Evolution in New Zealand

Junior Science

Organisms vary and that some variations give advantages over others in a given environment

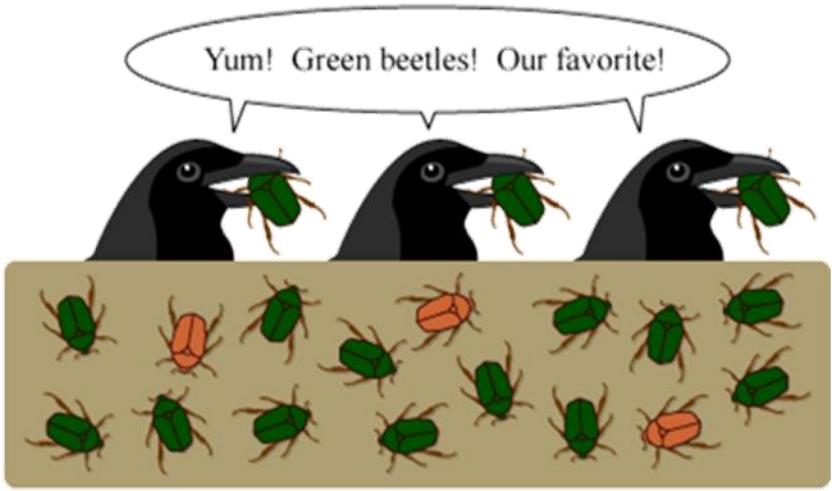
Adaptations of a New Zealand kakapo include mossy green colouring for camouflage, and a stout ridged bill to cut through tough plant material

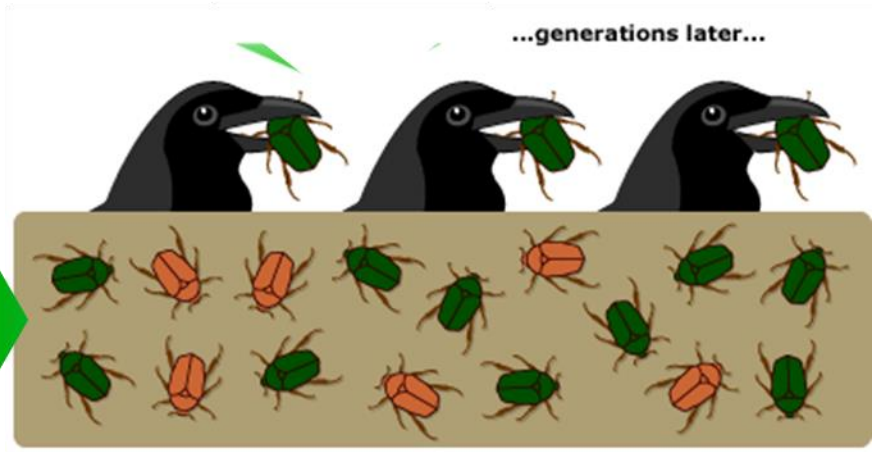
https://www.tumblr.com/search/strigops%20kakapo

Individuals of a species occupy a **niche** and they have **adaptations** to survive in their habitats. The adaptations may help them to best obtain food, seek mates, raise offspring, find shelter or escape predators.

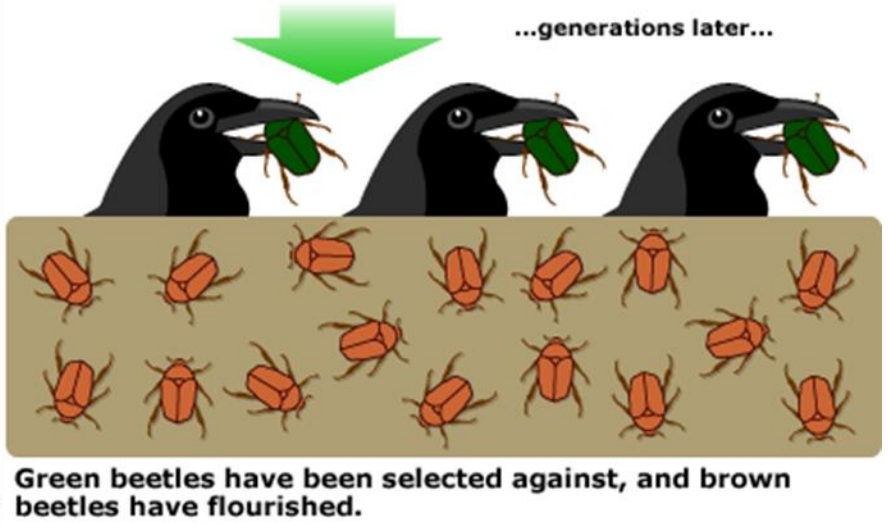
Adaptations are **physical characteristics (phenotypes)** an organism can genetically pass onto their offspring. Because there is variation between individuals of a species, some individuals may have an advantage over others when one or more of their adaptations is better suited for survival in their habitat.

Variations caused by genes can be passed on to offspring and genes giving advantageous adaptations are more likely to be passed on than others





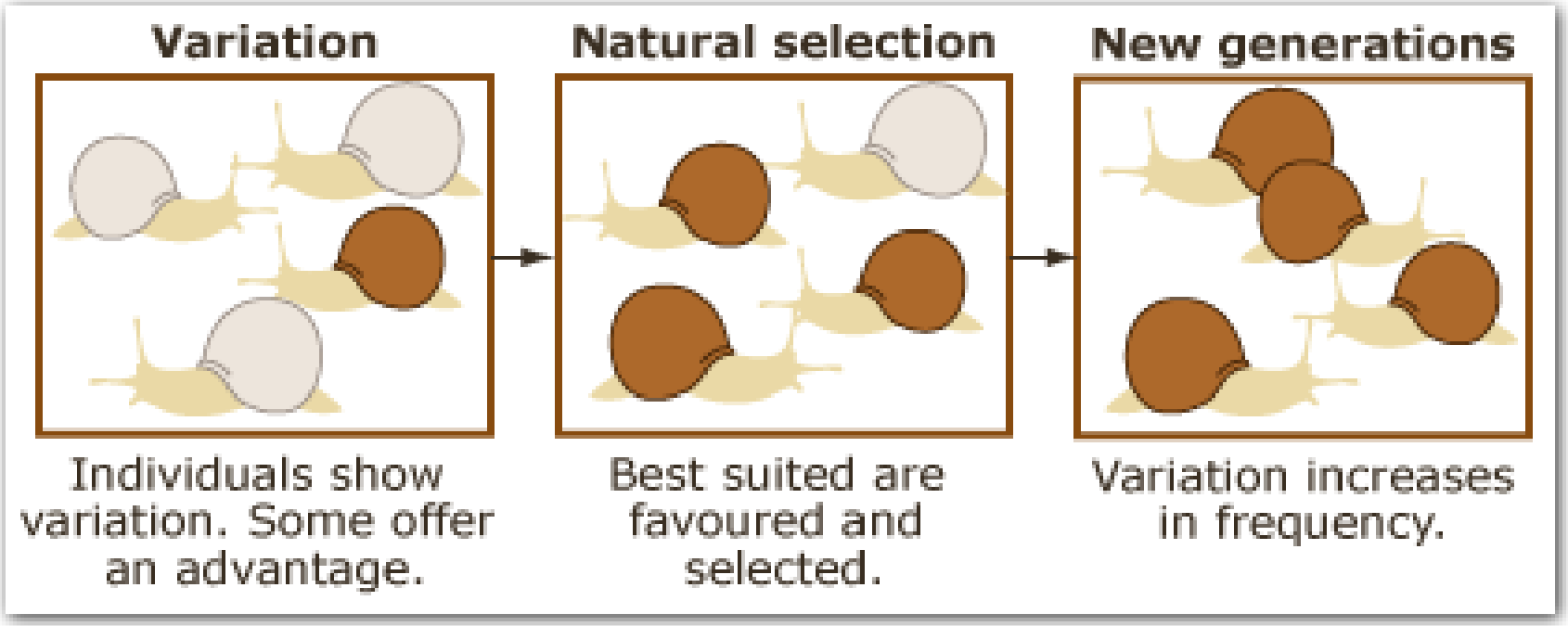
When there is a higher chance of survival for an individual with an better adapted trait then there is also more chance that the organism is alive long enough to find a mate and produce offspring than other less advantaged individuals. A higher frequency of offspring with the inherited advantageous **genes (genotype)** will be born.



https://evolution.berkeley.edu/evolibrary/article/bergstrom_02

Natural Selection

Natural selection occurs when environmental factors may favour certain variations of physical characteristics (phenotypes) and selects for or against it, and its underlying genes (genotypes).



https://danielnevolution.weebly.com/natural-selection.html

Natural selection occurs due to environmental factors

Natural selection occurs due to environmental factors (called **selection pressures**) acting on the natural variation that occurs in a group of individuals of the same species.

