

# Science Programme of Study

## Evolution

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This unit has been designed for children in Year 6 and meets the requirements of the 2014 Curriculum.

### Introduction to the programme

Evolution features for the first time in the Year 6 Programme of Study for Science. Through this unit, children will learn that living things have changed over time. They will learn to recognise that living things produce offspring, and that normally these offspring are not identical to their parents. They will see how animals and plants are adapted to suit their environment in different ways – and that adaptation may lead to evolution. There is the option to do more in-depth study of a specific animal and also of Mary Anning, Alfred Wallace or Charles Darwin.

It is suggested that the study of this unit could be enhanced by a visit to the DISCOVERIES: Art, Science & Exploration from the University of Cambridge Museums exhibition at Two Temple Place, London between 31 January and 27 April 2014. Should this not be possible, it is suggested that a visit to an alternative museum or gallery could be arranged. However, if no visit is possible, the plans and resources will work well as a stand-alone unit.

### Lesson Variations

The session plans for this unit are detailed.

Suggestions have been made about how to differentiate activities for children with Special Educational Needs, children with English as an additional language, and children who are gifted and talented.

Each session also has a resource list which makes it clear which resources have been included in this pack, and which need to be sourced at school.

# Year 6 Evolution Session 1

Duration 1-1.5 hours Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p><b>LO:</b> To recognize that characteristics are passed from parents to offspring, and that living things change over time.  <i>Children need to bring in photos of themselves and their parents. Some could bring in pictures of their parents when they were the age the children are now.</i>                      Explain to the children that this term, they will be learning about 'Evolution and Inheritance'.</p> <p><b>Q: What does 'evolution' mean?</b>  <b>Q: What does 'inheritance' mean?</b>  <b>Q: Do these words have different meanings in different contexts?</b></p> <p>Allow children to discuss their thoughts. Ensure children understand that evolution is essentially change over time – it is more complicated than that, but that is a good starting point. Inheritance is when something is passed on to the next generation. e.g. eye colour, skin-colour, height etc. Some children may already know about genes and chromosomes, but a full understanding of inheritance with regard to genes is not necessary at this stage.</p> <p>Explain to the children that when living things produce offspring – reproduce – they pass on characteristics to their offspring.</p> <p><b>Q: What characteristics have you inherited from your parents?</b>                      Children to carry out <b>Activity 1</b>.                      Discuss the children's findings from Activity 1.</p>	<p><b>Activity 1</b> (in mixed ability groups):                      Children to have their photos of themselves and their parents. With a partner, look at each other's pictures and discuss what characteristics they have inherited from their parents. Children could record what they have inherited.</p> <p><b>Activity 2</b> (on laptops)                      Children to explore hominid skulls, and compare them to a chimpanzee skull. The skulls can be rotated and the website also says when they are from.</p> <p><b>HA:</b> When observing the skulls, to summarise the major differences and similarities between a homo sapien skull and a chimpanzee skull. What are the advantages of our skull? (Plenty of brain space)                      Disadvantages? (Childbirth not easy as skull is so large)</p> <p><b>SEN:</b> Could stick with comparison of dog parents and puppies rather than comparing hominid skulls.</p> <p><b>Success criteria:</b>                      I understand that parents pass characteristics on to their offspring.                      I understand that this means living things change over time.</p>	<p>Discussion about what characteristics would be inheritable and which would not be.</p> <p>If a woman has dyed her hair purple, might her baby have purple hair? Why or why not?</p> <p>If Usain Bolt had a son, would he be a fast runner?</p>
<p>Ask children what breeds of dogs they know about, and make a list.</p> <p><b>Q: What would happen if a Labrador crossed with a poodle?</b>  <b>Q: What would you expect the puppy to look like? Why?</b>                      Show picture of labradoodle and discuss.                      Repeat with other examples of cross-breeds.</p> <p>Scientists think that humans and chimpanzees descended from a shared ancestor between 5 and 8 million years ago. Since then, the human skull has gradually changed shape due to inheritance, and evolution. Either show this website on...                      Continued on right</p>	<p><b>Main teaching continued</b></p> <p>whiteboard, or allow children to complete on laptops – Activity 2.  <a href="http://www.nhm.ac.uk/nature-online/life/human-origins/modern-human-evolution/3d-hominid-skulls/">http://www.nhm.ac.uk/nature-online/life/human-origins/modern-human-evolution/3d-hominid-skulls/</a></p> <p><b>ICT:</b> Showing images on interactive whiteboard.  <b>Ethnic Minority Achievement/English as an additional language learning strategies:</b> modeling, visual scaffolding, mixed ability grouping  <b>Every Child Matters:</b> Enjoy and Achieve</p>	<p><b>Resources</b></p> <p><b>(Bold = in pack)</b>                      Children to bring in photos of their parents and themselves.</p>

