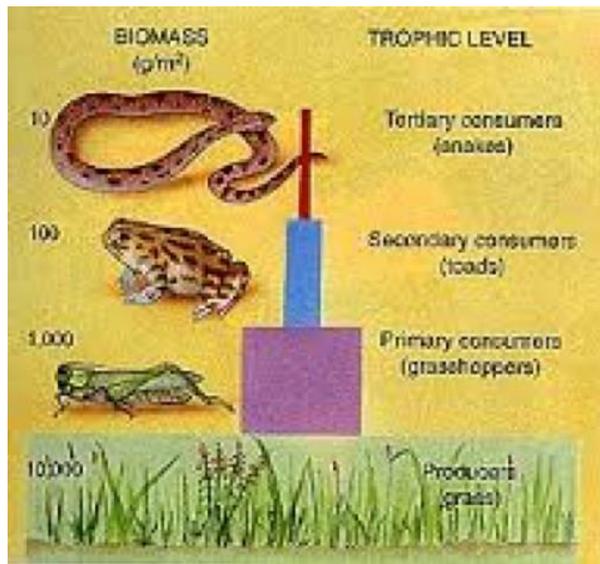
One way to illustrate how organisms in a food chain relate to each other is by counting the numbers at each trophic (or feeding) level and drawing a pyramid of numbers.

Draw a pyramid of numbers for the following food chain (draw it to scale):

Dandelions, Snails, Thrush

There were 10 dandelions eaten, 5 snails eaten and one thrush found.

Pyramid of Biomass



Define the term biomass:

Draw an estimated pyramid of biomass for the rosebush → greenfly thrush food chain:

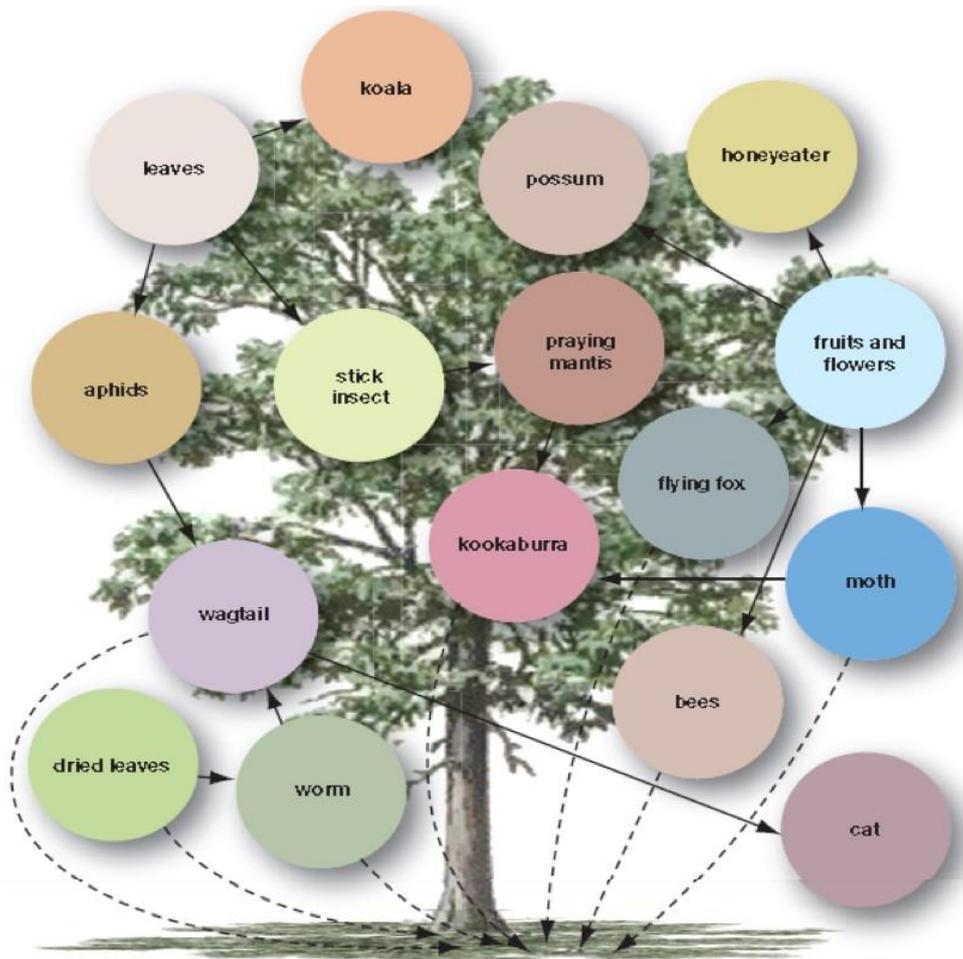


The diagram above is an example of a food chain.

1. Draw arrows on the diagram above to show how the energy flows through organisms in the food chain.
2. Explain what happens to the amount of energy as it is passed on from one trophic level in the food chain to the next.

3. Describe the original source of energy for most biological communities and how it enters the 'biological system'.

Food Webs



1. What is a food web? How is it different from a food chain?

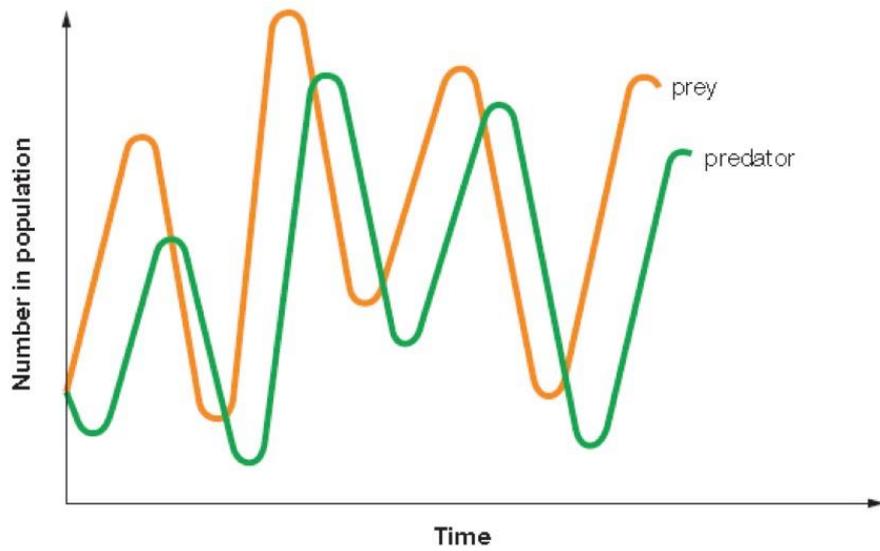
2. Name the producers shown in the food web above.

3. Name the carnivores shown in the food web above.

4. Write out a long food chain from the food web above. The food chain should have 4 trophic levels.

5. Name 3 insectivores from the above food web.

Predator-Prey Relationships



What's going on in the graph above?

Factors Affecting Predator-Prey Relationships

- Number of predators competing for same prey
- Availability of prey's food
- Birth rate
- Death rate
- Male : Female ratio
- Size of ecosystem
- Movement between ecosystems
- Number of shelter sites available