Environmental factors can include drought and lack of food or water, disease, flooding and sudden climate change. If there are some individuals with a trait/s that are better suited to survive in the changed environment then they maybe able to reproduce and past their genetic material onto the next generation to help the survival of the species.

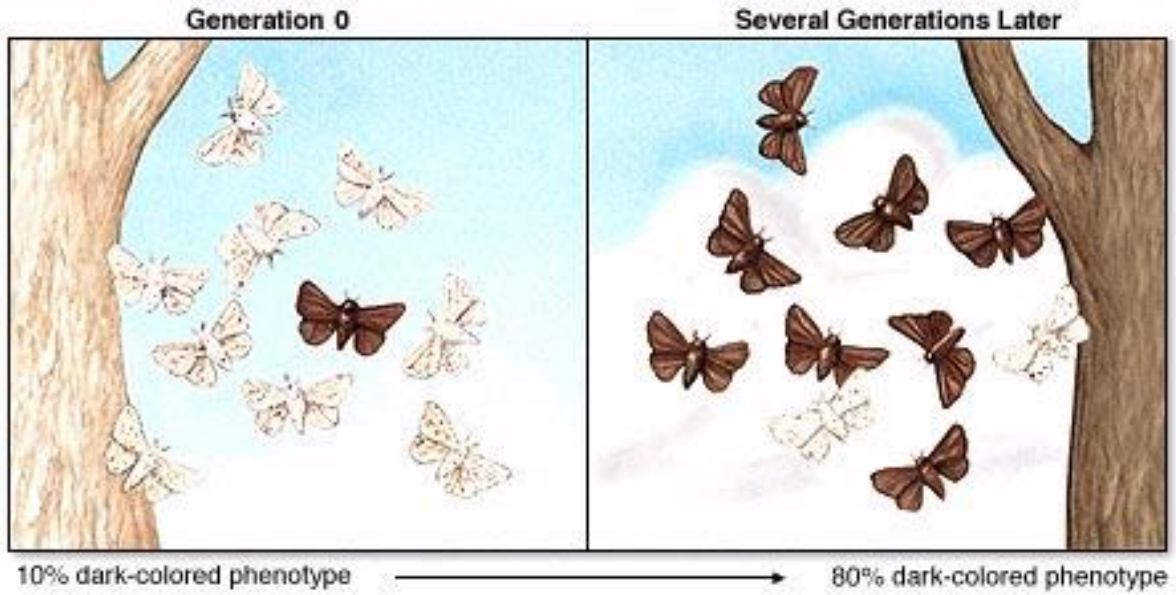
Without variation in a species any sudden environmental change can mean that no individual has a trait that allows it to survive, causing the species to become **extinct**.

Variation in the coat length and thickness of a tiger have allowed it to survive in many different types of environment ranging from snow covered Siberian forest to tropical Malaysian jungle. From one original tiger species with variation, 10 subspecies have evolved.

Conditions for Natural Selection to occur

For **Natural Selection** to occur:

1. There must be variation in one or more physical characteristic in a population that gives an advantageous adaptation.
2. The individuals with the advantageous physical characteristic must be more successful in reproducing and producing more offspring.
3. The physical characteristics must be able to be passed on genetically to the offspring. (in the form of alleles)
4. The alleles responsible for the physical characteristic must increase in **frequency** in the population over time.



https://cdn.thinglink.me/api/image/501756802828861441/1240/10/scaletowidth

Natural selection acts on the phenotype

Traits in a species such as structural adaptations and behaviour are controlled by genes. Species that reproduce sexually show **variation in the traits** of individuals.
Variation in a species **increases the chance of survival of a species** if there is a change in the environmental factors.

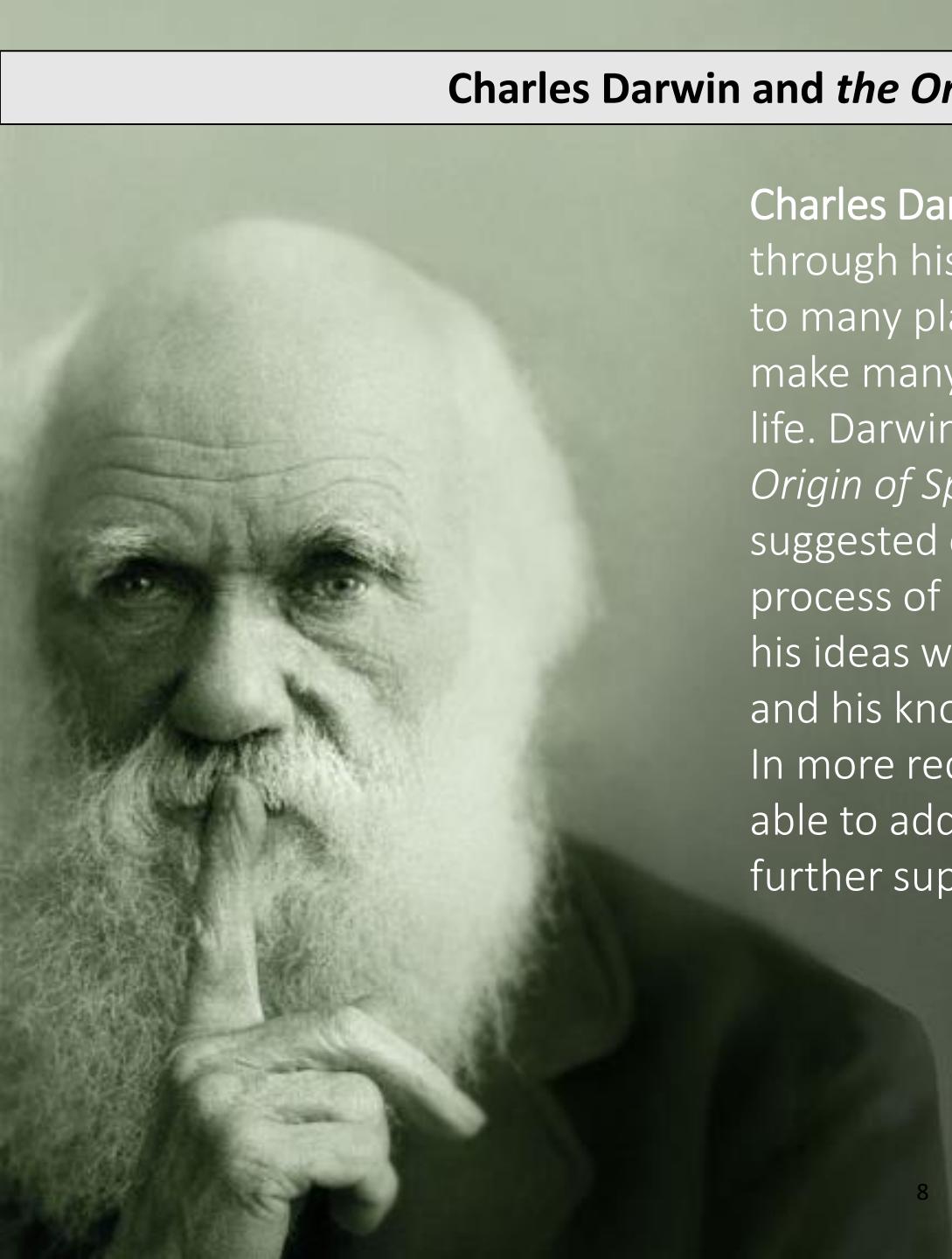
Traits that an organism has is called its **phenotype**, or physical characteristic. The phenotype is the result of the genotype which is the gene combinations passed on from the parents during reproduction.

Natural selection acts on the physical characteristic (phenotype) and selects for or against it which results in certain combinations of genes (genotypes) being more or less favoured to survive and reproduce OR being selected for or against

extra info

Variation in the neck length of a giraffe is a phenotype passed on from parents to offspring.
In a drought season when there is limited food, those giraffe that have the longer neck phenotype can reach higher into the trees for leaves and have a better chance of survival and breeding. Their genes have a better chance of being passed on.

