

Evolution and Inheritance: Lesson 7

Natural Selection

Science KS2 Year 6



Large ground finch (seeds)



Cactus ground finch (cactus)



Vegetarian finch (buds)



Tree finch (insect)

Evolution and Inheritance: Lesson 7

Science Key Stage 2 Year 6	Learning Aim: • learn about mutation, variation, natural selection, inheritance, adaptation and evolution using examples of Darwin's finches and African Elephants Curriculum Link: • identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution
Working Scientifically • 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.	
Key Vocabulary Deoxyribonucleic Acid (DNA). Variation. Fair test. Hypothesis. Adaptation. Natural selection. Mutation. Inherited. Evolution. These have all been used in previous lessons.	



Some Reading Links:

1. The 'DNA Detectives - The Stone Age Mystery' is an exciting, page-turner of a story, where the characters in the book use DNA to catch the thief who is stealing DNA from an ancient grave. In the story the scientists use DNA to find out what the ancient skeleton looks like, just like we did in Lesson 5: DNA & Variation. We also find out about the evolution of skin and eye colour in humans. The story also recaps on what they have learnt in previous lessons about DNA, cells and the nucleus.
2. Primary Science – the DNA Detectives – Insight & Perspective
<https://insightandperspective.co.uk/primary-science-the-dna-detectives>
3. The Little Story Telling Company: Books | Story telling and published author
<http://www.thelittlestorytellingcompany.co.uk/books/>
4. 'Moth. An evolutionary story' by Isobel Thomas is beautifully illustrated. It tells the story of the peppered moth and how it adapted to changes in its environment.
<https://isabelthomas.co.uk/project/moth/>
5. 'The Mollie bird. An Evolutionary story' by Jules Pottle won the ASE Book award. It also comes with useful notes for teachers.
<https://pstt.org.uk/resources/resources-available-through-tts/the-molliebird>
6. 'Darwin's On the origin of species' by Sabina Redeva retells Darwin's story and how he came up with his "Theory of Evolution". The perfect complement to this lesson.
<https://www.sabinaradeva.com/#!/darwins-on-the-origin-of-species-a-picture-book-adaptation/>



Equipment

You will need:

- bowls/plates
- tray
- hair brush
- raisins
- bird seed
- wool (cut into approx. 5cm sections. We want the wool to be like worms!)
- kitchen rolls (cut into selection of sizes) (don't forget to tell the children that they can't tip the food out!)
- optional: tree bark (taken from broken-off branches, not directly from the tree!)
- sellotape
- tall plastic pots (e.g. bicarbonate of soda pots)
- pot porri, leaves, flower heads
- pliers
- tweezers
- clothes pegs
- chopsticks (child-friendly version. You could put an elastic band around the base to make them easier for children to use))
- teaspoon
- plastic fishing maggots and worms
- timer (the PowerPoint has a timer, but you may also want to supply your own)
- worksheet, "Battle of the beaks!" on pages 7, 8, 9, 10, 11 and 12 of this PDF



PowerPoint Presentation

The accompanying PowerPoint presentation has 29 slides with the following learning points. At intervals throughout the lesson, we suggest asking the children what questions they might have. These can be collected throughout the unit of learning and added to the slide at the end of the lesson.

- Slides 1 and 2 introduce the lesson.
- Slide 3: Just like Charles Darwin in 1832 we are off on the HMS Beagle to the Galapagos Islands. You can click on the weblinks on Slide 27 of the PowerPoint to find out more about this voyage.

Activity (slides 4 – 9)

- Slide 4: We introduce our four islands on the Galapagos, each with a different food source. The children set up their islands ready for their experiment.
Battle of the Beaks - note for teachers (refer to slide 4).
Divide the children into groups. Each group will be allocated an island with a different food source as detailed on slide 4. (Additional islands can be added for large classes). Each child in the group will have a different beak, representing the different finches on the island (see slide 5 for ideas for beak choices, you could also use different shaped forceps or another implement of your choice).
- Slide 5: We prepare the different beaks for our finches. Which beaks do the children think will be better for eating different foods?
- Slide 6: We discuss how we can make this a fair test. How do we make sure they all start together? Can they all access the food equally? How will they mark the end of the time to make sure they all finish at the same time? What is their hypothesis? We fill in the worksheet “Battle of the Beaks”. Time for Battle of the Beaks to find out! There is a timer on this slide, click once to animate the countdown to one minute. Children have until the end of the countdown!
- Slide 7: Results of round 1! Time to count the amount of food for each finch. Remove the finch who starved from the experiment and replace it with the most successful finch. How many of each species of finch is now on the island? Record the results on the worksheet. Time for round 2! There is also a timer on this slide, click once to animate the countdown to one minute. Children have until the end of the countdown!
- Slide 8: Results of round 2! Time to count the amount of food for each finch. Remove the finch who starved from the experiment and replace it with the most successful finch. How many of each species of finch is now on the island? Record the results on the worksheet. Time for round 3! Don’t forget the timer on this slide! Click once to animate the countdown to one minute. Children have until the end of the countdown!



