

Year: 6

Term: Autumn

Science: Evolution and Inheritance

Prior Knowledge

Identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other. (Y2 - Living things and their habitats)

Notice that animals, including humans, have offspring which grow into adults. (Y2 - Animals, including humans)

Explore the part that flowers play in the life cycle of flowering plants, including pollination, seed formation and seed dispersal. (Y3 - Plants)

Describe in simple terms how fossils are formed when things that have lived are trapped within rock. (Y3 - Rocks)

Recognise that environments can change and that this can sometimes pose dangers to living things. (Y4 - Living things and their habitats)

Describe the life process of reproduction in some plants and animals. (Living things and their habitats - Y5)

Key Knowledge

Fossilisation

Fossils give us clues and information about living things that inhabited the Earth millions of years ago. Look at examples of fossils and discuss what they might tell us.

Look at the process of fossilisation using videos and other sources. Children to understand the different stages required for a fossil to form.

Evolution

What is evolution?

Evolution is the way that living things change over time.

Do things evolve?

- We know that living things used to look a lot different to how they do now. We know this because fossils have been found that show creatures that look a lot different to how they do today.
- Fossils show us that living things have changed over time.

How do things evolve?

A famous scientist, Charles Darwin observed that although individuals in a species shared similarities, they were not exact copies of each other. He noticed that there were small differences or variations between them. He also noticed that everything in the natural world was in competition. The winners were those that had characteristics which made them better adapted for survival. For example, they were stronger, faster, cleverer or more attractive than others in their species. These living things were more likely to reproduce and pass on their useful characteristics to their offspring. Individuals that were poorly adapted were less likely to survive and their characteristics were not as likely to be inherited. Given enough time, these small changes can add up to the extent that a new species altogether can evolve.

Variation

What's the important thing to know?

Variation

Living things produce offspring of the same kind. For example, owls produce baby owls and humans produce baby humans... BUT... normally offspring vary and are not identical to their parents.

So...

Natural variation like this can lead to offspring being more likely or less likely to survive in their environment. If the variant makes them more likely to survive, they are more likely to be alive to pass this variant to their offspring. As a result, this variant is more likely to become more common in this species.

Adaption

What is Adaption?

Adaption is when things evolve to overcome challenges in their environment. For example by adapting their behaviour.

Examples of Adaption

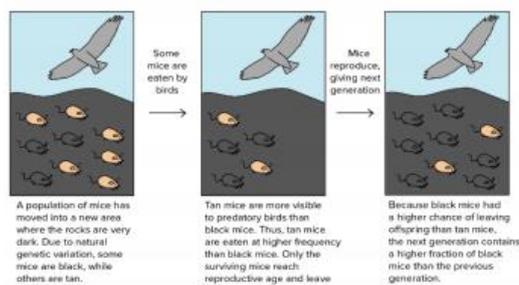
Migration

Birds have adapted to move around the world to find weather and food sources to suit them. Birds that didn't do this may have run out of food and died.

Sticking together in packs

Animals that learned to live in packs were more likely to be safer and more successful when hunting, leading them to be more likely to survive.

Because the hawks can see and catch the tan mice more easily, a relatively large fraction of the tan mice are eaten, while a much smaller fraction of the black mice are eaten. If we look at the ratio of black mice to tan mice in the surviving ("not-eaten") group, it will be higher than in the starting population.



Key Vocabulary

Prior vocabulary - compare, group, appearance, physical properties, fossils, formation, soils, organic matter, metamorphic, igneous, sedimentary, rotting, grains, crystals, investigate, decay, material, extinction, palaeontologist, permeable, impermeable

Working scientifically vocabulary – prediction, measurement, enquiry, dependent variable, independent variable, fair test, similar, theory, hypothesis, line graph, relationship, outlier

Adaptation	The process of change by which an organism or species becomes better suited to its environment.
Body fossil	The entire remains of prehistoric organisms including soft tissue such as insects embalmed in tree sap that hardens to create amber.
Breeding	The mating and production of offspring by animals.
Evolution	The process by which different kinds of living organism are believed to have developed from earlier forms during the history of the earth.
Inherit	To receive a characteristic or trait from someone else i.e. parents.
Natural selection	The process whereby organisms better adapted to their environment tend to survive and produce more offspring.
Variation	A slightly different form or version of something

Additional vocabulary to discuss across the unit – birth, extinction, species, characteristic

Key skills

Planning different types of scientific enquiries to answer questions, including recognising and controlling variables where necessary

Taking measurements, using a range of scientific equipment, with increasing accuracy and precision, taking repeat readings when appropriate.

Recording data and results of increasing complexity using scientific diagrams and labels, classification keys, tables, scatter graphs, bar and line graphs.

Using test results to make predictions to set up further comparative and fair tests.

Reporting and presenting findings from enquiries, including conclusions, causal relationships and explanations of and degree of trust in results, in oral and written forms such as displays and other presentations

Identifying scientific evidence that has been used to support or refute ideas or arguments.

Future Learning

Heredity as the process by which genetic information is transmitted from one generation to the next. (KS3)

A simple model of chromosomes, genes and DNA in heredity, including the part played by Watson, Crick, Wilkins and Franklin in the development of the DNA model. (KS3)

The variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection. (KS3)

Changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction. (KS3)

Deepening and broadening the knowledge and understanding for GDS learners:

- knows that organisms can be turned into fossils in a number of ways, e.g. *unaltered preservation – insects trapped in amber*
- draws a simple (correct) series circuit using the recognised symbols
- starts to consider the ethical implications of human intervention, including cloning
- suggests further examples of selective breeding that would be beneficial
- recognises that selective breeding can have negative and often unpredictable side effects
- predicts how humans might evolve in the future
- discusses how global warming might affect the evolution of plants and animals
- talks about how non-living things have been adapted over time to become more complex and better for purpose, e.g. *cars, mobile phones*

Key Outcomes

1. What inhabited the Earth millions of years ago and what can fossils tell us?

Children will use secondary sources and explore fossils to explain what the evidence shows us about our origins on Earth.

2. Why do offspring vary?

Children will find patterns of inherited characteristics in humans or animals and present findings then research own inherited characteristics. Children will investigate why offspring vary.

3. Which scientists have developed our understanding of evolution?

Children will research and compare the works of Charles Darwin/John Edmonstone/Mary Anning/Alfred Russel Wallace and present findings about their achievements including an explanation of the theory of 'natural selection'.

4. How are animals adapted to their environments?

Children will investigate how animals and plants are adapted to suit their environment in different ways, identify and classify characteristics that make plants and animal species suited to their environment and explain their conclusions e.g. Darwin's finches.

5. Why does adaptation lead to evolution?

Children will plan and conduct investigation into how the adaptations of colour or pattern of an animals skin can affect its chances of survival in a particular environment e.g. put different coloured pipe cleaners out on the field and record which ones are found first etc. then record data and results using classification keys, scientific diagrams, labels and tables.

6. How have humans evolved?

Children use their knowledge from the unit to describe how and why humans have evolved using the scientific vocabulary and theories studied.