Charles Darwin and *the Origin of Species*



Charles Darwin was a naturalist and through his travels on the *HMS Beagle* to many places in the world he was able to make many observations of plant and animal life. Darwin published a book called *The Origin of Species* in 1859 in which he suggested evolution was occurring due to the process of **Natural Selection.** He supported his ideas with observations from his travels and his knowledge of **selective breeding**.
In more recent times Scientists have been able to add their discoveries of **Genetics** to further support the Theory of Evolution.

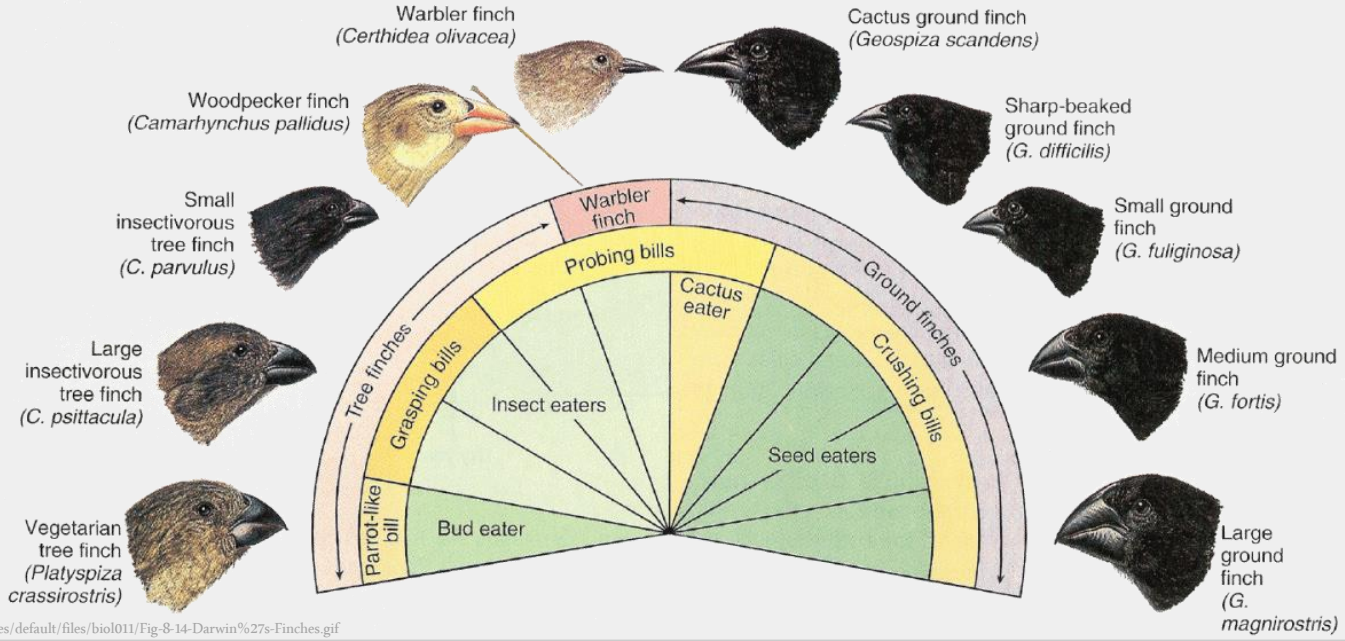
https://allyouneedisbiology.files.wordpress.com/2015/06/cientifico_charles_darwin-e1434061521343.jpg

Background Knowledge

Evolution is the process of change in all forms of life over generations.

The **Theory of Evolution** explains that living organisms change in structure and function over long periods of time. A scientific theory is an idea or concept that is supported by large amounts of **evidence**. The evidence is collected from observations and scientific investigations.

The evolution of the Galapagos finches from an ancestral finch



https://online.science.psu.edu/sites/default/files/biol011/Fig-8-14-Darwin%27s-Finches.gif

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Background Knowledge

Evidence for Evolution

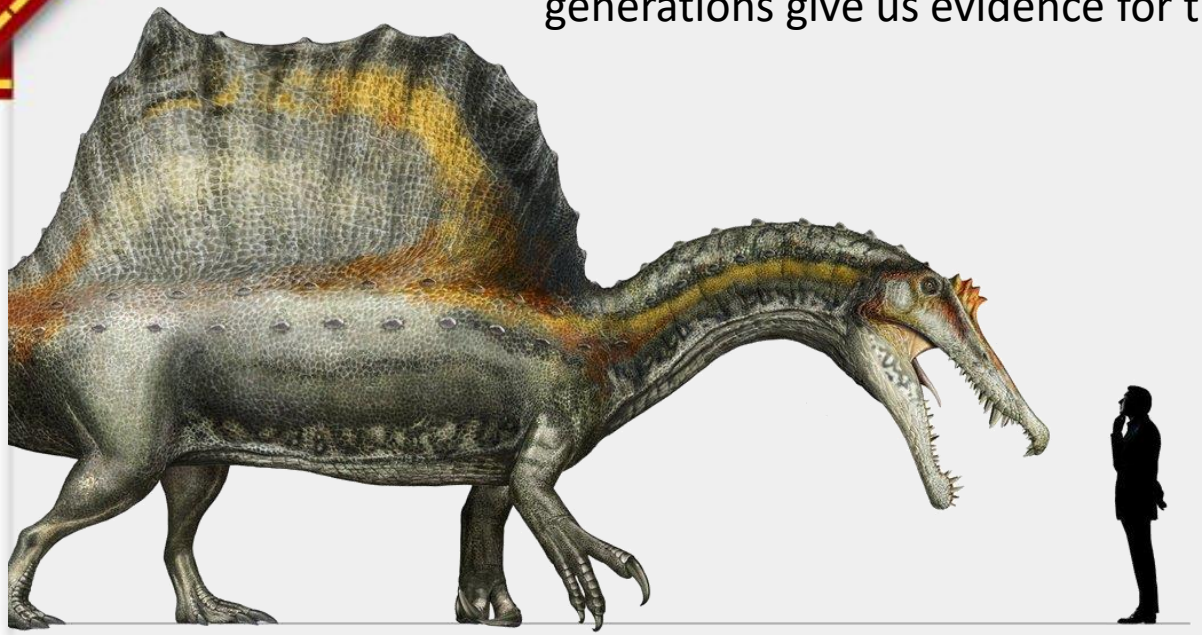
extra info

Scientists have been able to collect evidence from many sources to support the Theory of Evolution:

Fossils show us that there has been changes in the forms of plants and animals on Earth. We have also been able to find fossils of common ancestral animals that join species found on Earth today.

Genetics and DNA structure allow us to compare living organisms and to calculate the amount of differences between species.

Observations of small changes in species occurring within a few generations give us evidence for the process of natural selection.

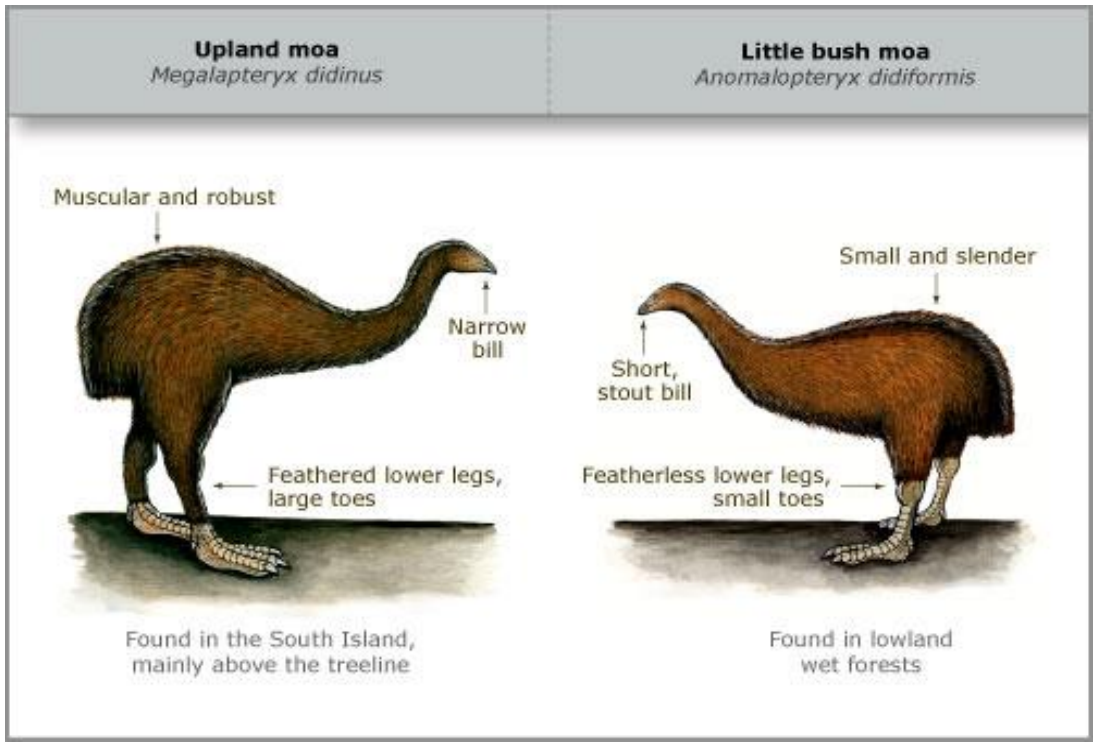


Biogeography or how species are distributed around the world gives us evidence to the relationships between species.

