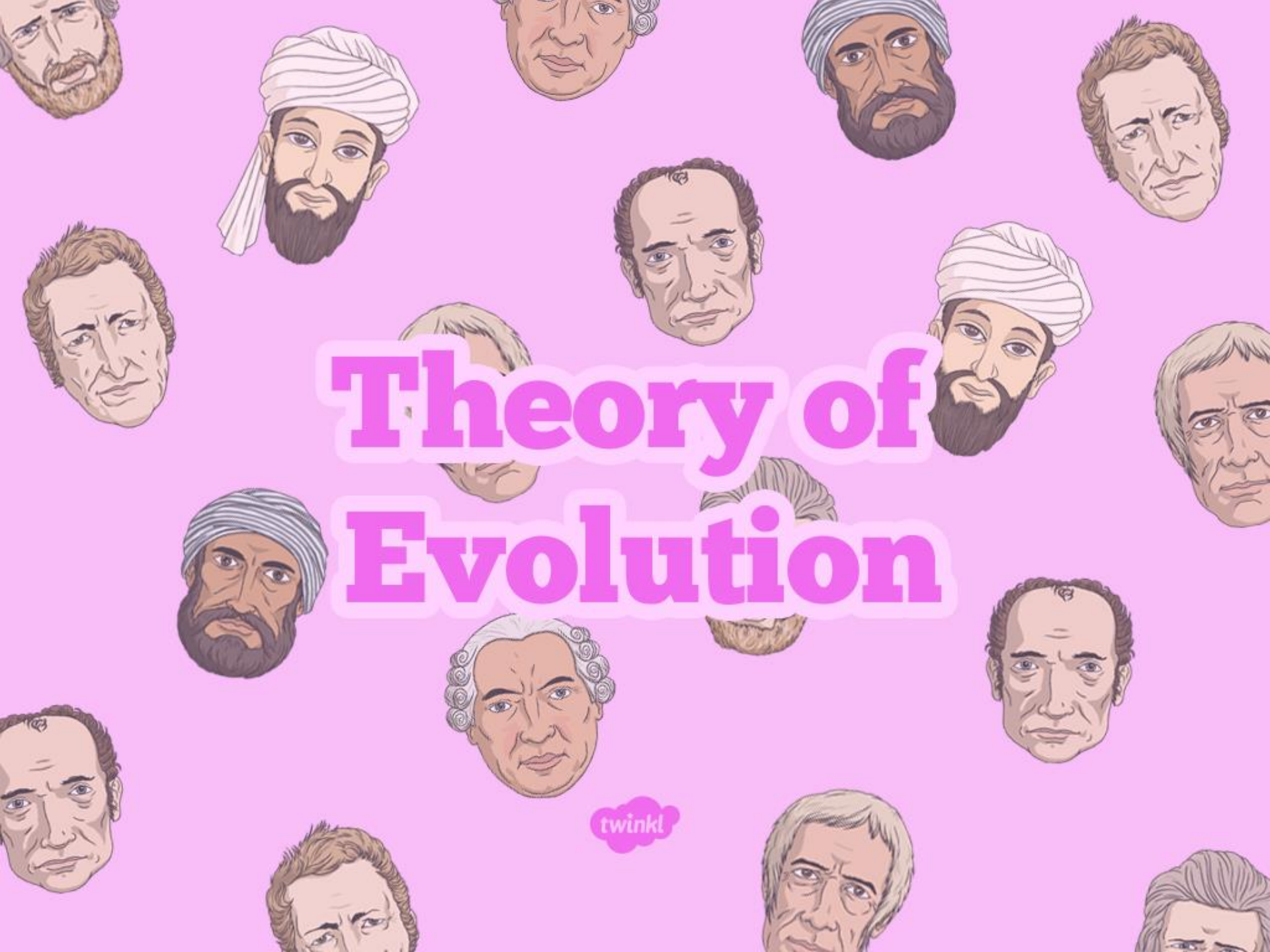
Science

Evolution and Inheritance


Theory of Evolution
twinkl

Aim

- I can identify the key ideas of the theory of evolution.

