

## Knowledge Organiser

**Subject: Science      Unit: Evolution and Inheritance**

### Overview:

During this sequence of learning, pupils will recognise that living things have changed over time, that living things produce offspring of the same kind and that animals and plants are adapted to suit their environment and this adaptation may lead to evolution.

### What should I already know?

- Living things move, grow, consume nutrients and reproduce.
- Polar bears are an example of an animal adapted to its environment e.g. thick fur for warmth.
- Cacti are an example of a plant adapted to its environment - thick skin keeps a store of water safe; sharp spikes keep animals from stealing the water.
- Woodlice live under logs - an example of a microhabitat - as they need somewhere dark and damp so that they do not dry out.
- A species is a group of living things that have many similarities and can reproduce together to produce offspring.
- Changes to the environment can make it more difficult for animals to survive and reproduce; in extreme cases this leads to extinction, where an entire species dies.
- Human activity - such as climate change caused by pollution - can change the environment for many living things, endangering their existence.
- The polar bear is a famous example of climate change endangering the existence of a species; as the climate changes and gets warmer, the sea ice on which polar bears live reduces in amount making it harder for them to survive and reproduce.
- Fossils form when a plant or animal dies and is quickly covered with silt or mud so that it cannot be rotted by microbes or eaten by scavenging animals; in time layers of sediment build, squashing the mud and turning it to stone around the dead plant or animal; the materials in the body are replaced by minerals that flow in water through the rock, leaving a rock in the shape of the animal or plant that was once there.

### Vocabulary:

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| species<br>(revision) | A group of living things that have many similarities and can reproduce together to produce offspring.                            |
| evolution             | A change over time.  |
| natural selection     | The process where organisms that are better suited to their environment survive and tend to produce more offspring.              |
| variation             | A change or slight difference in something.  |
| advantageous          | Something favourable that increases the chance of success.   |
| inheritance           | The process of passing characteristics to future generations.  |
| adapt                 | To change to become better adjusted to something e.g. a polar bear has to adapt to its habitat by having thick fur to keep warm. |

### What will I know by the end of the unit?

- All life on Earth began from a single point around 4.5 billion years ago.
- Living things change over time and that this gradual change is called evolution.
- Natural selection is the cause of this change; natural selection works as across a species there is natural variation within a species; there is also competition to survive and reproduce and that members of a species with advantageous characteristics survive and reproduce - these characteristics are passed down to their offspring. This is called inheritance.
- Members of a species with less advantageous characteristics do not survive and reproduce - these characteristics are not passed down to offspring.



Charles Darwin was born in 1809 and died in 1882. He is still remembered and talked about today due to his work around evolution.

- Offspring are varied and are not an identical match to their parents.
- Inheritance is genetic, not environmental i.e. if two parents have blonde hair but dye their hair black, the offspring will have blonde hair not black.
- It was Charles Darwin who presented this theory of evolution by natural selection.
- The gradual change of species over millions of years can be observed by looking at examples of fossils. Palaeontologists (people who study fossils) are able to compare fossils from the past with animals today and see the differences have occurred.
- Fossils have shown that giraffes necks did not used to be as long but have developed over time to be able to reach high branches.
- On the Galapagos Islands, Charles Darwin found that there were differences between the finches beaks from island to island. They had adapted due to the different foods they had to eat.
- Fossils have allowed us to find out about species which are now extinct such as dinosaurs.

