

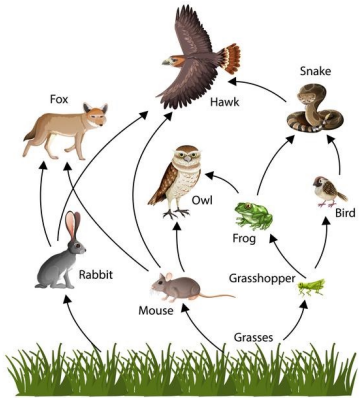
# Ecosystems & Interdependence

## Food webs

The source of all energy in a food web is the Sun's radiation. It is made useful by plants and algae which make glucose and then other compounds by photosynthesis. This is why plants (producers) are always at the start of a food chain.

The arrow in a food chain/web indicates the direction of the flow of energy.

Species in a food web rely on other species for food. If the number of one species in a food web changes, there will be knock on effects for all other species in the web. This is called interdependence.



## Food Security

Food security is the ability of all people to be able to access nutritious food. A large proportion of the crops humans eat rely on insect pollinators like bees in order to reproduce. Bee populations are under threat from insecticides, loss of habitat and disease. It is important that we protect bees in order to protect our food security.

## Competition

Species will compete with one another (interspecific competition) and also within their own species (intraspecific competition) to survive and reproduce.

Animals compete for resources like food, water, and space/shelter. They may also compete within their species for mates.

Plants compete for light, water, space and minerals. These are needed for photosynthesis.

## Adaptation

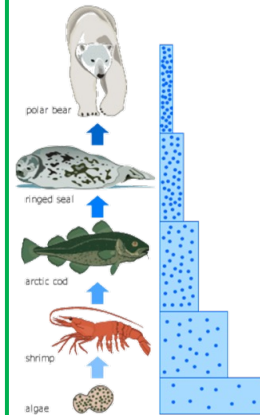
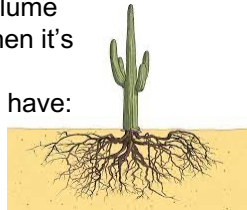
Adaptations are specific features of an organism that help it to survive and reproduce in the conditions of their habitat, e.g.

Animals in a hot climate may have:

- Thin fur
- Produce little urine
- Large surface area : volume
- Active at dawn/dusk when it's cooler

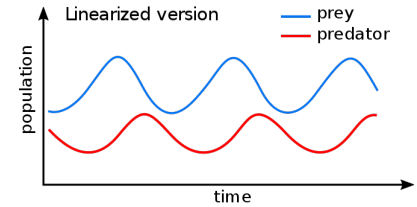
Plants in dry climates may have:

- Deep roots
- Thick waxy cuticle
- Store water
- Spines instead of leaves to reduce surface area



## Predator Prey Cycles

Populations of predators and prey increase and decrease over time in cycles. The size of the predator population depends on the size of the prey population and vice versa.



## Bioaccumulation

Some toxins (e.g. mercury, or some insecticides like DDT) are **persistent**. This means they do not break down in living tissue.

These toxins can enter a food chain by being absorbed by a plant or eaten by an animal. Low levels of toxins may not kill the organism that ingests it.

**Bioaccumulation** means that the higher up the food chain the more concentrated the toxins become; it is often the organism at the top of the chain that succumbs to the toxin.

## Sampling

The **distribution** of an organism (where it is found) is affected by living (**biotic**) and non-living (**abiotic**) factors. Quadrats are 1m<sup>2</sup> square frames that can be used to estimate population sizes. You count the individual organisms in a sample of quadrats, then find the mean by taking the total number organisms you counted and dividing it by the number of samples. Then multiply the mean by the total area being investigated to estimate the number of organisms present. Quadrats must always be placed randomly. If you divide the area to be tested into numbered squares, you could use a random number generator to help you choose where to place the quadrats.