Success Criteria

- I can demonstrate understanding of how ideas about evolution developed over time.
- I can explain the terms adaptation, evolution and natural selection.

Key Vocabulary

What is **adaptation?**

What is **evolution?**

Have your ideas changed? If so, how?

Who are the key **scientists** that came up with the **theory of evolution?**

Evolution and Inheritance Key Vocabulary

Read the words and then write one or two sentences explaining what the word means.

Key Vocabulary	Meaning (Start of Unit)	Meaning (End of Unit)
Variation		
Parent		
Fossils		
Identical		
Evolution		
Offspring		
Adaptation		
Non-identical		
Environment		
Inheritance		

I believed that the
during a wet phase
that the first land
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that the first human
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I was a Taoist philosopher. We believed that plants and animals did change and that the species were not fixed. We also speculated about how the environment affected the attributes of different living things. In general, Taoists thought that all living things, the Earth and the heavens were in a state of constant transformation rather than fixed.

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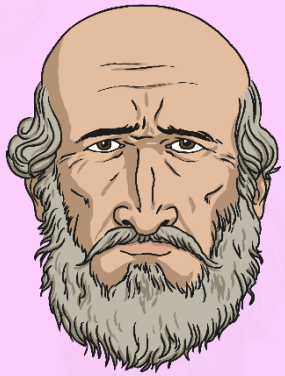
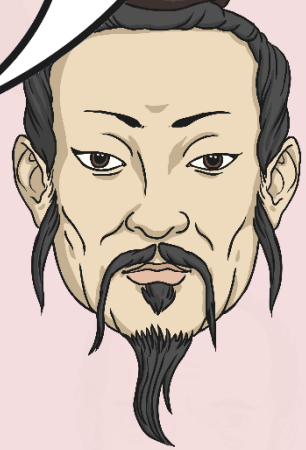


Anaximander of Miletus
(c.610 – 546 BC)

Empedocles
(c.490 – 430 BC)

Epicurus
(c.341 – 270 BC)



Zhang Zhou
(c.369 – 286 BC)

Click a head to find out more about them!

I was a Catholic bishop and a theologian (som
the idea of God and the na
called 'De Genesi ad li
Meaning of Genesis'. Gen
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thought that Genesis shou
God created life but that li
over time. I also thought t
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I noticed pattern
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were better able

I put forward a basic theory of evolution of species almost 600 years
before Darw
similar elen
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those that
animals we
from those
that lived in

I argued that humans developed from the world of monkeys by a process that led to numerous species. I thought that the cleverness and perception of monkeys was transformed into the human ability to think and reflect. I believed that all animals and plants were connected to others in this way. Living things were able to transform from one thing to another.

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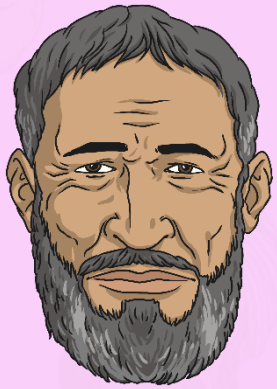

Augustine of Hippo
(354 – 430)

Al-Jahiz
(776 – 868)

Tusi
(1332 – 1406)

Ibn Khaldūn
(1332 – 1406)

Click a head to find out more about them!

I was a French m
I thought that
when living thin
result in new va
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I believed that many of the species were actually just varieties of an animals which had been modified from the original animal due to environmental factors. For example, I believed that lions, tigers, leopards and house cats all had a common ancestor. I also thought that all the mammals had descended from as few as 38 original animal types. I studied and compared the skeletons of different animals, including humans and apes but did not believe that they did have a common ancestor.

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tion of species did occur
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s shared a common ancestor.

