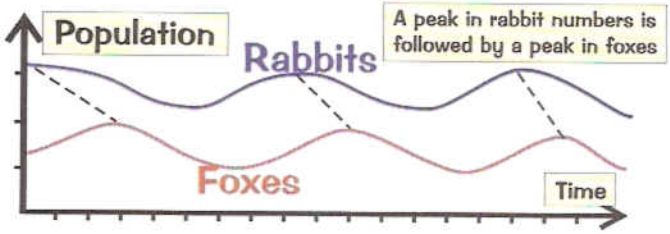
Relationships Between Organisms

Relationships between organisms can be negative, positive, or neutral. Some examples of relationships in nature are producer/consumer, predator/prey, or parasite/host.

Populations of prey and predators go in cycles

In a community containing prey and predators (as most of them do of course):

1) The population of any species is usually limited by the amount of food available.
2) Usually, if the population of the prey increases, then so will the population of the predators.
3) However as the population of predators increases, the number of prey will decrease.



For example, more grass means more rabbits.
More rabbits means more foxes.
But more foxes means less rabbits.
Eventually, less rabbits will mean less foxes again.
This up and down pattern continues...

Mutualism is where both partners benefit

Mutualism is a relationship between organisms of different species where both partners benefit — so it's a win-win relationship.

Example

There is a win-win relationship between ruminants, like cattle, and the microorganisms that live in their rumen (part of the stomach). The ruminant provides food and a warm, moist environment for the microbes. The microbes digest cellulose in the grass that the ruminant eats. The ruminant can't digest grass itself because it hasn't got a cellulase enzyme to break down the cellulose found in grass.

A parasite feeds off its host

Parasites live on or in their larger host. The parasite gets its nutrition from the host. This often harms the host — which makes this a win-lose relationship.

Example

The tapeworm is an example of an effective parasite. It starts its life living in a pig, but through consumption of under-cooked pork ends up living in a human gut, where it can grow up to 3 meters long. It is long and thin with a large surface area to absorb lots of nutrients from its host. The tapeworm produces loads of eggs to increase the chances of infecting a new host. The eggs leave in the host's feces.

Ecological Succession

Over time, all ecosystems progress through a series of changes — this is called succession.

Ecosystems change over time

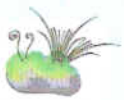
Ecological communities modify (change) the environment they live in. These changes can make it possible for a different community to live there, and so the ecosystem gradually changes. Eventually the ecosystem becomes stable and can last unchanged for hundreds or thousands of years.

For example, in the diagram of succession below these steps may take place:

1. Bare rocks, for example, new rock that is formed after a volcanic eruption.

2. Lichens are the first organisms to colonize the rocks. Over many years the lichens create a shallow soil.

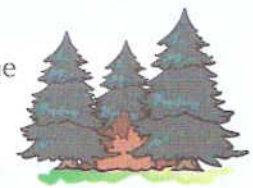
3. Mosses, grasses, and ferns take root in the shallow layer of soil created by the lichens.



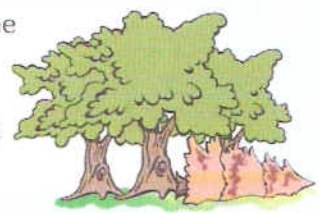
4. Grassland forms, and the layer of soil is built up. The plants also add nutrients to the soil and provide food for small animals.

5. Shrubs colonize the grassland when there is enough nutrient-rich soil. Shrubs provide protection for animals and seedlings of pine trees and other softwood conifers.

6. Coniferous trees (like pine, spruce, and hemlock) take over the area. They often provide enough shade that the grasses and shrubs cannot receive the Sun's energy and so they die out.



7. Hardwood trees (like oak, maple, and hickory) will replace the conifers, if there is enough rainfall and nutrients in the soil. These trees create so much shade that the pine, spruce, and hemlock seedlings will not be able to survive. This is a stable ecosystem and will probably then last for hundreds of years.



Different organisms exist in each stage of succession. Once a community is established, it gradually changes the environment, making it unsuitable for itself but ideal for the next stage in the process.

Sometimes a stable ecosystem is changed through the action of organisms (including humans) or because of natural events like forest fires, floods, or global warming. But a changed ecosystem can usually recover, and through the process of succession return to long-term stability.

Succession — betcha not lichen it much...

The most important thing to remember about succession is that an ecosystem will change over time because of the organisms living in it. These changes mean that other organisms can move into the ecosystem, making more changes. It goes on like this until you get a stable ecosystem. Now learn it...