Artificial selection that humans have used to domesticate animals and plants shows us how species can change.

https://static01.nyt.com/images/2014/09/12/science/12dino-1/12dino-1-videoSixteenByNine1050.jpg

Natural selection case study – New Zealand Moa



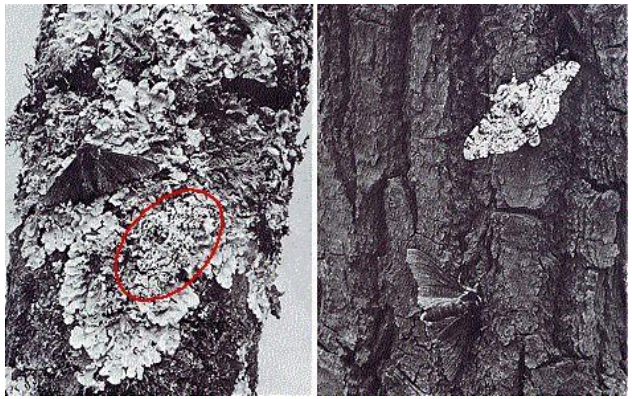
https://teara.govt.nz/files/di-12447-enz.jpg

Moa are a group of Flightless Native New Zealand birds that are now extinct. **Natural selection** is a process that changes the occurrence of particular **physical traits** in a species (and therefore the alleles that produce them) over many generations. The Moa species to the left have different physical traits but would have had a common ancestor in the past.

The most likely factor that would have caused this change into two different species above, is **different habitats and environmental factors;** as one species lived in bush and one Moa species lived on open hills. Physical traits such as a small slender shape to fit under trees and move around easier and therefore be able to escape predators and gather more food, or featherless lower legs to prevent getting waterlogged in the wet forest and therefore keep warmer and not be so heavy to move around, would be selected for.

Natural selection case study – Moths

In some parts of England two centuries ago coal started to be burnt in large amounts to power steam engines and provide heating in homes. The coal soot from the burning polluted the air and many once light coloured tree trunks around polluted areas were turned dark from the soot. A species of moth had **two traits, light and dark.** Both light and dark moths are eaten by birds. Light coloured moths now could be more easily seen by birds.



How did the two traits (phenotypes) of the species of moth help the population to survive when the environment changed (selection pressures) and all the trees on which the moths lived become darker?

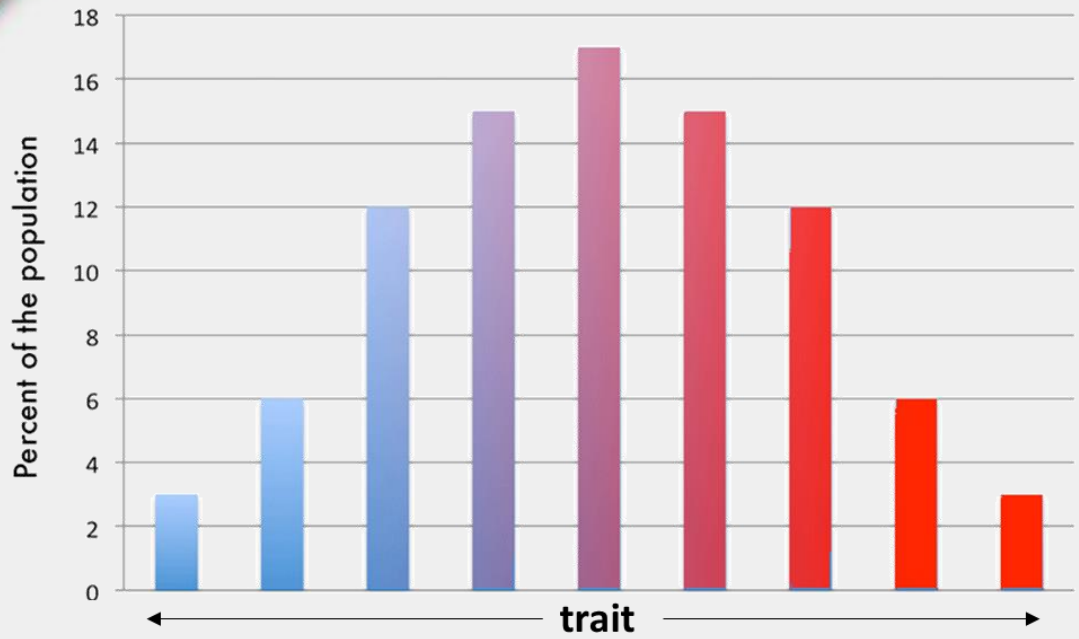
White bodied moths are more visible on a dark background and easily preyed upon. Dark coloured moths are more visible against a light / lichen background.

Individuals that are best suited to an environment will survive to reproduce and pass on their genes to future generations. This will lead to increase in numbers of the moth with an advantageous trait (phenotype).

If the environment changes, eg trees become darker, those individuals with dark bodies will have the beneficial characteristic and pass this onto their offspring, while the light coloured moths will stand out and be preyed upon, therefore reducing in number. As a result the trait (phenotype) ratio will change to more dark than light over time.

Background Knowledge

Why is variation so important for a species survival?



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During a “typical” season in any environment, an average phenotype for any particular trait is most likely to be best adapted to the environment and therefore the organism having it will have the best chance for survival. Those “average” phenotypes are likely to make up the largest percent of the population.

In an “atypical” season that may be drier/wetter, or hotter/colder, then individuals with more extreme versions of a phenotype (alleles) may have the advantage of survival. If the conditions have a very large change then sometimes only those with extreme phenotypes survive. Permanent shifts in the frequency of alleles to either end is called **evolution**.

