

# Aim

- LO: To identify the key ideas of the theory of evolution.
- LO: To create a mini-biography.

# Success Criteria

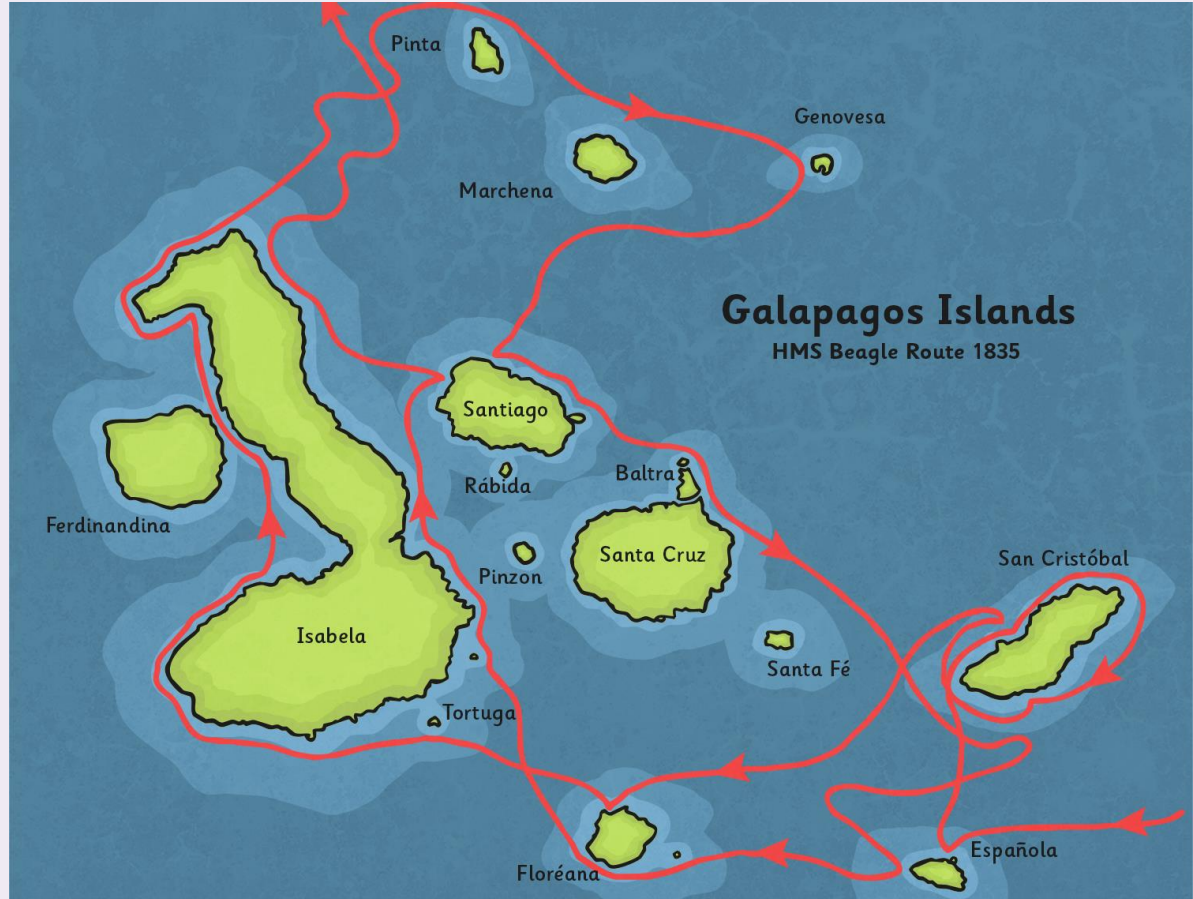
- I can demonstrate understanding of how ideas about evolution developed over time.
- I can explain the terms adaptation, evolution and natural selection.