# Year 6 Evolution Session 2

Duration 1-1.5 hours Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p><b>LO:</b> To understand that changes can be an advantage or a disadvantage.</p> <p>Review learning from previous session – that parents produce offspring, but the offspring are not normally identical to the parents. Sometimes, the changes in the next generation (ensure children understand the term generation) can be an advantage – they are better suited to their environment, but other times it can be a disadvantage – it is harder for them to survive in their environment.</p> <p><b>Q: What is the term for the environment where a living thing lives? Habitat.</b> Tell the children that different habitats require different adaptations. Explain <b>Activity 1</b></p> <p>Class discussion of the challenges and adaptations in different environments.</p> <p>Explain <b>Activity 2</b></p> <p><b>ICT:</b> Showing clips on whiteboard <b>Ethnic Minority Achievement/English as an additional language learning strategies:</b> modeling, visual scaffolding, mixed ability grouping <b>Every Child Matters:</b> Enjoy and Achieve</p>	<p><b>Activity 1</b> (On mixed ability tables) Children to look at the pictures of different animals and habitats and brainstorm to answer the questions: <b>What are the challenges in this habitat?</b> <b>How have the animals which live here adapted to survive?</b></p> <p>Children should rotate around the different tables so they can see all habitats. They could make notes as they go on the challenges and adaptations for each.</p> <p><b>Activity 2</b> Children have the opportunity to design their own creature for a chosen habitat.</p> <p><b>SEN:</b> Will be able to access the main activity.</p> <p><b>G&amp;T:</b> Extension work on maladaptations (see plenary).</p> <p><b>Success criteria</b> I know that living creatures change from one generation to the next. I know that sometimes these changes can be an advantage. I know that sometimes changes can be a disadvantage. I can suggest ways in which an animal has evolved to thrive in its habitat.</p>	<p>Maladaptations</p> <p>Explain that sometimes adaptations that were beneficial, become disadvantages. For example, when the climate changes and gets warmer somewhere, an animal which was adapted for cold weather will overheat.</p> <p>Discuss the story of the dodo (see information sheet) and show image. Ensure children understand the term 'extinct'.</p> <hr/> <p><b>Resources</b></p> <p><b>(Bold = in pack)</b> <b>Images of animals and habitats.</b> These should be printed and stuck onto A3 – one page for each habitat on each table (polar, jungle, ocean, woodland, desert) <b>Worksheet Activity 1</b> <b>Worksheet Activity 2</b> <b>Key questions</b> <b>Picture of Dodo Skeleton</b> <b>Dodo information sheet (from Wikipedia)</b></p>

# Year 6 Evolution Session 3

Duration 1 hour. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p><b>LO:</b> To research an animal in depth</p> <p>Tell the children that you will be completing a class fact-file on animals and how they have evolved to thrive in their habitats. You could also include some animals whose adaptations are now proving to be disadvantages.</p> <p>Some schools may prefer to make the children's research into a class book. It would work well also as part of a school website, or as a powerpoint.</p> <p>Model finding information either using books or the internet.            Model taking notes on key information e.g.            habitat            appearance – how is this suited to the environment?            diet – what does it eat, and how does it catch/find its food?            defence – how does it protect itself?</p> <p><b>Ethnic Minority Achievement/English as an additional language learning strategies:</b> modeling, visual scaffolding, mixed ability grouping</p> <p><b>Every Child Matters:</b> Enjoy and Achieve</p>	<p><b>Activity</b> (Mixed ability pairs or individually)            Children to research an animal of their choice in depth and create a fact-file on the evolutionary history of that animal, and how it has adapted to suit its environment.</p> <p><b>SEN:</b> Supported in mixed ability groups.</p> <p><b>G&amp;T:</b> They could research maladaptation leading to extinction.</p> <p><b>Success criteria:</b>            I can find information on an animal.            I can record notes on key information.            I can create a fact-file on an animal and how it has evolved to suit its environment.</p>	<p>Children to share their research findings. They could do presentations including slides.</p> <p>They could then discuss and compare the advantages and disadvantages of specific adaptations.</p> <hr/> <p><b>Resources</b></p> <p><b>(Bold = in pack)</b>            Materials for research e.g. laptops with the internet or books.  <a href="http://www.bbc.co.uk/nature/">http://www.bbc.co.uk/nature/</a> This website has lots of information including video clips on different animals.</p>