Background Knowledge

Humans can exploit variation through artificial selection

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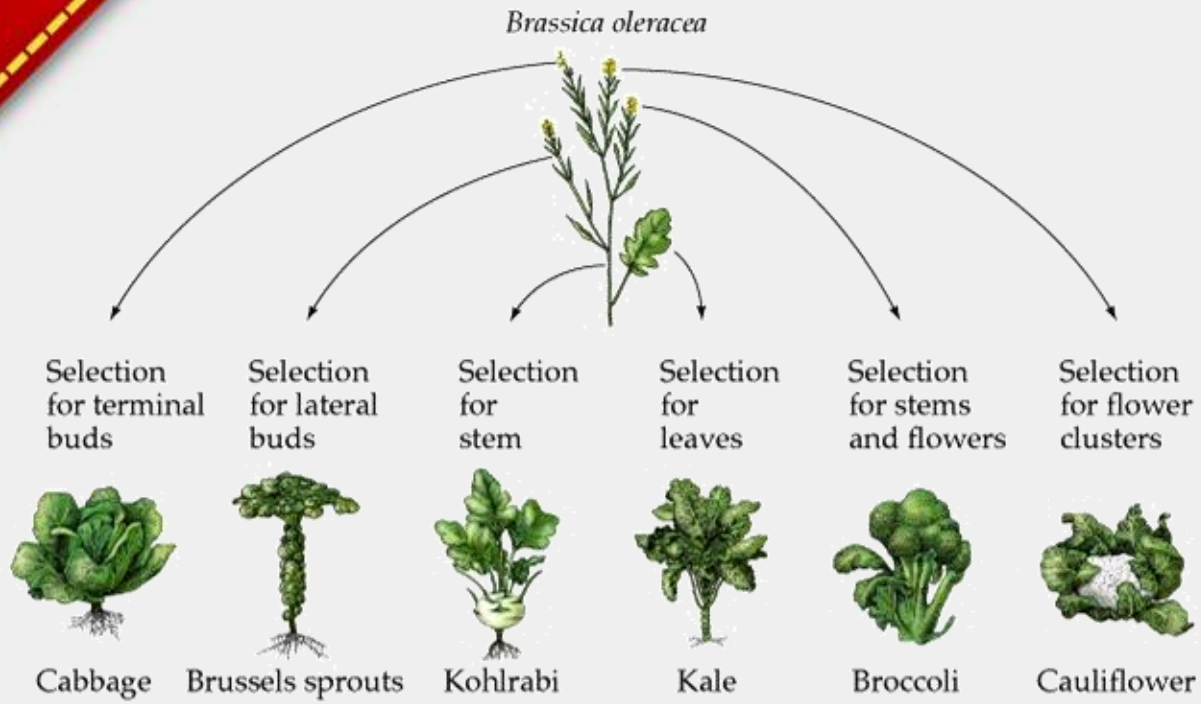
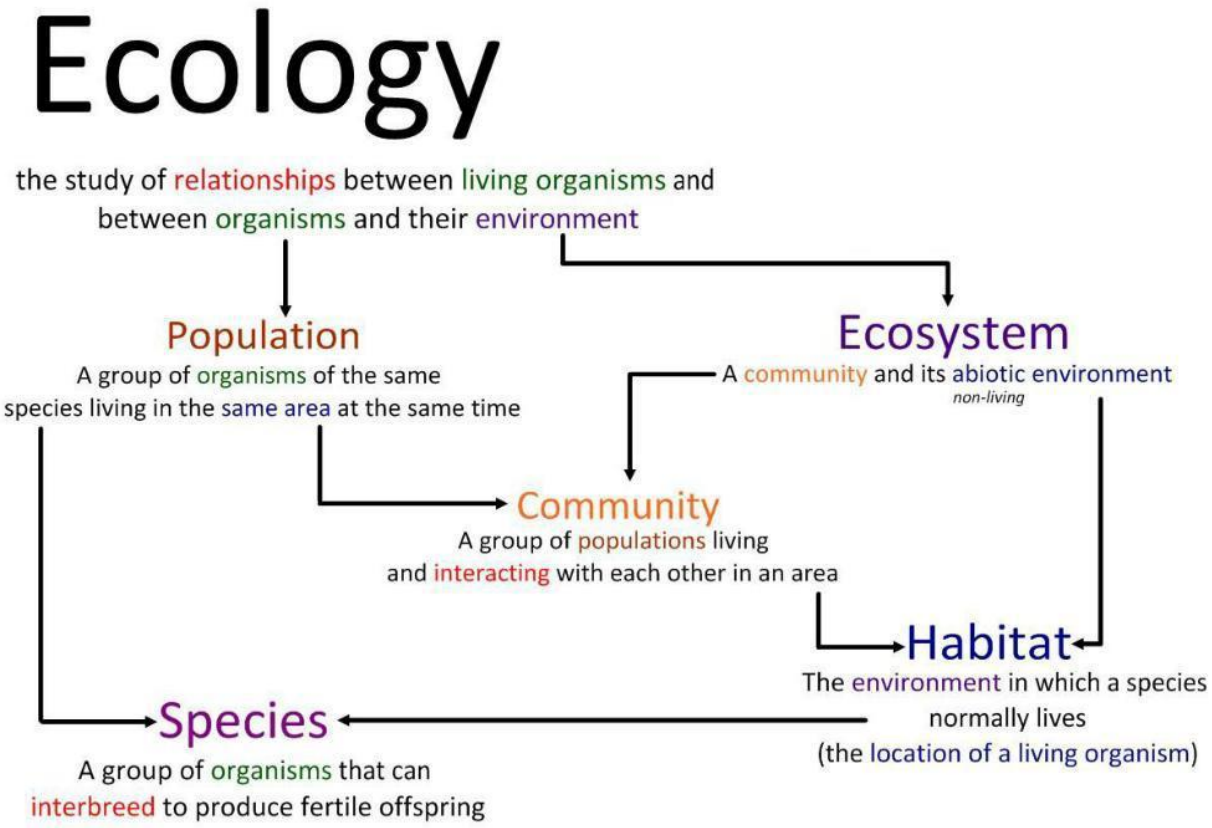


Humans have been able to **domesticate** plants and animals by actively selecting advantageous traits in a wild species and repeatedly breeding those individuals that exhibit it. After many generations the domesticated species looks distinctly different from the original wild ancestor. This process is known as **artificial selection**.

An ecosystem is the habitat and the community considered together.

extra info

An **ecosystem** includes all of the living organisms in a specific area. These systems consist of a living component called the **community** made up of all the plants, animals, fungi, bacteria and protista which interact with their non-living environments (weather, Earth, Sun, soil, atmosphere) which determine the **habitats** available. An ecosystem depends on the energy that moves in and out of that system. Ecosystems can be large or small.



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Adaptations assist an organism to survive in an ecosystem

An adaptation is a **feature** of an organism that aids the **survival** and reproduction of individuals of that species in its environment.

Whio (Blue Duck) live in rivers or streams that are:

- *fast-flowing*
- *surrounded by trees*
- *rocky-bottomed and clean and clear (not polluted!!)*

https://www.nzgeo.com/wp-content/uploads/2016/12/10_BACK_v18_flat_300dpi-600x291.jpg

http://roomwhio.blogspot.co.nz/p/class-items.html

Whio adaptations to its environment: The whio has large, webbed feet to give it power in fast-flowing water, and well-developed claws for rough terrain to hold on tight to rocks.

The whio has a tough rubbery tip to its beak to push between rocks and find aquatic invertebrates (water insects)

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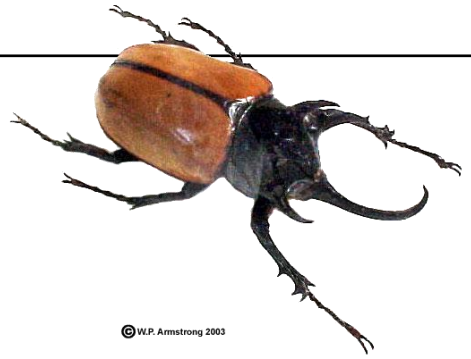
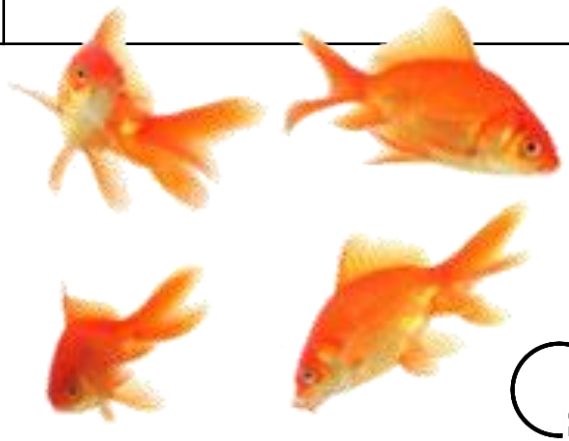
Adaptations are genetically inherited traits that allow species to survive better in their habitat

Adaptations can be classified into three main group. Structural adaptations are often seen as physical characteristics but all three types are genetically inherited and controlled by genes.

Structural	Physiological	Behavioural
A structure/physical feature of an organism that helps it to successfully live in it's habitat. e.g.: the long beak of a kiwi to get food in the soft forest ground	A chemical or process inside an organism that helps it survive. e.g.: bad tasting chemicals inside beetles to stop being eaten	An activity that an organism does that helps it (or its group) to survive. e.g.: fish swimming in groups for safety





The niche is the way in which an organism interacts with its environment including its feeding role, type of activity and habitat

The **niche** of a species describes how members "make a living" in the environment in which they are found.

Describing the niche of a species would include:

- The **habitat**, which means where the species lives, feeds and reproduces.
- When the organism is **active** (day or night)
- The **feeding role** that the species has in the community. (producer, consumer or decomposer)
- The **adaptations** the organism has to best survive.

The New Zealand kiwi is a flightless bird that lives in a NZ bush habitat that has a temperate climate. The kiwi is an omnivore and is nocturnal.