# Theory of Evolution

## Darwin and the HMS Beagle



**Charles Darwin**  
(1793 – 1874)

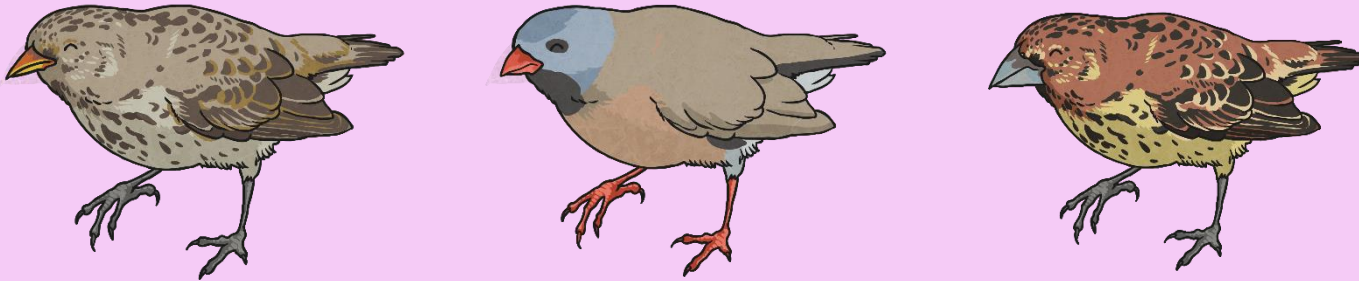


# Theory of Evolution

## 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.

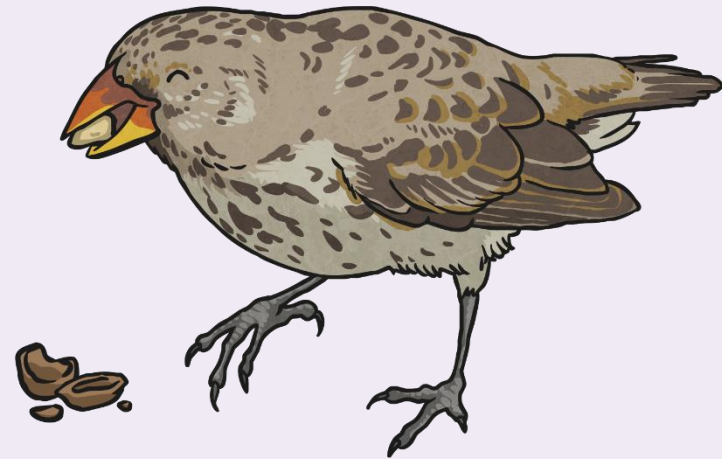
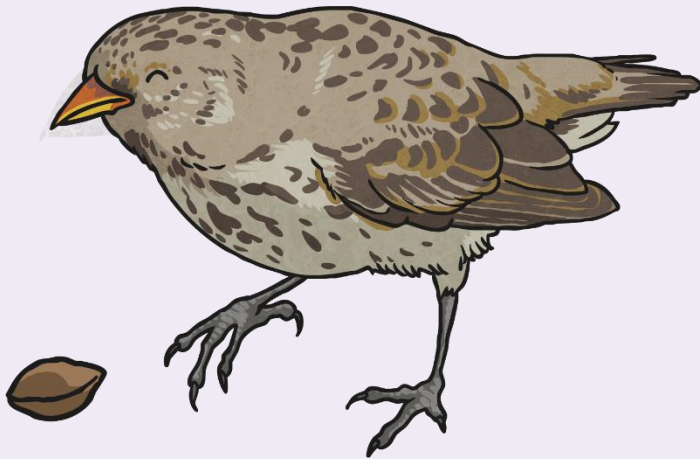


# Theory of Evolution

## The Galapagos Finches



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.