# Year 6 Evolution Session 4

Duration 3 hours. Date:

Planned by Matilda Munro for Two Temple Place, 2013

Main teaching	Activities - Differentiation	Plenary
<p><b>CCL English</b>  <b>LO:</b> To be able to write a biography of a famous scientist.                      (This is likely to take more than one session)</p> <p>Explain to the children that they are going to be learning more about a famous scientist figure.                      They can choose between Charles Darwin 1809-1882, Mary Anning 1799-1847 or Alfred Wallace 1823 – 1913.  <b>Q: Can you put these people in chronological order?</b>  <b>What technologies would not have existed when they were alive that we have now?</b>                      (make a list as the children suggest ideas)                      Anning died in 1847.  <b>What technologies do you think they did have by the time she died?</b>                      Model activity 1. Children carry out <b>Activity 1</b>.</p> <p>Discuss the correct answers and order of the images.  <b>Q: Were you surprised by any of the answers? Why?</b></p> <p>Now that they have some ideas about similarities and differences between the time the scientists were alive, and today, the children can go on to research their lives using websites or books.  <b>Q: What do we call writing that tells the story of someone's life?</b>  <b>Q: What features would you expect this text to have?</b>                      Contents, Index, subheadings, photographs, glossary</p> <p>Suggest that the children think about possible subheadings for their biography as they continue their research.</p> <p>Some modelling of writing may be required.</p> <p>Continued...on right</p>	<p><b>Activity 1:</b> (Mixed ability pairs)                      Sorting activity                      Children to have images of objects and then sort them into which they think did exist when Darwin, Anning and Wallace were alive, and which did not. More challenging – sort into chronological order.</p> <p><b>Activity 2:</b>                      Children to research and write a biography.</p> <p><b>HA:</b> Could sort objects from Activity 1 into chronological order. Biography of Wallace or Darwin.</p> <p><b>SEN:</b> Anning website more child-friendly.</p> <p><b>Success criteria:</b>                      I know that Anning, Wallace and Darwin were important scientists.                      I can find key information.                      I can organise information into a biography.</p>	<p>Children to share interesting stories from the biographies they have researched.</p> <p>This could be expanded into drama, re-enacting scenes from their lives.</p> <p>If there is time for children to research all three, then groups could do balloon debates between them.</p> <p>See explanation here:  <a href="http://en.wikipedia.org/wiki/Balloon_debate">http://en.wikipedia.org/wiki/Balloon_debate</a></p>
	<p><b>Main teaching continued</b></p> <p><b>ICT:</b> Darwin website: <a href="http://darwin200.christs.cam.ac.uk/pages/Anning">http://darwin200.christs.cam.ac.uk/pages/Anning</a>                      Anning website: <a href="http://www.bbc.co.uk/schools/primaryhistory/famouspeople/mary_anning/">http://www.bbc.co.uk/schools/primaryhistory/famouspeople/mary_anning/</a>                      Wallace website:  <a href="http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/wallace/">http://www.nhm.ac.uk/nature-online/science-of-natural-history/biographies/wallace/</a></p> <p><b>Ethnic Minority Achievement/English as an additional language learning strategies:</b> modeling, visual scaffolding, mixed ability grouping</p> <p><b>Every Child Matters:</b> Enjoy and Achieve</p>	<p><b>Resources</b></p> <p><b>(Bold = in pack)</b>  <b>Images for Activity 1 past and present</b></p> <p>Dates for images:                      St Paul's – 1675                      Steam Train – 1814                      Rubber band – 1845                      bifocal glasses – 1700s                      Sandwich – 1762                      iPod – 2001                      aeroplane – 1903                      Gherkin – 2001                      coca cola – 1886                      video tape – 1970s</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.**





























**Questions**



**What are the challenges  
in this habitat?**



**How have the animals  
which live here adapted  
to survive?**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**St. Paul's Cathedral**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Steam train**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Rubber band**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**