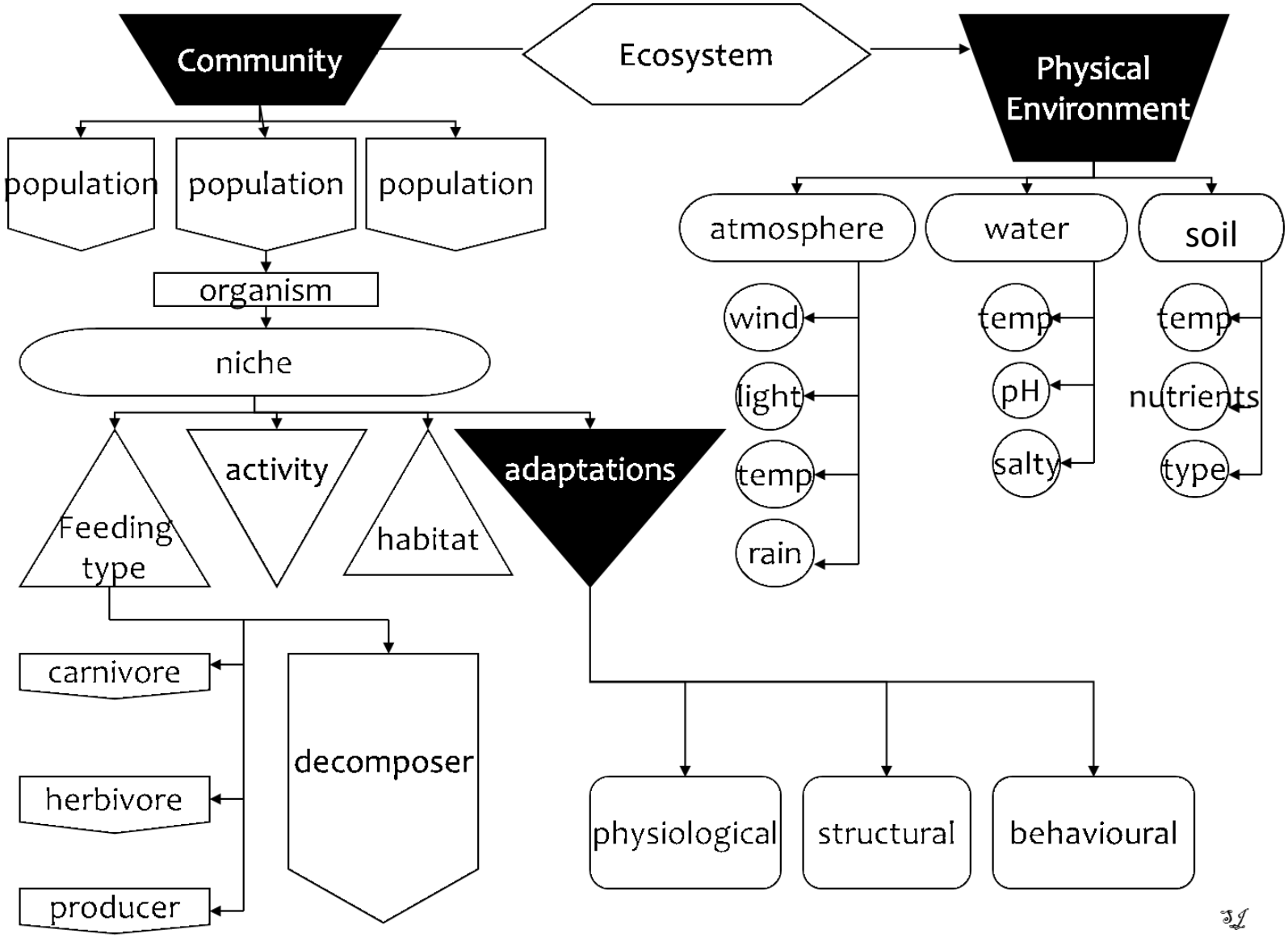
Habitat examples

All birds form a separate group of animals that evolved from the same ancestor. Bird species are found all across the world in many different habitats. Diversity in a bird adaptations help each type of species survive in different habitats.

A NZ Keas habitat is in South Island alpine regions

Emperor penguins found only in the Antarctic polar region

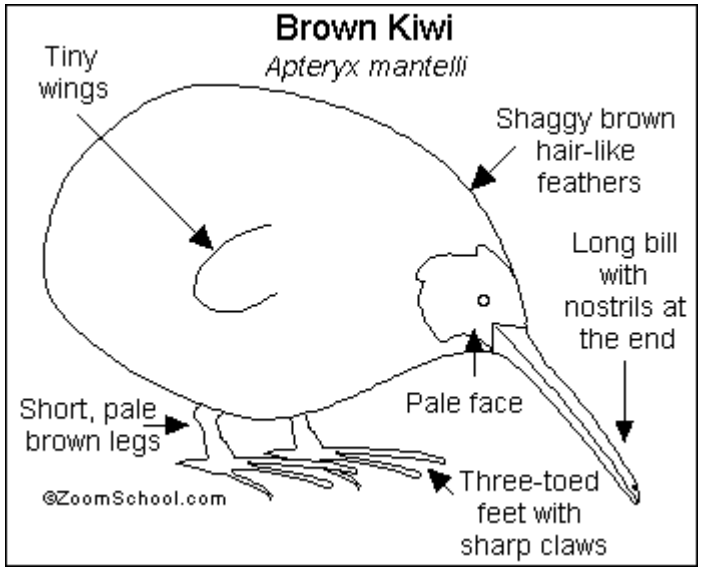
How a niche is related to the ecosystem



The niche of a Brown Kiwi

Plant / Animal Name …Brown Kiwi……. **scientific name** ..Apteryx mantelli

Drawing



Habitat – where does it live? New Zealand - In the bush in isolated areas. Especially northland and the Coromandel peninsular. In the undergrowth, in burrows

Activity – when is it active?

The kiwi is active at night in the bush, it is nocturnal.

Feeding type – What is it? And what food does it need to survive?

It is an omnivore. The kiwi uses it long beak to dig into the soft earth of the bush to collect and eat earthworms and small invertebrates (insects etc) and fruit/seeds

Adaptations – what is special about the organism to help it survive?

Physiological – how its system works –it produces a large egg with lots of yolk to help the baby kiwi grow to a big size before it hatches – then it has to look after itself

Structural – special body features – nostrils at the end of the beak to help it smell for food when it is in the ground

Behavioural – how it acts – it hides in a burrow during the day and feeds at night to stay away from predators

New Zealand plants and animals are unique due to them evolving in geographical isolation

For a long time in New Zealand's geographical history it formed part of a land mass called **Gondwana,** also composed of Australia, and Antarctica (as well as Africa, South America and India at an earlier stage). About 85 million years ago the plate that New Zealand sat on top of broke away from Gondwana and moved North, through the process of **plate tectonics**, and has remained in isolation ever since.

85 Million Years Ago **60 Million Years Ago** **Today**

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Ancestors of New Zealand's plants and animals arrived at various times in the past

extra info

When New Zealand first broke away from Gondwana it was in the form of a giant land mass called Zealandia and populated with animals and plants - all of which had previously evolved on Gondwana. Zealandia sat upon a thin crust and over time scientists believe it almost completely (if not entirely) submerged. Parts of it that we now recognise as New Zealand were raised up from the ocean due to active plate movement under it about 30 million years ago. It was after this time that New Zealand was populated by birds, insects, reptiles and plants that either flew or rafted over from Australia or South America

Ancestors of New Zealand's plants and animals arrived at various times in the past

From the original pioneers that populated New Zealand after it re-emerged from the sea we now have animals such as tuatara, kākāpō, wrens, moa, primitive frogs, geckos, dinosaurs, primitive groups of insects, spiders and earthworms as well as some types of plants - all of which had evolved and changed in time from their ancestors.

Other species of animals either flew across large distances from surrounding countries or were transported across by the sea at various times in the next 25 million years but **no species of Mammal** (aside from two species of bat that flew) ever made it across to New Zealand until Humans arrived around 700 years ago.

New Zealand's Plants and Animals have had to adapt to its constantly changing conditions

extra info

Ever since New Zealand broke away from Gondwana it has had a very **disruptive geographical history**. At various times in its past New Zealand has been totally (or almost completely) submerged under the ocean, encountered a series of ice ages which covered the country in ice, snow and glaciers as well as had ranges of mountains pushed up due to tectonic plate movement and eroded back down again. During this time New Zealand's animal and plant species have had to adapt and evolve to these changing conditions, some becoming **extinct** but others remaining to the present time.