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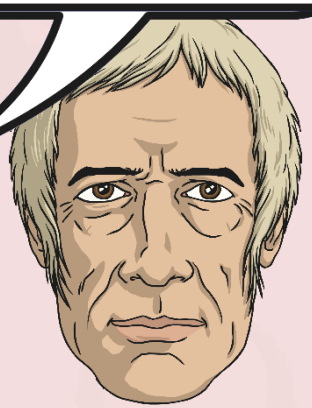
Pierre Louis Maupertuis
(1698 – 1759)

Georges-Louis Leclerc
(1707 – 1788)

Erasmus Darwin
(1731 – 1802)



Lamarck

(1774 – 1829)

Click a head to find out more about them!

I wrote about population (the number of people), not transmutation or evolution. However, my books were widely read and influenced scholars of other fields. This included the idea that if populations grew then they would struggle to survive as food would become scarcer. In this case, some would die of disease or hunger, which would lead to a decrease in the population. While I was talking about humans, this idea was applied to all living things by Darwin and Wallace.

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…nymously (which means that no-one …ok) called 'Vestiges of the Natural …', in which I proposed that the Solar …evolved, as well as living things on …gated fossils and believed that all …hed off to become different species, …While a lot of people debated my … many who disagreed with them.

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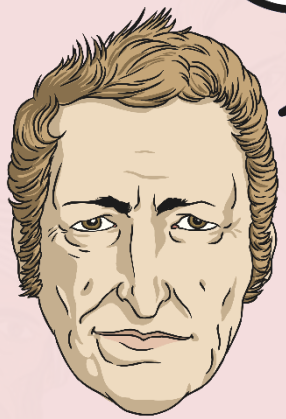
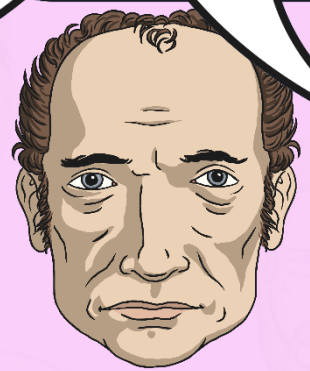


Thomas Robert Malthus
(1766 – 1834)



Robert Edmond Grant
(1731 – 1802)

Robert Chambers
(1774 – 1829)

Click a head to find out more about them!

Theory of Evolution
Darwi

Whole Class

Charles Darwin
(1809 – 1882)

From a young age I was fascinated by living things and studied them. I trained to be a doctor but could not deal with all the blood! So I studied plants and animals instead. When I was 22 years old I was able to go on the most fascinating journey to the Galapagos Islands, which took 5 years! It was in the Galapagos Islands that I studied different animals and started to come up with my greatest theory: the theory of evolution. It was the different types of finches (and nightingales) that really got me thinking.