**Bifocal glasses**





**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**Sandwich**



**iPod**



**iPod**



**iPod**



**iPod**



**iPod**



**iPod**



**iPod**



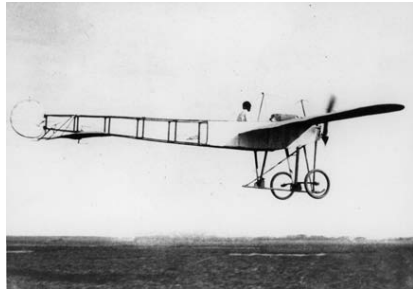
**iPod**



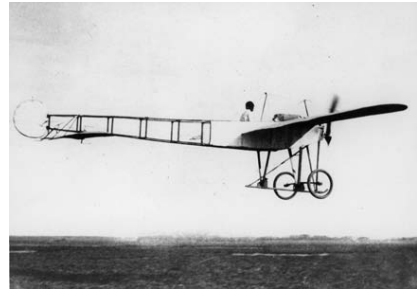
**iPod**



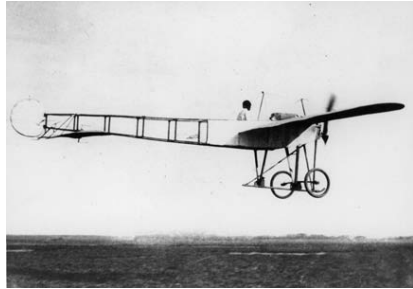
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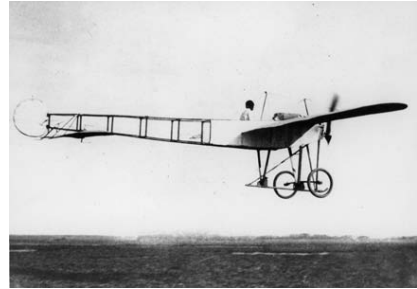
**Aeroplane**



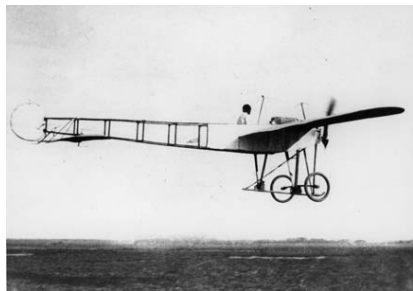
**Aeroplane**



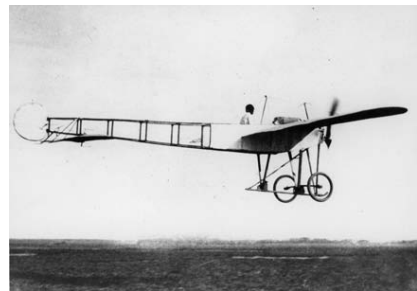
**Aeroplane**



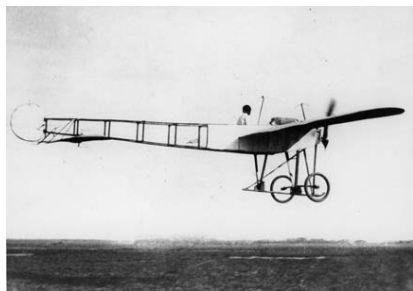
**Aeroplane**



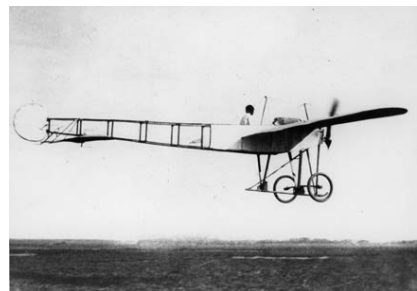
**Aeroplane**



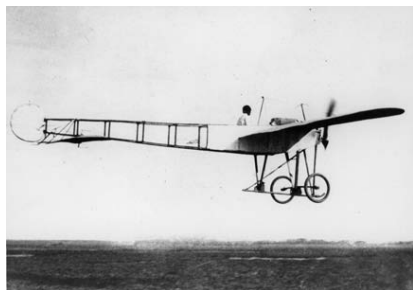
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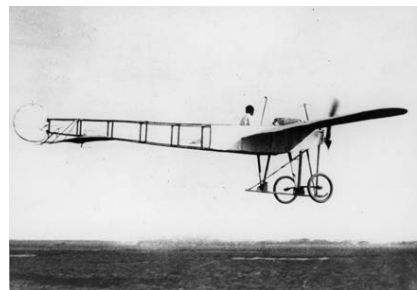
**Aeroplane**



**Aeroplane**



**Aeroplane**



**Aeroplane**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**The Gherkin**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Coca-cola**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



**Video tape**



Science - Year 6 - Evolution DODO SKELETON from The University Museum of Zoology, Cambridge