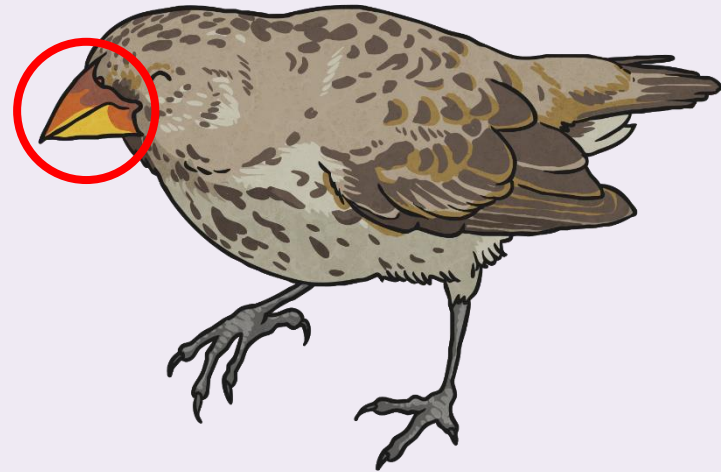
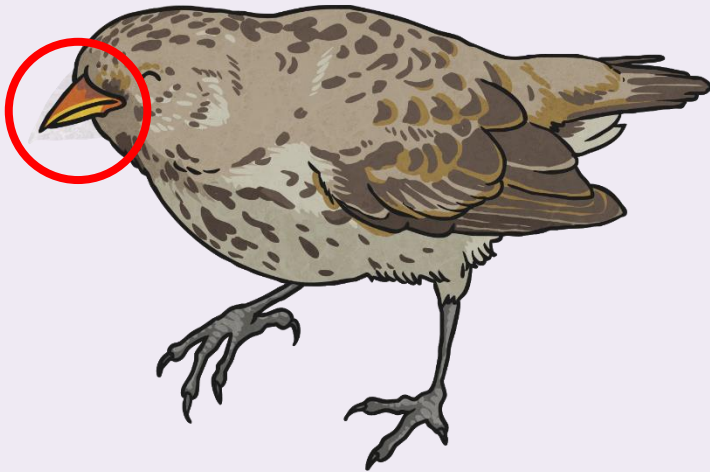


# Theory of Evolution

## The Galapagos Finches



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.