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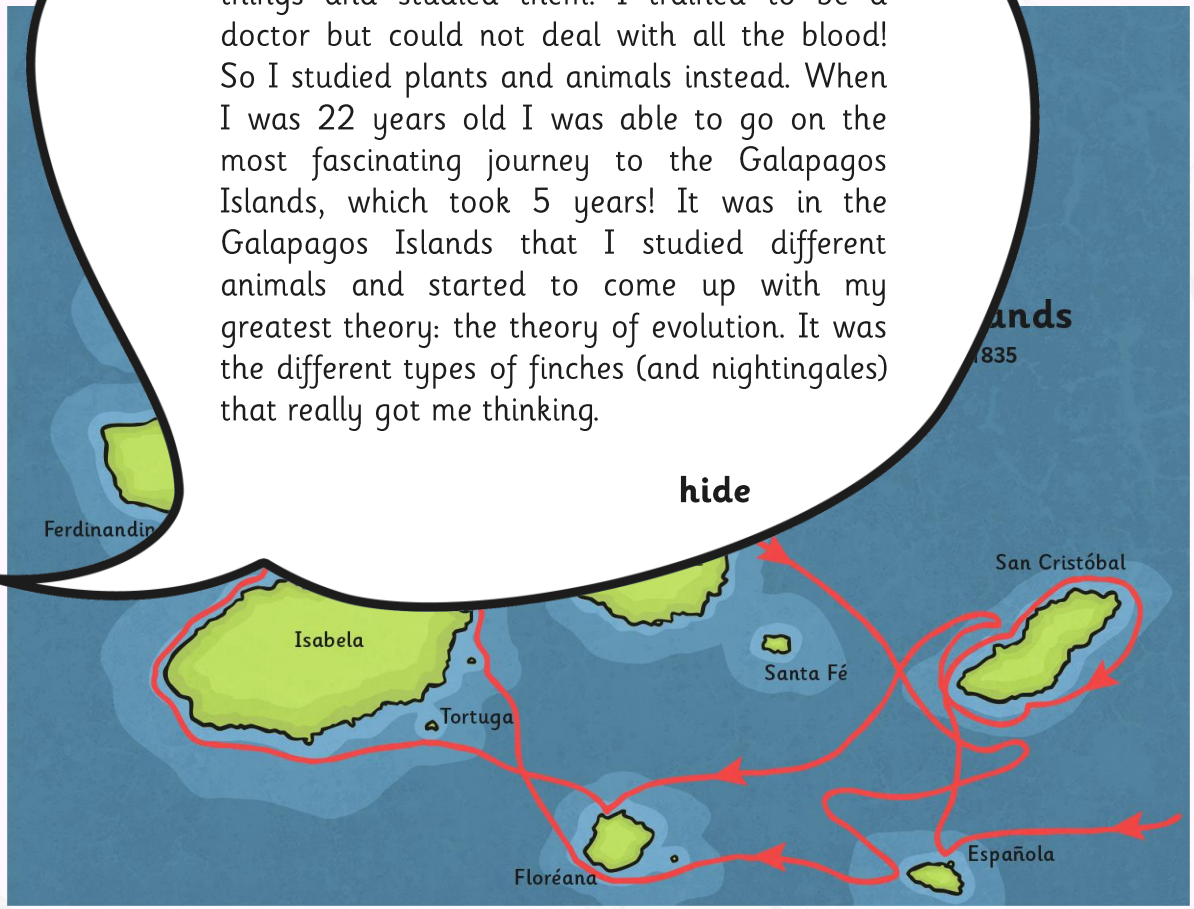
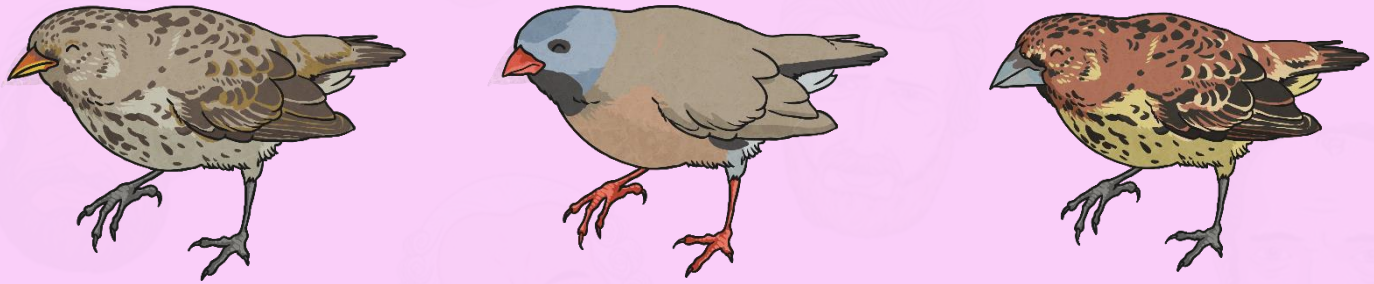


Theory of Evolution

The Galapagos Finches

I observed that there were lots of different types of finches. People believed that these were different species of birds that happened to have some similarities.



However, I realised that these birds were varieties of the same species and were related.

