



Triple Crossed Project

Testing the Theory

Teachers' Notes

Pupils are provided with information about Charles Darwin and his work. The Theory of Evolution by Natural Selection is discussed and they are asked to comment on the characteristics of certain animals. They are then asked to think about continued evolution and what our environment might be like in the future. The final task is to draw an image of what they feel a human might look like in the future taking into account the environment they have predicted.

Pupil Resources

Have you met Charles Darwin? – Stimulus
Charles Darwin - information sheet
Theory of evolution - information sheet
Human evolution – Task sheets x2
Smart Grid

Objectives

Personal Capability:

Team work: to review evidence, develop and put forward views.

Science, History and Citizenship:

- Work as a team to review and interpret evidence and develop and put forward views.
- To understand how different animals have become adapted to their habitat, including some examples of adaptations.
- To understand how variation can improve or harm an animal's chance of survival.
- To use the Theory of Evolution by Natural Selection to explain the characteristics of some animals.

Success criteria:

To be successful the pupils will:

- Be able to work as a team to review and interpret evidence and put forward views.
- Be able to sequence descriptions of a series of events to form a sensible timeline.
- Be able to give examples of evolution through adaptation and natural selection. species introduction and comment on the consequences of these for the environment and human populations.



Introducing the Overall Task

Show *Stimulus picture, Testing the Theory*. Ask the students if they know anything about Charles Darwin: When was he alive? What did people think about the variety of animals and plants around them at this time? Raise with the students the idea that in Darwin's day, most people believed that animals and plants were created (possibly by God) and that the characteristics of living things did not change.

Show *Stimulus picture, Charles Darwin*. Where did Darwin visit? Ask the children to find the Galapagos Islands on a map. Emphasise that these islands are in the Pacific Ocean, a long distance from other countries (605 miles west of South America) and so animals living on the Galapagos islands will have been isolated from other animals and only able to reproduce with animals of their kind on the islands.

What did Darwin notice? Explain that Darwin spent a long time observing and recording the animals and plants on the islands. Ask the children to look closely at the pictures of the finches on the sheet and to describe the similarities and differences between the birds' heads. Which birds do they think would be best suited to eating crunchy seeds and arthropods? Which birds would be best suited to eating insects hiding in the foliage? Make sure that the children understand what is meant by 'characteristic' and 'variation'.

Main Tasks

Organise the students to work in pairs or small groups. Give out *The Theory of Evolution sheet*. Ask the students to choose one of the animals and to list its characteristics. Provide books and access to websites for children to research the habitat of the animal. Can they suggest how the animal's characteristics help the animal to survive in its environment? Review the characteristics of each animal and discuss how each one might improve or harm the animals chances of survival. Ask the children to consider how variation in this characteristic might mean that their animal is better adapted for survival than others.

Emphasise that changes in a species' characteristics takes place over generations because animals that are not adapted to their environment die (before they can reproduce), and not within the life on one animal.

Move on to using the *Human Evolution task sheet*. Encourage the children to think about changes that have happened on planet Earth which might have an impact on our environment: ice ages, extinction of dinosaurs, volcanic eruptions, global warming, depletion of the ozone layer. Ask the groups to discuss and record a range of possible answers to the questions on the sheet. Ask individual groups to present their views to the whole class as a basis for extending the discussion. The children could also consider what they think humans will 'do' in the future.

Using the information discussed with the whole class, the children can use the second *Human Evolution sheet* to suggest what humans will look like in the future.

Reviewing the Task

Ask individual students or groups to explain how and why humans in the future will have different characteristics to us now. Their explanations should refer to adaptation and Natural Selection.

Involve the students in reviewing the task using the assessment for learning *Smart Grid* on page 6.



Historical notes

The naturalists of the 19th century gathered information to investigate how the world worked. The era in which Darwin lived was a period of great change. As naturalists and geologists were striving to understand the creatures and existence of our planet, other scientists (including a few women) were making discoveries in medicine, electricity and astronomy.

Charles Darwin was an English naturalist, geologist and biologist from a wealthy family. In December 1831, he joined *HMS BEAGLE* on a five-year voyage around South America and its nearby islands. Despite terrible seasickness, Darwin collected specimens of plants and animals and kept careful notes of his observations, which were regularly sent back to Cambridge where he had studied. On his return to England, Darwin was already a celebrity in science. His father organised funds so that Darwin could continue his work as a 'gentleman scientist'.

Back at home, Darwin allowed various scientists to take specimens away to study but he did not rush to publish his findings. His most famous book *On the Origin of Species* was published in 1859, twenty years after his return from his voyage. This book was controversial and upset many Christians who believed that it challenged the idea that there is a Creator God who designed nature. Also, Darwin suggested humans were the result of gradual changes from their ape ancestors. Most scientists now believe Darwin's Theory of Evolution by Natural Selection. Many of Darwin's specimens can now be seen in museums such as the Natural History Museum in London.