

Year 6

Science:

Evolution and Inheritance

Resource Pack



Living things and their offspring

- Living things produce offspring of the same kind, but normally offspring vary and are not identical to their parents.
- Animals and plants adapt to their environment and over time, adaptation may lead to evolution.

Fossils

- Fossils provide information about living things that inhabited the Earth millions of years ago.
- Fossils can show the evolution of species over time.

Famous scientists

- Mary Anning 1799-1847
- Charles Darwin 1809-1882
- Alfred Wallace 1823-1913

Core Knowledge

Science Unit Overview– Year Six

Evolution and Adaptation

Application of knowledge

Children to compare photos of themselves and their parents to see which characteristics they have inherited. (*Identifying*)

Identify the challenges presented by living in particular habitats. (*Identifying*)

Children to design their own creature for a particular habitat.

Children to research an animal in depth. (*Researching using secondary sources*)

Children to investigate skulls (including humans and their ancestors), and compare them to a chimpanzee skull.

(*Classifying and grouping*)

[Natural History Museum website on hominid skulls.](#)

Children can investigate other fossils and identify similarities and differences with creatures around today. (*Pattern seeking*)

[Natural History Museum fossils online](#)

Children to compare technology from the time of these scientists to today.

Children write a biography of a scientist. (*Researching using secondary sources*)

[Wallace biography information](#)

[Anning biography information](#)

[Darwin biography information](#)

[Balloon debates explained](#)

Types of scientific enquiry are in (*italics*)



Lesson 1: Characteristics are passed on

This lesson is the first in a series that introduces Year 6 children to evolution and builds on their knowledge of the characteristics of living things. Evolution is change over time. It is the reason we have so many species on earth. Evolution occurs when there is competition to survive (natural selection) and differences within a species caused by inheritance and mutations. Inheritance is when something is passed on to the next generation. Offspring are not identical to their parents and hence species change over time. Some characteristics are inherited. Other differences are new in the offspring – these are called mutations. It is not necessary for children to understand the genetic basis for mutations.

Learning Objective	Core Knowledge	Activities for Learning	Related Vocabulary	Assessment Questions
To recognise that characteristics are passed from parents to offspring.	<ul style="list-style-type: none"> - Evolution is change over time. - Evolution occurs when there is competition to survive (natural selection) - Differences within a species can be caused by inheritance and mutations. - Mutations are random changes (which are not inherited from the parents). 	<ul style="list-style-type: none"> - Children to have photos of themselves and their parents. With a partner, discuss what characteristics they have inherited. - Explore breeds of dog and cross-breeding - Explore Darwin’s finches – group them and discuss similarities and differences. - Discussion: If a woman has dyed her hair purple, might her baby have purple hair? Why or why not? If Usain Bolt had a child, would he or she be a fast runner? 	evolution inheritance mutation characteristics natural selection breed cross-breed	<p><i>What does evolution mean?</i></p> <p><i>What does inheritance mean?</i></p> <p><i>Can you explain how these words have different meanings in different contexts?</i></p> <p><i>What characteristics could a child inherit from their parents?</i></p>
<p>Resources:</p> <ul style="list-style-type: none"> - Children to bring in photos of themselves and their parents – or images of them, and their parents at the same age. - Video from Natural History Museum website explaining how evolution works with bird lice as example. - Evolution experience game 				

Lesson 2: Evidence for evolution

In this lesson, children learn about the evidence for evolution both in fossils, and in living things. Fossils are the remains of living things which are found in sedimentary rocks. These rocks form in layers so animals and plants can get trapped between the layers. When palaeontologists compare fossils to animals from today, they can see similarities and identify relationships between them. Since evolution of a species happens over such long periods of time, evidence is usually taken from fossils. However, natural selection which drives evolution, is happening constantly so some careful analysis of the natural world can show that sometimes evolution occurs more rapidly. As the NHM website on living creatures explains, a common ancestor species can gradually separate into different forms, forming different species. The children can explore different hominid skulls and compare them to a chimpanzee skull. Evolution does not mean we evolved from chimpanzees – it means that somewhere in the evolution family tree, we shared a common ancestor.

