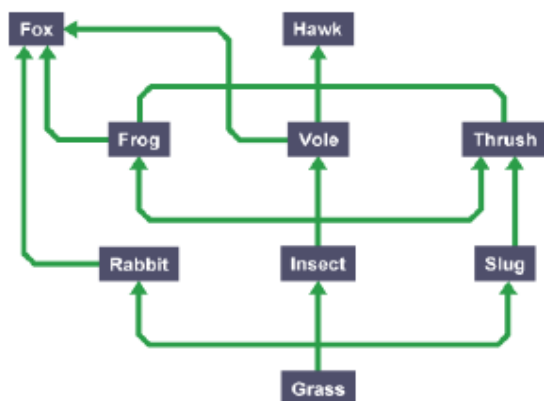


KPI 8BE 1: describe feeding relationships and food webs, and explain how a changing environment may affect them

Feeding relationships

A food chain shows the different species of an organism in an ecosystem, and what eats what. Here is an example of a simple food chain:
 grass → cow → human.

When all the food chains in an ecosystem are joined up together, they form a food web. Here is an example of a food web:



Factors including changes in the producer, changes in the number of consumers, and the population of pollinating insects all affect the size of populations within a food web.

Key terms and definitions

Term	Description
Environment	All the conditions that surround a living organism
Habitat	The place where an organism lives
Population	All the members of a single species that live in a habitat
Community	All the populations of different organisms that live together in a habitat
Ecosystem	A community and the habitat in which organisms live.
Producer	An organism that makes food – usually a green plant
Consumer	An animal that eats plants or another animal These are divided into: Primary consumer: the first consumer in the food chain Secondary consumer: the second consumer in the food chain Tertiary consumer: the third consumer in the food chain
Carnivore	A consumer that eats other animals
Omnivore	A consumer that eats plants and other animals
Herbivore	A consumer that eats only plants
Predator	An animal that hunts and eats other animals
Prey	An animal that gets eaten by the predator
Interdependence	The name given to the relationship between all organisms in an ecosystem

Pollinators

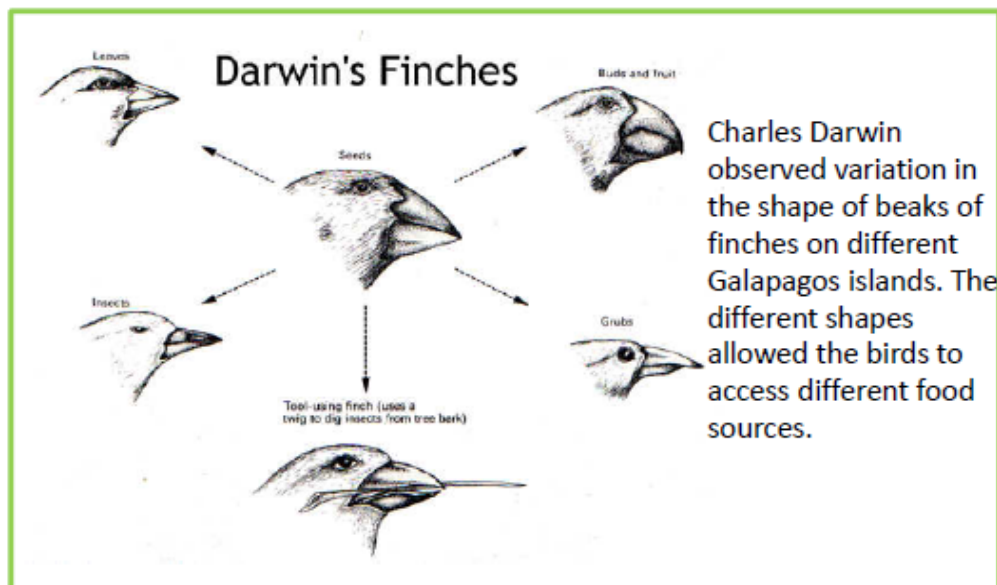
Insects such as bees pollinate plants which allows the formation of seeds and subsequent new plant growth. Without sufficient pollinating insects the population of these plants will reduce. This will reduce the food available for the consumers of these producers.

Toxic waste

Some poisonous toxins accumulate in food chains and damage organisms in it, especially predators at the end of the chain because accumulating toxins cannot be excreted. Examples include mercury and DDT. High levels of mercury can cause damage to the nervous and reproductive systems. DDT causes birds to lay eggs with weak shells.



KPI 8BE 2: explain how variation allows organisms to compete, and the way this drives natural selection



Term	Description
Species	A group of individuals that are physically similar that can produce fertile offspring
Variation	The presence of differences between living things of the same species
Competition	Interaction between groups of organisms seeking to access limited supplies of factors required for life e.g. light, space, food
Natural selection	A process that causes populations to change over time.
Evolution	The change in species over long periods of time
Gene	The basic units of genetic material inherited from our parents. A gene is a section of DNA which controls part of a cell's chemistry - particularly protein production.