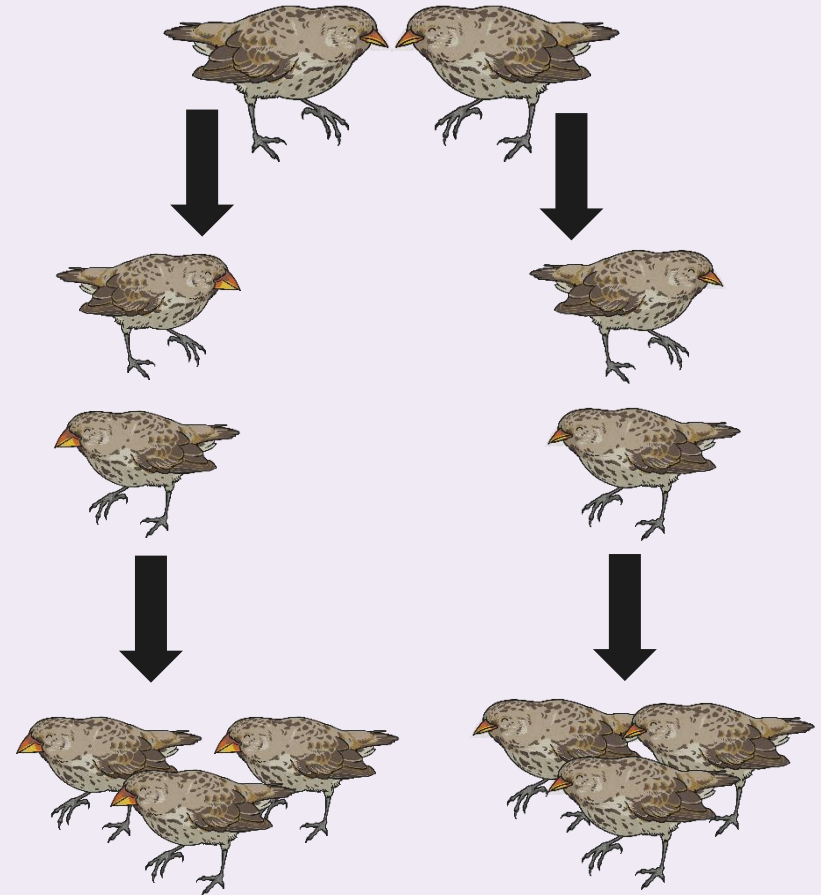


# Theory of Evolution

## 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.





# Task

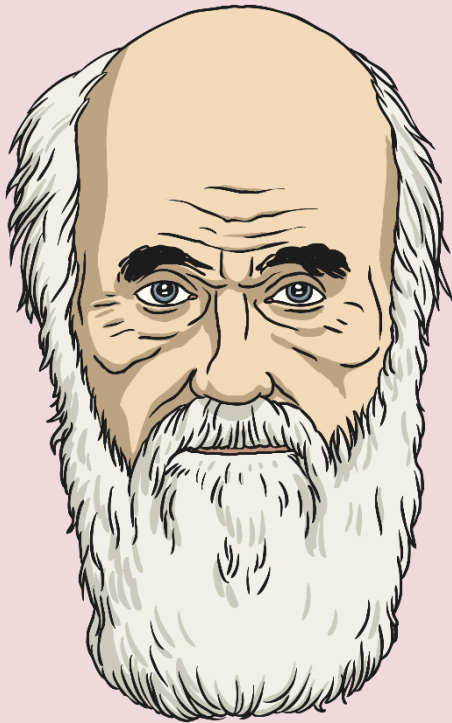
- To develop your own species or choose a species that already exists. Due to inheritance and environmental changes it adapts over time.
- Create a time-line to show how the species inherits characteristics and adapts to the environment over time.

## Adaptive radiation in Galapagos finches

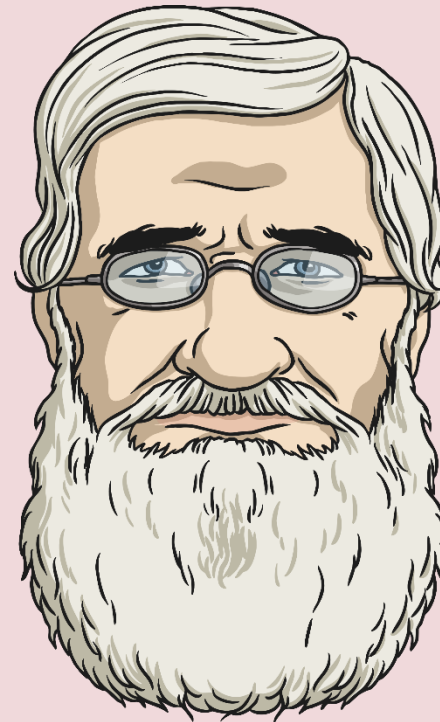


# Theory of Evolution

## Worries, Wallace and the World



Charles Darwin



Alfred Wallace

Mary Anning

<https://www.youtube.com/watch?v=Of5sK8p2rZY>

[https://www.youtube.com/watch?v=koota\\_lwU\\_4](https://www.youtube.com/watch?v=koota_lwU_4)

Alfred Wallace

<https://www.youtube.com/watch?v=JBEPLuU6q0E>

<https://www.youtube.com/watch?v=WJpZLwMIgk4>

# TASK

- To create a mini biography on either Mary Anning or Charles Darwin
- Use the headings opposite to help you plan your work:
- Scientist's name
- Lived from and to
- Best known for
- Five facts (at least)

Researcher: \_\_\_\_\_

Scientist's name:

Lived from \_\_\_\_\_ to \_\_\_\_\_:



Best known for:

Scientist's portrait

Five Facts

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

5 \_\_\_\_\_

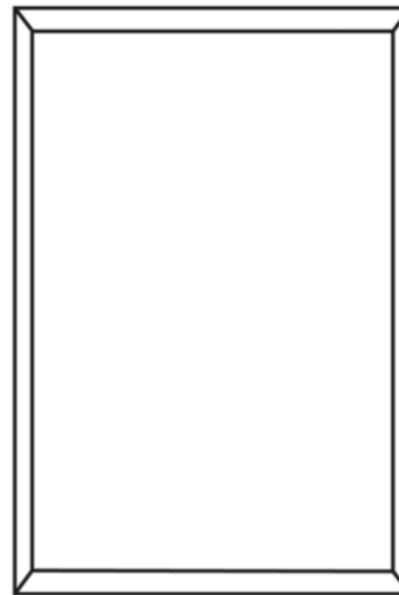
Researcher: \_\_\_\_\_

Scientist's name:

Lived from \_\_\_\_\_ to \_\_\_\_\_:



Best known for:



Scientist's portrait

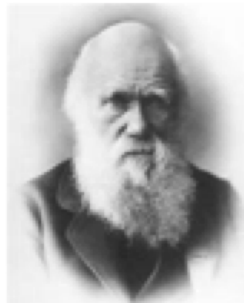
**Five Facts**

- 1 \_\_\_\_\_
- 2 \_\_\_\_\_
- 3 \_\_\_\_\_
- 4 \_\_\_\_\_
- 5 \_\_\_\_\_

Charles Darwin was an English scientist. He is most well-known for his theory of evolution.

Here are some facts about Charles Darwin:

- Charles Darwin's father was a doctor and he really wanted Charles to study medicine at university. Charles started to train to be a doctor, but he was afraid of the sight of blood, and switched to studying the classics. However, Charles soon realised that his real passion was for geology (the study of the Earth and rocks) and botany (plant biology).
- In 1831 Darwin set sail on the *HMS Beagle*, a naval survey ship. Darwin was there to collect plant and animal specimens from the countries and islands the ship visited.
- The voyage took five years. For Charles Darwin, the most important part of the journey was the time spent in the Galapagos Islands. These islands are the home to plants and animals that can't be found anywhere else in the world. Darwin noticed that each of the different islands was home to a different type of tortoise.
- When the Beagle returned to England, and Darwin began to study the specimens he had collected in more detail, he realised that the differences in finches of the Galapagos Islands followed a similar pattern to those he had observed in the tortoises. The finches from all of the islands were similar, but birds from different islands had different beaks.
- Darwin started to study other animals and plants, and he began to piece together his theory of natural selection which explains how populations evolve.
- Darwin didn't publish his findings straight away because he knew that they would be extremely controversial and upset many people.
- *On the Origin of Species* finally came out in 1859. It was a massive talking point because it challenged the truth of the creation story found in the Bible.
- Today, Darwin's theory of natural selection has been accepted (by most people) as scientific fact, and new fossil discoveries are constantly adding to our knowledge of the different stages of evolution.
- Darwin's appears on UK £10 notes, and a statue of him has been placed in the main hall of London's Natural History Museum.
- More than 120 species have been named after Darwin.



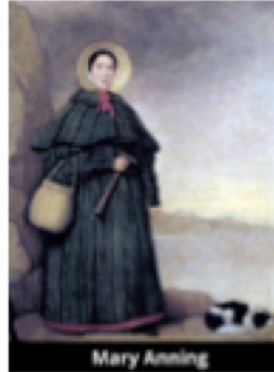
## Charles Darwin Biography

Charles Darwin was an English Naturalist born on February 12, 1809 in Shrewsbury, England. He is best known for developing a theory of evolution to explain biological change. This theory showed how Man evolved from lower life forms. With this theory, Darwin shocked religious Victorian Society by suggesting that [animals](#) and humans shared a common ancestry. He planned to study medicine at Edinburgh University as he came from a family of doctors. Eventually, he was offered a place on the HMS Beagle as a natural scientist in 1831. This voyage ended in 1836.

### **Quick Facts: –**

- Darwin was married to his first cousin, Emma Wedgewood.
  - He shared his birthday 12 February with [Abraham Lincoln](#), 16<sup>th</sup> President of the United States.
  - Charles and Emma had 10 children together, three of whom died as an infant
- 
- He also studied finches. Each island had a different species of finch.
  - He wrote many books about his voyage, Journal of Researches, Coral Reefs, Volcanic Islands and Geographical Observations on South America etc.
  - His commemorative work The Origin of Species was published on November 24, 1859.
  - He wrote his last book on earthworms which published in October 1881.
  - He is not the person who coined the phrase 'survival of the fittest'.
  - Darwin appears on the back of the British 10 pound note along with an image of HMS Beagle, a magnifying lens and flora and fauna seen on his travels.
  - When in Cambridge University, he formed the Gourmet Club for the purpose of dining on exotic animals.
  - Charles Darwin passed away on April 19, 1882 at Down House, Kent.
  - He was honoured by burial in Westminster Abbey next to fellow scientists John Herschel and Isaac Newton.