Learning Objective	Core Knowledge	Activities for Learning	Related Vocabulary	Assessment Questions
To be able to explore the evidence for evolution.	<ul style="list-style-type: none"> - Both extinct animals and living things provide evidence for evolution. - Fossils are the remains of living things which are found in sedimentary rocks. These rocks form in layers so animals and plants can get trapped between the layers. - When palaeontologists compare fossils to animals from today, they can see similarities and identify relationships between them. - Living things also provide evidence for natural selection and evolution 	<ul style="list-style-type: none"> - Children can watch videos from Natural History Museum website to explore fossils and natural selection in living animals. - Interactive website comparing hominid skulls to chimpanzee skulls. - Summarise similarities and differences between homo sapien skull and chimpanzee skull 	evolution natural selection extinct fossils sedimentary palaeontologist	<i>Why are fossils useful to show evidence of evolution? What is natural selection? How does natural selection drive evolution? What similarities are there between different hominid skulls? What advantages are there to our skull compared to a chimpanzee? What disadvantages are there?</i>

Resources:

[Natural History Museum website](#) on evidence from extinct species

[Natural History Museum website](#) on evidence from living species including a video about natural selection in action in sand martin populations

[Natural History Museum](#) tree of life

[Natural History Museum](#) website for exploring 3D hominid skulls - interactive

Lesson 3: Changes: Advantage or disadvantage?

Children should review their learning so far about natural selection, evolution, and characteristics being passed down from one generation to the next – along with mutations occurring, meaning that offspring are not normally identical to their parents. This session investigates how sometimes these changes can be advantageous, and sometimes they are disadvantageous. The latter are called maladaptations. A variety of habitats will be looked at and children will discuss the challenges that living in these habitats will pose. They will then discuss the adaptations of existing animals which make them successful in those habitats.

Learning Objective	Core Knowledge	Activities for Learning	Related Vocabulary	Assessment Questions
To understand that animals can change over time.	<ul style="list-style-type: none"> - Offspring are not normally identical to their parents. - Characteristics can be inherited or caused by mutations. - Sometimes the changes in the next generation can be an advantage (because they are better suited to their habitat); sometimes they can be a disadvantage (it is harder for them to survive in their habitat) 	<ul style="list-style-type: none"> - Children to look at pictures of different animals and habitats and brainstorm to answer these questions: <i>What are the challenges in this habitat?</i> <i>How have the animals which live here adapted to survive?</i> - Children to design their own creature for a chosen habitat, thinking about diet, home, transport, skin/covering, climate, predator/prey - Children can then present their creatures to the class. - Discuss the dodo story as an example of maladaptation. 	environment habitat adaptation maladaptation	<p><i>What is the term for the environment where a living thing lives?</i></p> <p><i>What challenges can habitats pose?</i></p> <p><i>How have animals adapted to live in their habitats?</i></p>
<p>Resources: Challenges worksheet Images of habitats – need to be found online Images of animals – need to be found online Design a creature worksheet – enlarge to A3 Dodo information</p>				

Worksheet

Habitat	What are the challenges in this habitat?	How have the animals adapted to survive?
Woodland		
Polar		
Oceans		
Desert		
Jungle		

Name:.....

Date:.....

MY CREATURE IS A.....

DIET

What does it eat?

HOME

Where does your creature live?
What is its home made from, and why?

TRANSPORT

How does your creature move?

PREDATOR OR PREY?

Will your creature be hunted by other animals?
How will it keep safe?
How will it catch its prey?

CLIMATE

How is your creature adapted for its climate?

SKIN OR COVERING

What is the skin/covering of your creature like and why?

IT LIVES IN.....

Dodos:

Dodos were able to cope with the climate conditions on Mauritius. There, during parts of the year semiarid conditions predominate, and plants produce relatively little biomass that dodos would have used as food (such as fruits), whereas in the wet season there is an overabundance of food. Dodos apparently adapted to this by building up fat deposits when food was plentiful, and adjusting their breeding cycle to climate conditions.

Confronted with humans and introduced predators, this proved ultimately fatal: humans would believe the fat dodos were good to eat and would hunt them, or simply kill them for fun because of their funny appearance and awkward movements. The breeding cycle, which originally ensured that as little effort as possible was invested in reproduction made them vulnerable to the introduced pigs and monkeys, as there was little possibility for a dodo whose egg had been destroyed to re-nest before the year's reproductive season was over.