Theory of Evolution

The Galapagos Finches

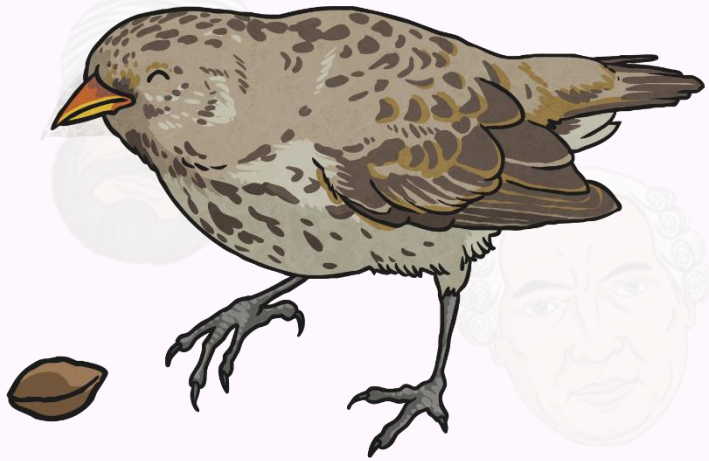
I thought that all the Galapagos finches had originated from one type of finch. The parents reproduced and created offspring. These offspring would have varied.

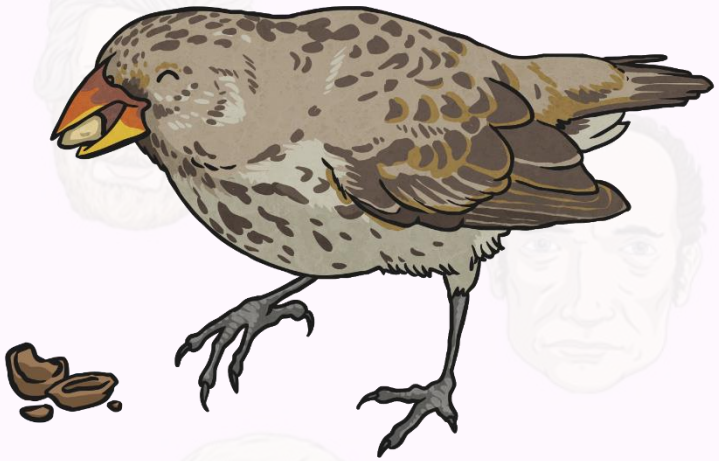
Theory of Evolution

The Galapagos Finches

Whole Class

In one part of the Galapagos Islands, bad weather affected the plants and so only those with larger seeds were left. Those finches who had slightly larger beaks were able to eat these seeds while those with smaller beaks could not.



