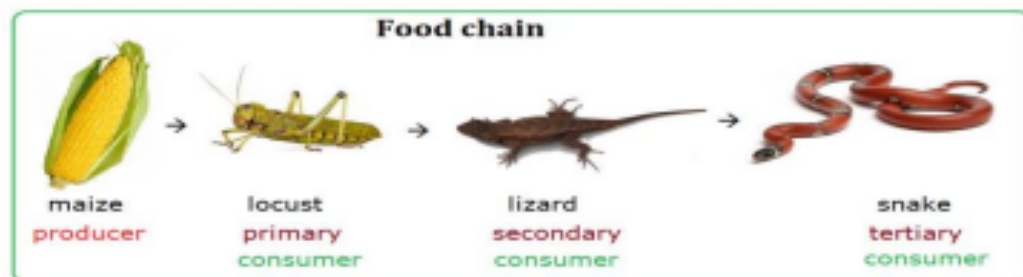


## Biology Knowledge Organiser Ecological relationships

**KPI 8.1** Describe feeding relationships and food webs, and explain how a changing environment may affect them.

All food chains start with a green plant, producers. Arrows point to the eater and show the flow of energy in a food chain. Each stage is called a trophic level

**mahogany tree → caterpillar → song bird → hawk**  
**maize → locust → lizard → snake**



The first eater in a food chain is called the **primary consumer** and is a herbivore.

The next organism is the **secondary consumer** and the next is the **tertiary consumer** and this is usually the **top carnivore**.

**Food chains** do not go on indefinitely as energy is lost at each stage of the food chain. Some of the available energy goes into growth and the production of offspring. This energy becomes available to the next stage, but most of the available energy is used up in other ways: In respiration, keeping warm, movement and waste materials, such as faeces  
All of the energy used in these ways returns to the environment, and is not available for the next stage.

Key Terms	Function
Herbivore	Organism eats plant only, prey organisms
Carnivore	Organism eats other organisms, they hunt prey for their dinner
Omnivore	Organism eats both plant and animals
Primary consumer	The first eater in a food chain
Secondary consumer	The second eater in a food chain
Tertiary consumer	The 3 <sup>rd</sup> organism feeding in the food chain, usually the top carnivore
Trophic level	Stages in the food chain e.g producers, or primary consumers
Bioaccumulation	The build up of toxic substances in the food chain, affecting organisms at the top of food chains
Ecosystem	A community of interacting organisms and their physical environment

**Food chains** show a simplistic view of who's eating who in an **ecosystem**. Organisms eat more than 1 food so food chains link together to make **food webs**

Removing an organism or adding an organism to a food chain can have big implications on other organisms



## Biology Knowledge Organiser

### Ecological relationships

**KPI 8.1** Describe feeding relationships and food webs, and explain how a changing environment may affect them.

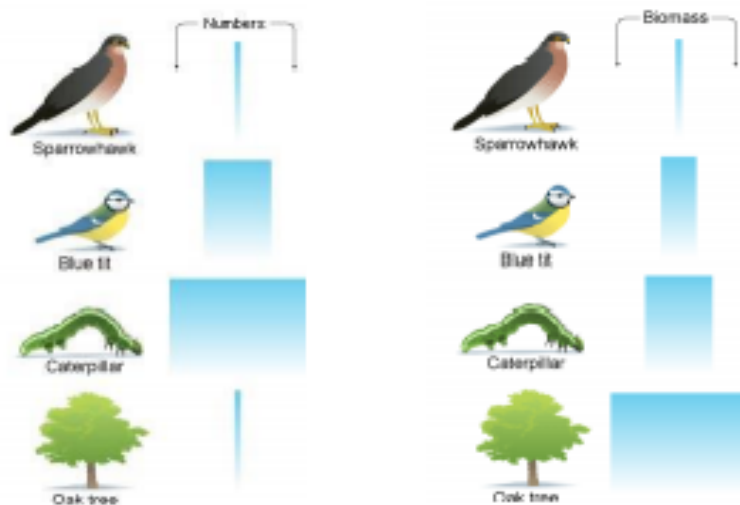
#### Pyramids of numbers and biomass

**Pyramids of numbers** show how many organisms are at each **trophic level**. The width of each box represents the number of organisms



Pyramids of number can end up odd shapes when 1 producer is large in size e.g one tree that supports lots of tiny organisms e.g aphids

**Pyramids of biomass** show more accurately what is happening to the energy in a food chain than pyramids of number do. Pyramids of biomass are always pyramid shaped

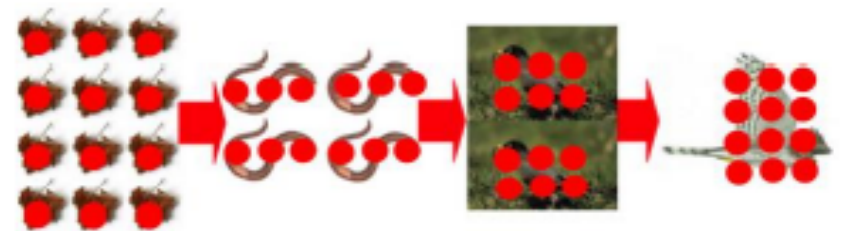


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#### Bioaccumulation

Some toxic substances like pesticides can pass up food chains.

Organisms near the bottom of the food chain absorb them in small amounts. The concentration in these organisms is too low to cause significant harm. However, as these organisms cannot excrete these substances, when they are eaten by others higher up the food chain, the concentration becomes more toxic and eventually causes harm. DDT is an example of a pesticide that was used and built up in the food chain.



## Biology Knowledge Organiser Ecological relationships

**KPI 8.2** Explain how variation allow organisms to compete, and the way this drives natural selection

Organisms compete for resources like food, water, mates, space, light, and minerals.

There are 2 types of competition. **Interspecific competition** is between individuals of different species and **Intraspecific competition** is between individuals of the same species



Organisms have special features known as **adaptations** to help them survive in their environment. For example polar bears are white so they are camouflaged in the snow.

Organisms have structural adaptations e.g camels carry very little body fat to avoid overheating, but can also show behavioural adaptations e.g penguins huddle together to keep warm and brown bears hibernate



Key Terms	Definition
Interspecific competition	Competition between individuals of different species
Intraspecific competition	Competition between individuals of the <u>same</u> species
Camouflaged	When an organisms blends in to their environment
Variation	Differences between organisms caused by genetics, environment or both
Natural selection	The process whereby organisms better adapted to their environment tend to survive and produce more offspring

### Natural selection

Natural selection states that there is variation within a species. Some adaptations are better than others. Those with the best adaptations **survive**, and the others die.

The survivors can **reproduce** and have **offspring**.

Their offspring **inherit** the **genes** for the best adaptations, so the organism **population** changes over time. This is survival of the fittest. Charles Darwin came up with this theory in the 1800's

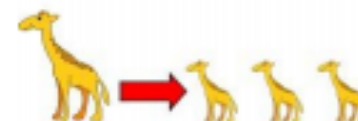
### Natural Selection

1) Each species shows variation:



2) There is competition within each species for food, living space, water, mates etc.

3) The "better adapted" members of these species are more likely to survive – "Survival of the Fittest"



4) These survivors will pass on their better genes to their offspring who will also show this beneficial variation.