Lesson 4: Animal research

This lesson gives the children the opportunity to do independent research from secondary sources to create a class fact-file on different animals, showing their learning from the sessions so far.

Learning Objective	Core Knowledge	Activities for Learning	Related Vocabulary	Assessment Questions
To explain how a chosen animal has adapted to its habitat.	<ul style="list-style-type: none"> -Some animals have changed over time to suit their habitat -Sometimes changes to animals can be advantages or disadvantages - Adapting to suit a particular environment helps animals to survive 	<ul style="list-style-type: none"> - Children to research an animal using books, the internet, or other secondary sources. - Children take effective notes including habitat, appearance, diet, defence. - Produce a detailed fact-file – could be hand-written, or as a Powerpoint or website 	animal appearance diet defence predator prey protection habitat	<i>Which animal did you choose? Why?</i> <i>What habitat does it live in?</i> <i>How is it suited to that habitat?</i> <i>What does it eat?</i> <i>How does it catch its food?</i> <i>How does it defend itself?</i>
Resources: <ul style="list-style-type: none"> - Secondary sources on different animals (books, websites) - BBC Nature website includes information on a large range of animals including videos 				

Lesson 5: Biography of a famous scientist

This lesson gives the children the opportunity to research and write about scientists who were influential in the development of evolutionary theory: Charles Darwin, Alfred Wallace and Mary Anning. It is a cross-curricular history/English and science lesson as it also allows children to explore similarities and differences between the time these scientists were alive, and today. It may take two sessions: One for research, and one for writing.

Learning Objective	Core Knowledge	Activities for Learning	Related Vocabulary	Assessment Questions										
To be able to write a biography of a famous scientist.	<ul style="list-style-type: none"> - Lots of scientists have researched evolution for many years. - Charles Darwin, Mary Anning and Alfred Wallace are scientists who thought about evolution. - All of the work that scientists do helps us to understand where we have come from. 	<ul style="list-style-type: none"> - Children to sort images of objects and sort them into which they think did exist when the three scientists were alive, and which did not. More challenging: sort into chronological order. <p>Dates for images:</p> <table border="0" style="width: 100%;"> <tr> <td>- St Paul's – 1675</td> <td>-Sandwich – 1762</td> </tr> <tr> <td>- bifocal glasses – 1700s</td> <td>-Steam Train – 1814</td> </tr> <tr> <td>- Rubber band – 1845</td> <td>-coca cola – 1886</td> </tr> <tr> <td>- aeroplane – 1903</td> <td>-video tape – 1970s</td> </tr> <tr> <td>- Gherkin – 2001</td> <td>-iPod – 2001</td> </tr> </table> <ul style="list-style-type: none"> - Children to research and write biographies of one or each of the scientists. (Link to learning about biographies in Literacy) - Mary Anning 1799-1847 - Charles Darwin 1809-1882 - Alfred Wallace 1823-1913 	- St Paul's – 1675	-Sandwich – 1762	- bifocal glasses – 1700s	-Steam Train – 1814	- Rubber band – 1845	-coca cola – 1886	- aeroplane – 1903	-video tape – 1970s	- Gherkin – 2001	-iPod – 2001	biography chronological Darwin Anning Wallace	<p><i>What did _____ discover?</i></p> <p><i>Why was the work _____ did important?</i></p>
- St Paul's – 1675	-Sandwich – 1762													
- bifocal glasses – 1700s	-Steam Train – 1814													
- Rubber band – 1845	-coca cola – 1886													
- aeroplane – 1903	-video tape – 1970s													
- Gherkin – 2001	-iPod – 2001													
<p>Resources:</p> <ul style="list-style-type: none"> - Images of objects for sorting – find online - Websites: Anning, Darwin, Wallace. For Darwin, also see pages 336-337 of <i>What your Year 5 child needs to know</i> - Question frame for biography research 														

Research questions for your biography of a scientist:

**When were they born?
Where were they born?**

**Where did they grow up?
What was their family
like?**

**Why are they famous?
What did they do or discover?**

**Why is their work
important?**