### Mary Anning

Mary Anning was an English palaeontologist and fossil collector. She did not receive any training but her technical illustrations were very detailed and accurate. Her findings gave her the title 'the greatest fossilist the world ever knew'. She was born on May 21, 1799, to Richard and Mary Anning.

Her father was a cabinet maker, carpenter, and an amateur fossil hunter. Those fossils were cleaned, polished, and then sold to tourists. The Annings had 10 children but only Mary and her brother Joseph made it to adulthood. Her father Richard Anning died in 1810 leaving his family destitute.

### Fun Facts:-

- Mary survived a lightning strike when she was only 15 months old. A neighbour who was holding her took shelter under an elm tree. He got killed but Mary was unhurt.
- She was born in Lyme Regis where the cliffs are rich in spectacular fossils from the seas of the Jurassic Period.
- Mary learned a lot about fossils from her father and developed skills in fossil hunting.
- In the year 1811, Mary found a well-preserved and nearly complete 17 feet long skeleton. It was later named as Ichthyosaurus.
- This skeleton of Ichthyosaurus was sold for 23 pounds.
- She made various great discoveries but the most important one was when he found the first Plesiosaur.
- Plesiosaur was a nine feet long reptile with a long neck, short tail, small head, four flippers, and lived in the sea.
- In 1826, she opened a shop 'Anning's Fossil Depot' that was visited by various important geologists from Europe and New York
- Mary Anning found the very first pterosaur in the year 1828.
- She died of breast cancer on March 9, 1847, at the age of 48 years.

- Mary Anning was born on 21st May 1799 in Lyme Regis, Dorset.
- Her father, Richard Anning, was a cabinetmaker and amateur fossil hunter.
- When she was only fifteen months old, Mary Anning survived being struck by lightning. She was in the arms of a neighbour under an elm tree, when a bolt of lightning struck the tree. The lightning killed the neighbor who was holding Mary, and it killed two other women, but Mary was unhurt.
- Mary attended a Congregationalist Sunday School. She learnt to read and write.
- Her father often took Mary and her brother, Joseph, fossil hunting around the cliffs of Lyme Regis. They sold their finds to tourists.
- When Mary's father died in 1810, the remaining family members focused on growing their fossil hunting / selling business.
- Mary became an expert fossil hunter. She spent days looking for fossils in the cliffs around Lyme Regis.
- Fossil collecting was dangerous work. The cliffs could collapse at any moment and landslides were common. Mary's dog, Tray, was killed when he was hit by falling rocks.
- She found her first complete Plesiosaurus skeleton on 10th December 1823. She also found various pterosaurs and a Squaloraja skeleton.
- Mary had an incredible understanding of fossils and dinosaur skeletons. It was said that she could just glance at a fossil and immediately work out what it was and which dinosaur it came from.
- Mary Anning and her family sold fossils to museums and collectors all over the world.
- She was good friends with the geologists Henry De la Beche, William Buckland and Richard Owen.
- Mary was also in contact with the geologist Adam Sedgwick, one of Charles Darwin's tutors.
- Although she knew more about fossils than many of the experts who visited her in Lyme Regis, because she was a woman and because she was a member of the working class, she wasn't completely accepted by the 19th century British scientific community.
- Mary Anning died on 9th March 1847. She had breast cancer.
- Charles Dickens wrote an article about Mary, celebrating her life and achievements.
- Anning is one of the main characters in the book *Remarkable Creatures* by Tracy Chevalier.
- Apparently, Mary Anning was the inspiration for Terry Sullivan's tongue twister, *She Sells Seashells*.
- Mary was good friends with Elizabeth Philpot, another fossil collector from Lyme Regis.