- Slide 9: Results of round 3! Time to count the amount of food for each finch. Remove the finch who starved from the experiment and replace it with the most successful finch. How many of each species of finch is now on the island? Record the results on the worksheet.
- Slide 10: Record results on the worksheet. As a class recap on the food sources on each island. Which finch (beaks) were the most/least successful on each island? Why do the children think this was?
- Slide 11: Record results on the worksheet. Discuss as a class which finch (beak) was there the most of on each island? Who starved and disappeared from each island? Why do they think this was? What would happen after 10 rounds? Would the most successful finch takeover the island? What would happen if the food source on the island changed?
- Slide 12: What are our conclusions?
- Slide 13: We learn about famous scientists Charles Darwin and Alfred Wallace who tried to explain what was happening.
- Slide 14: We learn about Charles Darwin's ideas on adaptation and natural selection.
- Slide 15: We remind ourselves that variation in DNA is caused by chance mutations. We introduce the important concept that mutations are chance events but natural selection is not.
- Slide 16: We recap on the meaning of "adaptation" and "natural selection".
- Slides 17 and 18 introduce the idea that living things are fighting for survival in changing environments. Discuss factors affecting survival. Show how mutation, variation, natural selection, inheritance and adaptation lead to "Evolution".

Activity (slide 19)

- Slide 19 is a quick quiz to recap children's understanding. A fun way to do this activity is to have the children in a large space, with areas labelled, "natural selection", "mutation", "adaptation" and "evolution". They have to run to the corner they think is the right answer. You can use the labels on pages 13 and 14 of this PDF.
- Slides 20 to 24 feature another example of natural selection that has been influenced by humans. A mutation which exists in African elephants causes females to be born without tusks. Males with this mutation die before birth. In heavily-poached parts of Africa, the number of tuskless females has significantly increased.
- Slides 25 to 26 recap on what the children have learned.
- Slide 27: Useful links.
- Slide 28: this slide is kept blank for any questions.
- Slide 29 is the closing slide.



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Battle of the beaks!

Which island are you on?

.....

What is the food source on this island?

.....

Which finches are present on your island?

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Number of each					

How have you made sure it is a fair test?

.....

.....

.....

What is your hypothesis? i.e. which beak (finch/s} do you think will get the most food and survive?

.....

Why do you think this?

.....

.....

.....

What is your hypothesis? i.e. which beak (finch/s} do you think will get the least food and starve?

.....

.....

.....

Why do you think this?

.....

.....

.....



Results – Round 1

Record your results in the table.

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Amount of food					

The finch with the most food was:

The finch with the least food (starved) was:.....

Which finches are now present on your island?

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Number of each					



Results – Round 2

Record your results in the table.

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon	New Beak 1 ()
Amount of food						

The finch with the most food was:

The finch with the least food (starved) was:.....

Which finches are now present on your island?

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Number of each					



Results – Round 3

Record your results in the table.

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon	New Beak 1 ()	New Beak 2 ()
Amount of food							

The finch with the most food was:

The finch with the least food (starved) was:.....

Which finches are now present on your island?

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Number of each					



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Analysis

Was your hypothesis correct?.....

Which finch (beak) got the most food?.....

Why do you think this was?.....

.....

.....

Which finch (beak) got the least food?.....

Why do you think this was?.....

.....

.....

Survival

Fill in the tables

Finch	Chopsticks	Pegs	Tweezers	Pliers	Teaspoon
Number of each (start)					
Number of each (end)					

Which of the finches (beaks) starved and died? Why was this?

.....

.....

.....



Survival (cont.)

Which of the finches (beaks) was the most successful? Why was this?

.....

.....

.....

.....

What do you think would happen to the numbers of these finches (beaks) if you completed 10 more rounds? Do you think they would take over the island?

.....

.....

.....

.....

Why do you think this might happen?

.....

.....

.....

What would happen if the food source changed to something different?

.....

.....

.....

.....





Natural selection

Mutation





Evolution

Adaptation



Evolution and Inheritance: Keywords Flashcards



**Deoxyribonucleic
Acid (DNA)**

Variation

Fair test

Hypothesis

Adaptation

**Natural
selection**

Mutation

Inherited

Evolution