'Survival of the fittest' is a used to summarise Darwin's theory

Natural selection

A theory proposed by Charles Darwin to explain evolution . It states that:

- Individuals in a species show a wide range of variation.
- Inherited variation is due to differences in their genes.
- Individuals with the features that are best suited to the environment are more likely to survive and reproduce.
- The genes that allow these individuals to be successful are passed to their offspring.
- Individuals that are poorly adapted to their environment are less likely to survive and reproduce. This means that their genes are less likely to be passed to the next generation.
- Over many generations these small differences add up to the new evolution of species.
- Given enough time, a population may change so much it may even become a new species, unable to reproduce successfully with individuals of the original species.

Darwin's book 'Origin of Species' was not well received by many. It contradicted traditional religious views and challenged society's thinking on the origin of life.



KPI 8BE 4: describe the importance of maintaining biodiversity and how gene banks can be used for preservation

Why is biodiversity important?

Biodiversity is essential in maintaining environments, feeding relationships and providing sources of medicines and other scientific opportunities to support life on Earth.

Importance	Example
Food	Fish, wheat etc.
Medicines	Morphine from opium poppy
Raw materials	Wood, cotton etc.
Recreation	Hill walking, diving etc.
Genetic material	Disease-resistant crops

Term	Description
Biodiversity	The range of animals and plants in a given area.
Endangered species	Animals that are close to extinction because of their low numbers.
Gene bank	A store of genetic material such as sperm, embryos or seeds

How can we maintain biodiversity?

Conservation measures of endangered animal species such as:
 education programmes
 captive breeding programmes
 legal protection and protection of their habitats
 making artificial ecosystems for them to live in
 Some plant species are also endangered.

What is a seed bank and what is it used for?

Conservation measures for plants. Seeds are carefully stored so new plants can be grown in the future. Seed banks are an example of a [gene bank](#). Gene banks are increasingly being used to preserve genetic material for use in the future. A cryobank is another type of gene bank. Embryos, sperm or eggs are stored at very low temperatures in liquid nitrogen (which is at a very chilly -196 °C). They can be thawed out later for use in breeding programmes



Conservation measures

An endangered species is at risk of becoming extinct. For example, the panda and gorilla are endangered and may become extinct. A species can become endangered for several reasons, including:

- the number of available habitats falls below a critical level
- the population of the species falls below a critical level

For example, the South African quagga was a type of zebra that became extinct because of hunting. The last wild quagga was shot in the late 1870s. However, a lone female quagga later died in a zoo in Amsterdam in 1883, the last of her species.



KPI 8BE 3: describe how a species may become extinct

What causes extinction?

A species becomes extinct when there are no more individuals of that species left. Changes in the environment may leave individuals less well adapted to compete successfully for resources such as: food, water and mates.

Some of the changes in the environment that can cause a species to become extinct are:

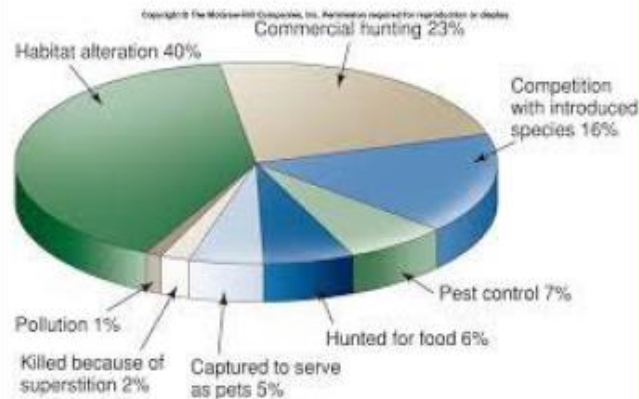
- a new disease
- a new predator
- a change in the physical environment, such as climate change
- competition from another species that is better adapted, including competition from humans.

The dodo

Characteristics:
 flightless bird; found on the island of Mauritius; no fear of humans; easy to catch. Became extinct in the 17th century because of human activities – disturbing it’s habitat and also brought new predators to the island, like dogs. It only took about 100 years after its discovery for it to become extinct.



Causes of extinction



Causes of Depletion and Premature Extinction of World Species

Underlying causes

- Population growth
- Rising resource use
- Undervaluing natural capital
- Poverty

Direct causes

- Habitat loss
- Habitat degradation and fragmentation
- Introduction of nonnative species
- Pollution
- Climate change
- Overfishing
- Commercial hunting and poaching
- Sale of exotic pets and decorative plants
- Predator and pest control