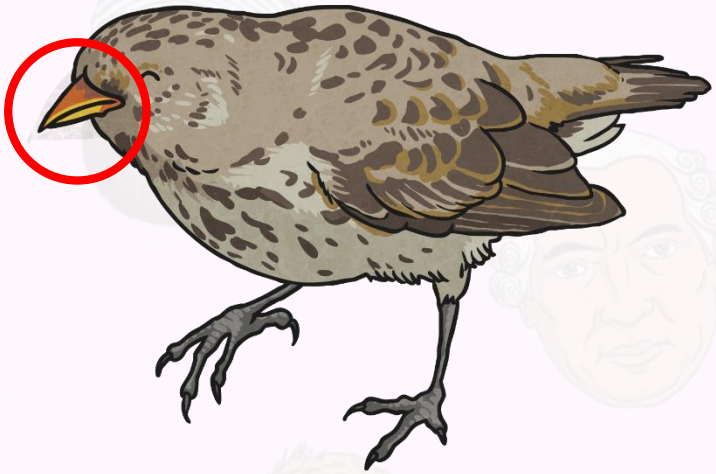


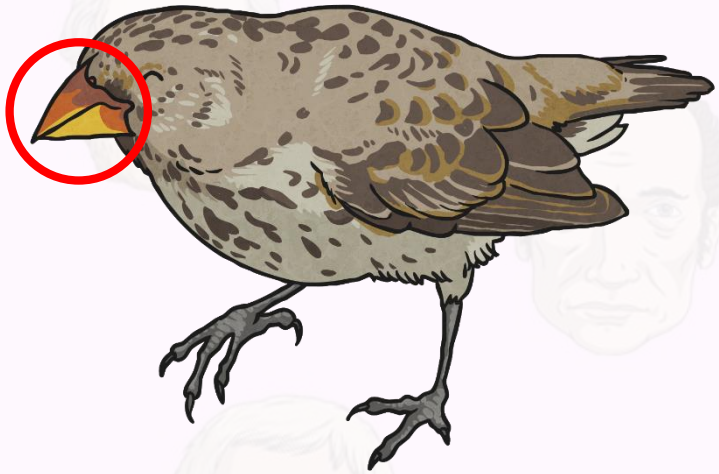
Theory of Evolution

The Galapagos Finches

Whole Class

Only the offspring with large beaks could break open and eat the larger seeds. Therefore, these offspring survived and the other, smaller beaked offspring died. 'Survival of the fittest' means those that are most suited to their environment as a result of their inherited or adaptive traits survive while others do not.

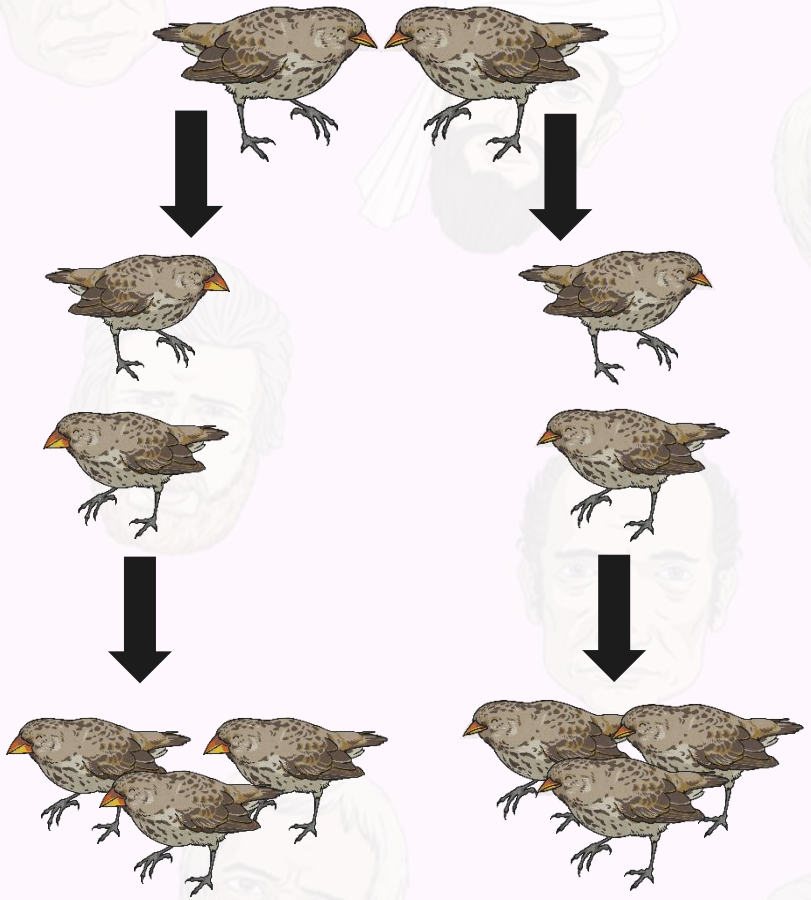




Theory of Evolution

The Galapagos Finches

The Galapagos finches with large beaks reproduced and had offspring. More of these offspring inherited large beaks and survived. In other parts of the Galapagos, smaller beaks ensured better survival than larger ones, larger eyes than smaller ones, etc. The adaptations caused by variation meant that over a long period of time the Galapagos finches evolved adaptive traits that caused differences between them.



Theory of Evolution
The Galapagos Finches

These offspring would also have differed due to inherited and environmental factors and so eventually over time stopped resembling their common finch ancestors.