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New Zealand's plants and animals have evolved in the absence of Mammals

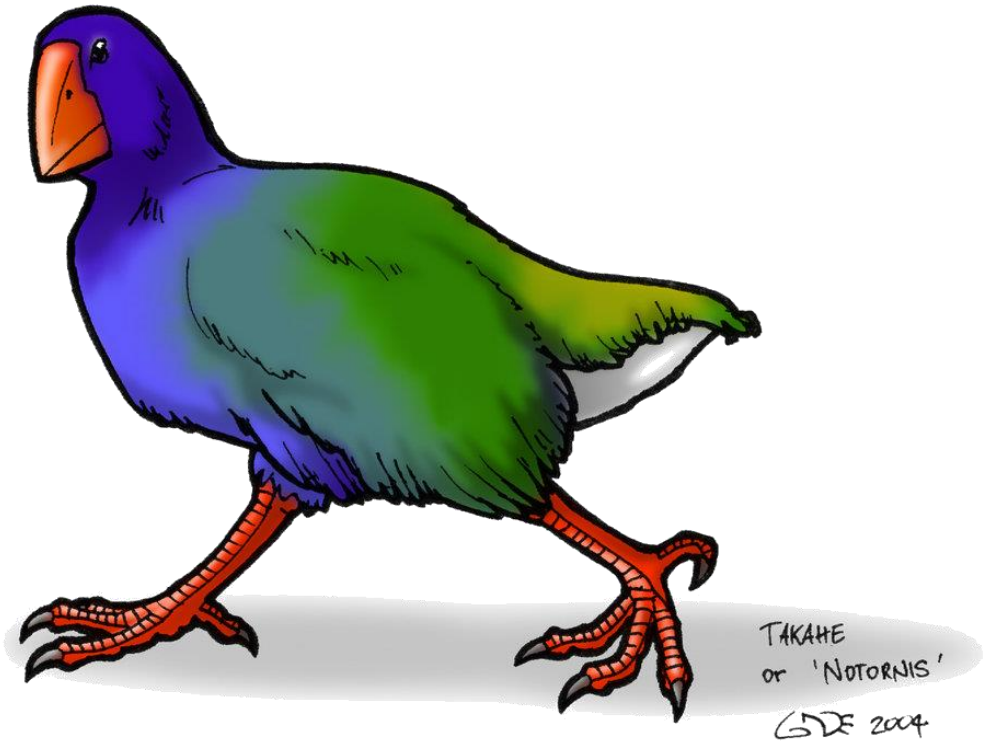
New Zealand's animals have evolved without the presence of Mammals and any ground predators.
This has created some special characteristic features in our animals. Many of our bird species have become flightless because they have not needed to fly away from predators. Niches or lifestyles filled by Mammals in other countries have been filled by birds, insects and reptiles in New Zealand.

For example the kiwi occupies a niche similar to a badger - lives in burrows, eats worms and other invertebrates (animals without an inside skeleton) , the Moa occupied a browsing niche similar to deer, Weta and the Short tailed bat occupied a niche that is taken up by mice elsewhere.
Because of this many of our species look quite different from related groups of animals and plants in other countries.

What is the advantage of not flying?

Flight in birds is an adaptation to escape from predators and move around quickly. It requires a lot of energy, which means birds who fly must find and eat a lot more food than non flying birds. Birds who fly also need to be light so their size and weight is limited.

New Zealand had no mammal predators so birds did not need to fly to escape. The benefits of not flying out weigh those of flying. Birds which did not fly had a **survival advantage** over those that did and produced more offspring. New Zealand flightless bird species could also become heavier and be suitable for niches (jobs) that were occupied by mammals in other areas of the world.



New Zealand has a large number of **endemic** plants and animals – that means not only are they found in New Zealand (**native**) but they are also found in no other place. There many thousands of fungi and insect species that are endemic plus around 70 birds, 80 skinks and geckos, 38 freshwater fish, four frogs, three bats and two species of tuatara.

New Zealand Birds

New Zealand has many different types of **habitats** ranging from mountains to forest to coast and marine. All of these habitats have bird species which live, feed and breed in them.

Since humans have lived in New Zealand, for at least the past 700 years, introduced mammal pests and habitat destruction have reduced the numbers of these birds. Some like the *Huia* and *Moa* have become extinct. Others like the *kakapo* and the *black robin* have been saved from extinction but have a very small population.

We are now realising how important it is to protect the habitats and the birds that we still have left to stop more being lost forever.

http://www.katesutton.co.uk/#/birdsofnewzealand/

Our unique birds - Kakapo

The Kakapo is the only flightless and nocturnal parrot in the world. The Kakapo is also the heaviest parrot in the world, weighing up to 3.5 kilograms.

Due to habitat destruction and predation there are now only approximately **62 Kakapo left**. These remaining birds have been **relocated** to several predator free island habitats, where the birds can breed in safety.

http://www.factzoo.com/sites/all/img/birds/parrots/kakapo-tree.jpg

Our unique birds - Kiwi

The kiwi are a flightless, nocturnal group of birds related to the extinct Moa and the still living Emu, which form part of a group called the **ratites** which now live in countries once forming part of Gondwana.(Africa, Australia, South America etc)

There are 5 main species of Kiwi in New Zealand: the brown kiwi, the rowi, the tokoeka , the great spotted kiwi or roroa and the little spotted kiwi.
They all eat invertebrates (worms, insects etc) and fruit.
The females produce an enormous egg which the males **incubate**. The chicks must survive on their own as soon as they are born.

https://www.finetoursnewzealand.co.nz/new-zealand-kiwi-bird-blog302

Our unique birds - Tui

https://www.flickr.com/photos/swallowtailgardenseeds/18139365303

Tūī belong to the **honeyeater** family, which means they feed mainly on **nectar** from flowers of native plants such as kōwhai, pohutukawa, rātā and flax. Occasionally they will eat insects too.

Tūī are important **pollinators** of many native trees and will fly a long way for their favourite foods, especially during winter. Flowers that are red or yellow often indicate that a plant is pollinated by birds.

Our unique birds – New Zealand Black Robin

The New Zealand black robin all live on the Chatham islands off the coast of New Zealand. They are an endemic species (found nowhere else in the world) and are famous for being one of the World's rarest birds at one stage.

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In 1980 there were only 5 black robins left in the world, and only one female – Old Blue, who was thought to be too old to produce chicks. Fortunately this was not the case and with the chicks she went on to have, there are now around 250 black robins with Old Blue being the ancestor to all of them.

Our unique birds - kōkako

The North Island kōkako, distantly related to the Tui and the extinct Huia, in found in small populations in the North Island forest. There is also a South island kōkako with orange wattles (flaps on the chin) but it is thought that that species is now extinct.

The kōkako have a unique way of moving through the forest trees by running and climbing along the branches then gliding from tree to tree. Its song is very particular and the main part of it gave the bird its name – kō – ka – ko.

Other unique plants and animals - Tuatara

extra info

Tuatara are rare, medium-sized reptiles found only in New Zealand.
They are the only living members of the **Order Sphenodontia,** which were a group of reptiles that lived on Earth about the time of the first dinosaurs, some 200 million years ago.

Although the species of Tuatara has been around for a very long time it appears to be nearly **identical** to its ancestors that lived over 200 million years ago.
It has been ideally adapted to its habitat and there has been no environmental pressure to change.

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http://science.nationalgeographic.com/wallpaper/science/photos/jurassic-period/tuatara-reptile/

Other unique plants and animals – native frogs

extra info

New Zealand has four endemic species of frogs including Hochstetter's Frog, and Archey's Frog. They all exhibit very **primitive traits** showing very little or no webbing between their toes. They have no free swimming tadpole stage, and they spend much less time in and near water than other more "advanced" frogs found else where in the world.

All or our frog species are rare and **endangered**. Two species are found only on a few small isolated islands of the coast. They have been affected by habitat destruction and the introduction of predators like many other endangered New Zealand species.

http://www.forestandbird.org.nz/what-we-do/branches/tauranga/hotchstetters-frog

Other unique plants and animals - Weta

extra info

Weta are mainly herbivorous and nocturnal Insects. There are more than 70 species of weta in New Zealand and they live in a variety of habitats including grassland, shrub land, forests, and caves. They dig holes under stones, rotting logs, or in trees.

Weta are similar to many species of plant and animals in New Zealand in that one ancestral species has **radiated** and **adapted** into many species to fill available **niches** due to the absence of many types of organisms found in other countries.

