Evolution and Inheritance – How and why has life on Earth changed?

Key Vocabulary

Evolution – Adaptation over a very long time.

Natural Selection – The process where living things that are better adapted to their environment tend to survive and produce more offspring.

Fossil – The remains or impression of a prehistoric plant or animal embedded in a rock.

Adaptation – An adaptation is a trait changing to increase a living thing's chances of surviving and reproducing.

Inherited Traits – These are the traits that you get from your parents. Families often have similar traits e.g. eye colour, height or curly hair.

Offspring – A young animal or plant that is produced by the reproduction of that species.

Characteristics – The features or qualities that are specific to a particular species.

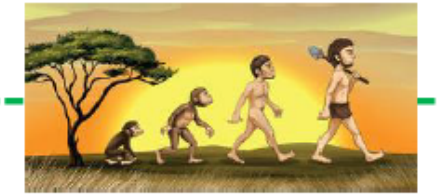
Variations – The differences between individuals in the same species.

Inheritance – This is when characteristics are passed to offspring from their parents.

What is evolution?

Evolution describes the gradual **changes** that happen in the **same species**, living in the **same location**, over a **long time**. Scientists have proof that living things are continuously **evolving** – even today!

Evolution does not describe people changing their bodies by exercise or dyeing their hair. Evolution happens over a much longer time and can only happen between parents and **offspring** through **inheritance.**



Natural Selection

Natural selection is the idea that species change over time in order to survive in their environment and reproduce. As **offspring** are born, they have the advantageous genetic **characteristics** passed on from their parents. Over time, this is how species **adapt**. Living things that are unable to **adapt** to the changes in the environment are unlike to survive

Fossils of giraffes from millions of years ago show that they used to have shorter necks. They have gradually **evolved** through **natural selection** to have longer necks so that they can reach the top leaves on taller trees.

Fossils

After an animal dies, the soft parts of its body **decompose** leaving the hard parts, like the skeleton. This becomes buried by small particles of rock called **sediment**. As more layers of sediment build up on top, the sediment around the skeleton begins to compact and turn to rock. The bones then start to be dissolved by water seeping through the rock. Minerals in the water replace the bone, leaving a **rock replica** of the original bone called a **fossil.**

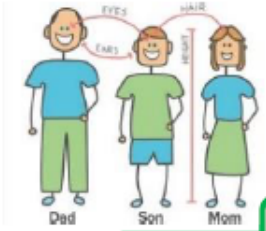
Researchers and scientists have been able to use the fossils they have discovered to find out about different animals, their **characteristics** and how they have changed over the years.

Galapagos Finches

When bad weather affected plant growth and there were fewer seeds to eat, the **offspring** had to eat larger seeds that would not normally be part of their diet in order to survive. Only the offspring with large beaks could break open and eat the larger seeds. Therefore, these **offspring** survived and the other, smaller beaked offspring died. **Offspring** **inherited** large beaks and so Galapagos finch species started to **evolve** and **adapt.**

Offspring

Animals and plants produce offspring (babies) that are similar but not identical to them. Offspring often look like their parents because features are passed on. The particular mix of DNA that offspring inherit from their parents is unique to them. 50% of the DNA comes from the mother and the other 50% comes from the father.

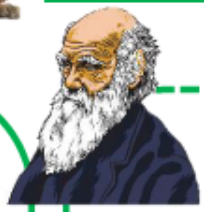


Living Things		Habitat		Adaptation
Polar Bear		Artic		Its white fur enable it to camoflouge in the snow. It has thick layers of fat to keep warm and large feet to increase grip on the snow.
Camel		Desert		Camels have large flat feet to spread their weight on the sand. Two rows of eyelashes to keep out the sand and the ability to go a long time without water.
Cactus		Desert		Stems can store large amounts of water and their very deep roots are able to collect water. Spines also provide protection from predators.

Inheritance and Variation

Inheritance refers to the genes that are passed on from parents to **offspring**. When we talk about **inherited** **characteristics**, we tend to focus on physical characteristics, such as eye colour or skin colour, as these are easy to spot, but inherited characteristics include abilities such as taste and smell. Characteristics are inherited from both parents but the way they combine creates **variations**, making the **offspring** unique. For example, humans may get blue eyes from our Mum, but brown hair from our Dad.

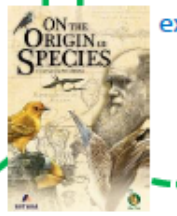
The **inherited** **characteristics** can combine in different ways, which is the reason why siblings (brothers and sisters) inherit the same characteristics but are not identical to each other. Even identical twins that share the exact same combination of DNA are not 100% the same.



Charles Darwin

Charles Robert Darwin was a naturalist who was born on February 12th, 1809, in Shropshire, England. He died in 1882 at the age of 73. Darwin is famous for travelling the world, investigating what makes animals and plants different and introducing the Theory of Evolution.

Darwin wrote a book called **'On the Origin of Species'** in 1859. In it, he explained his Theory of Evolution by Natural Selection.



Mary Anning

Mary Anning was born on 21st May 1799 and lived all her life in Lyme Regis in Dorset (England). Mary is recognised as a **pioneer** in the field of **palaeontology** (the study of fossils) and is celebrated as the greatest fossil hunter of all time! In 1811, at the age of 12, Mary discovered an **ancient species**, named **Ichthyosaurus** – meaning **'fish lizard'**. She also discovered a **Plesiosaur skeleton** (long necked sea creature) and a **Pterodactyl** (flying reptile). Mary died in **1847** at the age of 47.