Evolution is the process of **adaptation** over a long period of time.

This process, whereby certain inherited and adaptive traits allowed them to live and reproduce while others became extinct, is called **natural selection**.

Finch Ancestors

Different varieties of finches who evolved from a common ancestor that exist today.

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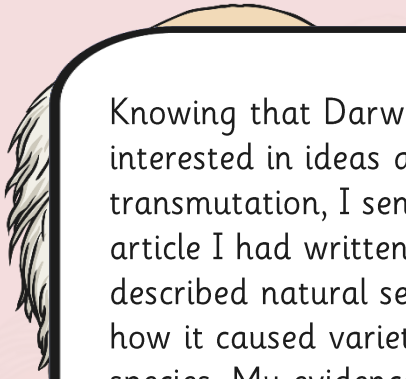

Knowing that Darwin was interested in ideas about transmutation, I sent him an article I had written in which I described natural selection and how it caused varieties of the same species. My evidence was from observations in South America and Asia. While our ideas were similar, Darwin emphasised competition for food more while I emphasised how environmental changes could lead to natural selection. However, I had not intended to publish my work straight away.

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Click a head to find

I knew my ideas were controversial and I took a long time to mull them over. For 15 years I wrote about my journey on the HMS Beagle, what I had found and other books. While my friends knew I had my own ideas about transmutation, they did not realise the full extent. However, in 1856 everything changed. A certain Alfred Wallace published a paper called 'On the Law which has Regulated the Introduction of New Species'. My friend, Sir Charles Lyell, thought I should publish my own ideas as Wallace's were similar. At first I wasn't concerned but I had partly completed my book about evolution. In 1858, I was forced into action.

I had put off finishing my book and really struggled with it because I knew that I was opposing the idea that many religious people believed: that God had created all living things just as they were now. My grandfather's negative experience when he suggested the idea of transmutation also made me question whether I wanted to publish my ideas. When I received Wallace's paper, some of my friends said to publish straight away so that I would be known as the first person to propose natural selection, but I didn't think that was fair. So I decided that we would announce the theory and we should both be attributed with its discovery.