Other unique plants and animals – Short-tailed bat

extra info

The short-tailed bat is an ancient species unique to New Zealand and only one of two species of Mammal to have reached the Island (the other being the long tailed bat that arrived at a later stage). The bats are omnivorous and nocturnal. The bats are also important pollinators of the woodrose, a rare parasitic plant which grows on the roots of trees on the forest floor.

Most bats catch their prey in the air but the short-tailed bat has **adapted** to **ground hunting** and is one of the few bats in the world which spends large amounts of time on the forest floor. It uses its folded wings as `front limbs' for scrambling around on the ground.

https://faunarecovery.org.nz/short-tailed-bats/

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Other unique plants and animals - Kauri

extra info

Ancestors of the Kauri were probably present on the New Zealand land mass 85 million years ago when it was first breaking away from Gondwana . The Kauri has been able to survive a succession of ice ages, land sinking and mountain building periods on New Zealand, as confirmed by fossil trees and Kauri gum found in archaeological excavations. At one stage the Kauri covered vast areas of New Zealand whereas now its mainly confined to the northern parts of the North Island.

The huge Kauri belongs to the plant family of **podocarps** which are a type of **conifer** that evolved before the flowering plants. It is a slow growing tree but it can live for over 1000 years.

Recently a fungus has been spreading through New Zealand and killing the Kauri, possibly causing it to become extinct in the near future.

Other unique plants and animals - Rimu

extra info

Like the Kauri, the Rimu belongs to the Podocarp family of conifers. The Rimu is an important part of the New Zealand bush ecosystem and birds rely on its red berries it produces for food. Some species such as the kakapo **synchronise** their breeding with the years that Rimu produce their most fruit, called the Mast, so they have sufficient food to feed their chicks.

Other unique plants and animals - Cabbage Tree

The cabbage tree, belonging to the (monocot) flowering plants group, was a relatively late arrival to New Zealand with it's ancestor most likely to have been washed ashore or carried over from a more tropical area around 15 million years ago (in the warm Miocene era). Since then the plant has adapted to various habitats in New Zealand and can be found throughout most of the country.

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Other unique plants and animals – ponga (silver fern)

extra info

The Ponga is an endemic plant but also arrived late in New Zealand's history (during the Pliocene) around 4 million years ago.
The Ponga is found on the main islands of New Zealand and many surrounding islands.
It is a member of the fern group which produce spores and grow in habitats with sufficient water.

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Environmental changes may occur naturally or be human induced

Natural Environmental factors such as drought leading to lack of food or water, disease, flooding, volcanic activity and sudden climate change have been occurring since living organisms first appeared on Earth. In some cases these factors have been so extreme that world wide extinction of many species has occurred.

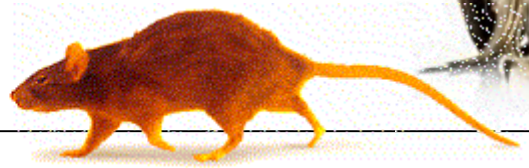
Environmental factors can also be caused or induced by Humans such as the climate change occurring at the moment created in part by human pollution in the atmosphere. Cutting down trees and destroying habitats along with introducing animal and plant pests also have negative impacts on the native life.

The main threats to our native animals

What is Killing our Native Animals?

- ❑ Introduced species such as rats, stoats and possums killing the birds and/or their eggs
- ❑ Introduced competing species such as rabbits and possums eating the birds food
- ❑ Human destruction of bird habitats

Our animals in New Zealand evolved in the **absence** of ground predators or mammals so they have not developed adaptations to defend themselves as well as other species the rest of the world have. Our birds, that have become flightless, heavy and slow breeding, have been especially vulnerable to **introduced predators**. Large areas of our native forest have been burnt and cut down as well as wetlands drained to convert to farmland, since humans have arrived. Some of our **endangered species** are confined small marginal areas of land.



The Kakapo case study

Kakapo were once spread all over New Zealand in large numbers before humans arrived on New Zealand. The species evolved without mammal predators. The nocturnal behaviour (active at night time) and bush camouflage protected it from its main predator, the giant Haast eagle – that hunted in the day by sight.

The introduction of mammal pests that ate and killed kakapo as well as humans killing and eating kakapo, greatly reduced numbers of kakapo. The destruction of the habitat and food of the kakapo by humans and pests also had an impact. Kakapo have not evolved to escape predators and they cannot fly to escape. They are more sensitive to predators than birds that have evolved with them. Kakapo are slow breeding and have small numbers of chicks – they cannot replace lost birds quickly. There is low genetic variation and diversity of the remaining birds so there are less healthy chicks produced and a low breeding rate. It is harder for males to find partner to mate with and a limited habitat to live in and get enough food, especially mast Rimu required during breeding.

The ways humans can conserve and protect our environment

extra info

What can we do to save our Plants and Animals?

- ❑ Pest control by trapping or poisoning
- ❑ Fencing off areas such as Maungatautari to make a safe pest free area for birds.
- ❑ Plant more native trees and protect habitats that remain
- ❑ Educate New Zealanders about conservation

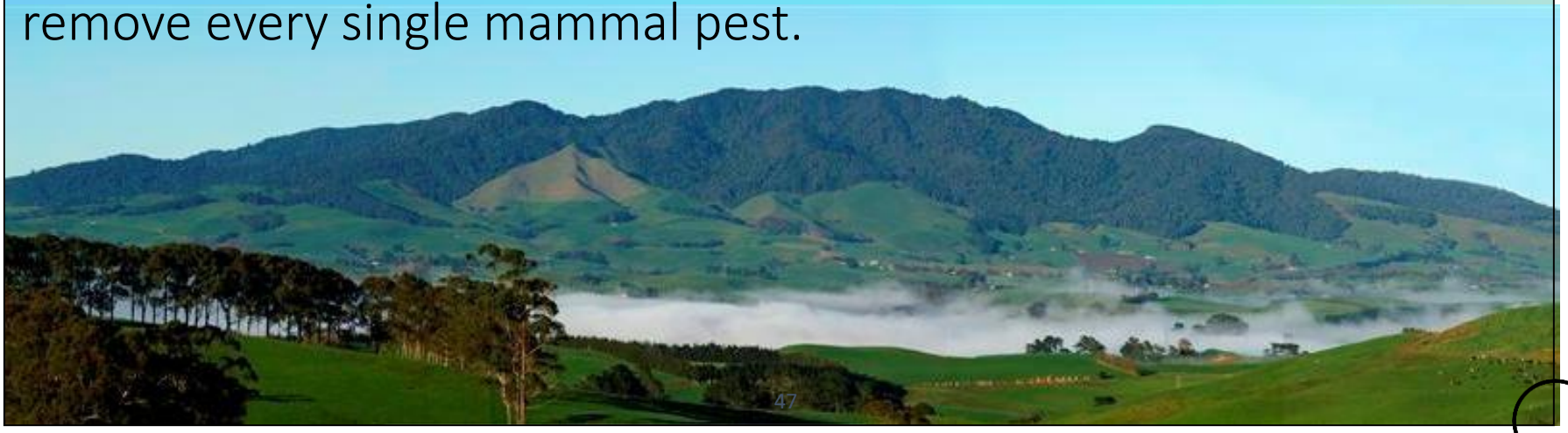
Breeding programmes and habitat protection projects have picked up pace in the last few decades to protect and save our most **endangered** species. Pest free areas have been created along with more marine reserves. Some species such as the Kiwi are making a gradual recovery in these areas, others such as the Kakapo and Maui's dolphin have so few remaining individuals left that saving the species from **extinction** becomes difficult. Education and involvement in conservation can help us save the unique plants, animals and habitats that New Zealand has been given.

Maungatautari Ecological Island trust – A case study

extra info

Part one - Maungatautari is a bush covered mountain surrounded by farmland in the Waikato. It was once the home of many New Zealand species but due to introduced predators such as rats, possums and stoats, and habitat destruction, many species became extinct and the mountain became empty.

Over a decade ago a number of farmers and conservationists came up with an ambitious idea to surround Maungatautari Mountain with predator proof fencing and begin intensive pest control to remove every single mammal pest.



Maungatautari Ecological Island trust – A case study

extra info

Part Two - Not that many years later, with a huge effort from volunteers and the generosity of local land owners and Iwi, Maungatautari started to come alive once more.

The Hihi (stitchbird), takahe, Tuatara, Kiwi, saddleback and the North Island Robin are just some of the species introduced back into the safe predator free sanctuary.

Many species of Reptile, plants and Fungi once thought extinct have also made a remarkable recovery as well. Maungatautari sanctuary has become Taonga (treasure) for all New Zealanders