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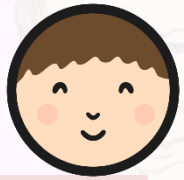
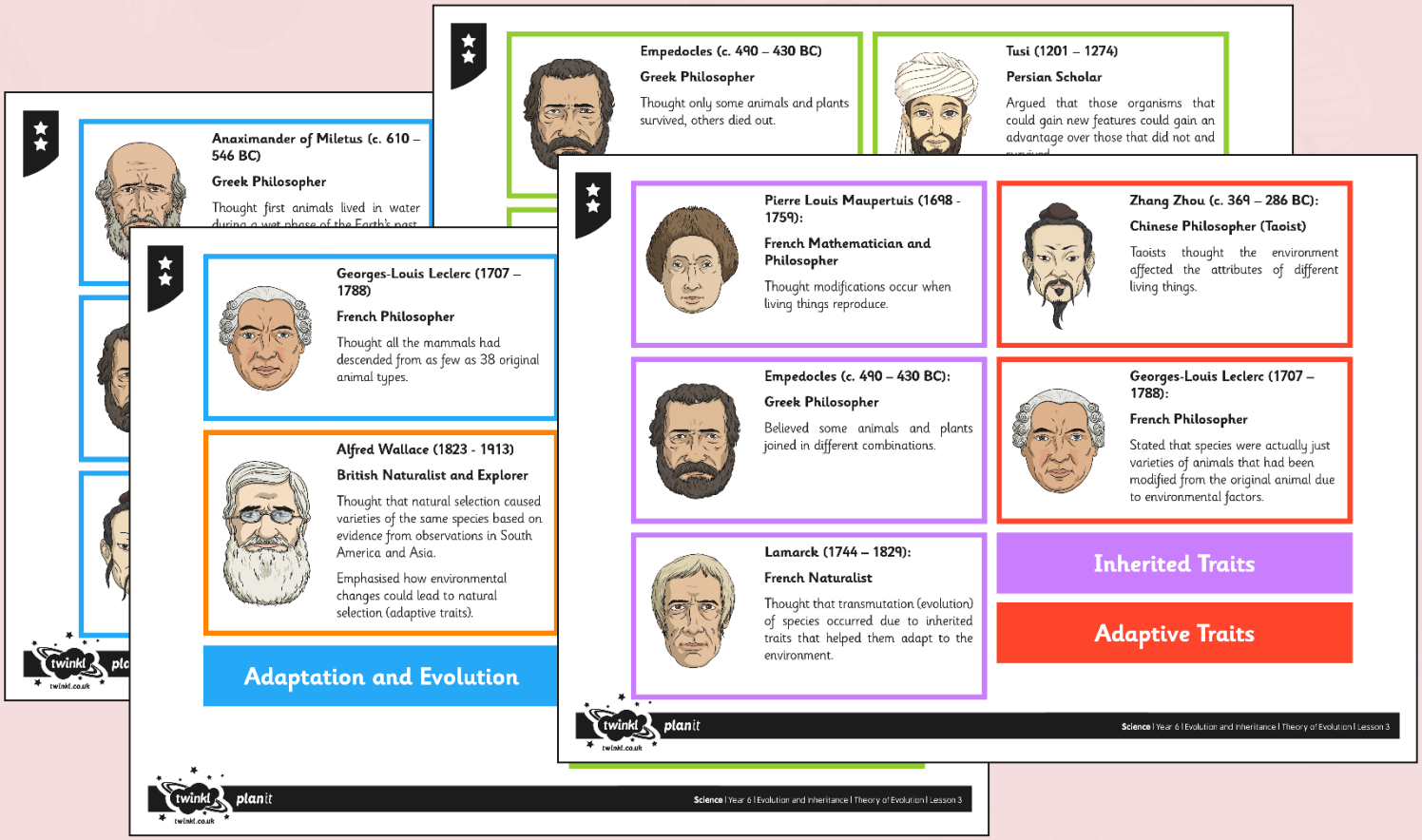
Evolution




Anaximander of Miletus (c. 610 – 546 BC)
Greek Philosopher
Thought first animals lived in water
Empedocles (c. 490 – 430 BC)
Greek Philosopher
Thought only some animals and plants survived, others died out.
Tusi (1201 – 1274)
Persian Scholar
Argued that those organisms that could gain new features could gain an advantage over those that did not and
Georges-Louis Leclerc (1707 – 1788)
French Philosopher
Thought all the mammals had descended from as few as 38 original animal types.
Alfred Wallace (1823 - 1913)
British Naturalist and Explorer
Thought that natural selection caused varieties of the same species based on evidence from observations in South America and Asia.
Emphasised how environmental changes could lead to natural selection (adaptive traits).
Adaptation and Evolution
Pierre Louis Maupertuis (1698 - 1759):
French Mathematician and Philosopher
Thought modifications occur when living things reproduce.
Zhang Zhou (c. 369 – 286 BC):
Chinese Philosopher (Taoist)
Taoists thought the environment affected the attributes of different living things.
Empedocles (c. 490 – 430 BC):
Greek Philosopher
Believed some animals and plants joined in different combinations.
Georges-Louis Leclerc (1707 – 1788):
French Philosopher
Stated that species were actually just varieties of animals that had been modified from the original animal due to environmental factors.
Lamarck (1744 – 1829):
French Naturalist
Thought that transmutation (evolution) of species occurred due to inherited traits that helped them adapt to the environment.
Inherited Traits
Adaptive Traits
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planit
Science | Year 6 | Evolution and Inheritance | Theory of Evolution | Lesson 3

Aim

- I can identify the key ideas of the theory of evolution.

Success Criteria

- I can demonstrate understanding of how ideas about evolution developed over time.
- I can explain the terms adaptation, evolution and natural selection.