

Science - Year 3

Rocks – Block 3R

Rocks and Fossils

Session 4

Resource Pack

Task Sheet 1

I know how Fossils are Formed

Name

1.	2.	3.
Stick text here	Stick text here	Stick text here
4.	5.	6.
Stick text here	Stick text here	Stick text here

The 6 sections of text below explain the stages of how a fossil is made, but they have been written in the wrong order. Cut them out carefully and stick them on your task sheet in the right order. Illustrate each stage with a drawing in the box above.

More and more layers of sediment build up and over millions of years the sediment turns into rock.	Gradually the skeleton becomes buried in the sediment.	A creature dies and its body sinks to the bottom of the sea.
The flesh of the creature is eaten by other animals and just the skeleton is left behind.	Water trickles through the rock and the skeleton is washed away leaving a mould (an empty space the same shape as the skeleton).	Minerals from the water collect in the mould to form rock (a fossil) that fills the space. After millions of years the rock rises to the surface and might one day be found by fossil collectors

Task Sheet 2

I know how Fossils are Formed

Name

Draw pictures to show the stages of how a fossil is formed and write a sentence or two beneath each picture to explain what is happening

1.	2.	3.
4.	5.	6.

Make Your Own Fossils

Children will love this activity which you can run alongside the group tasks. You will need to set up a 'fossil making' zone in the classroom and call a group at a time to make theirs. Probably about one third of the class at a time is a workable number to cope with. It will also give you the opportunity to talk through the real fossil making process as you do it to reinforce understanding of the scientific process (*See explanations in green italic*)

You will need:

A lump of Plasticine™ (warm enough to be easily pliable) the size of a plum per child

A strip of thick card (4cm wide and at least 21cm long) per child –larger fossils will need longer strips – to circle the fossil and retain the plaster

A thick cardboard rectangle per child (to use as a base to roll out the plasticine on - 10 x 15cm approx.)

A small rolling pin between 2 children in the group

Plaster of Paris and water to mix (**Alginate™ can be used if your school's policy recommends not using plaster of Paris:** <http://www.maragon.co.uk/alginate.html>)

An old plastic jug and large metal spoon

A metal teaspoon per child to spread the plaster

Some old pencils (to scratch their initials in the base)

Flat boards or trays – one per group

Method

1. Give each child a lump of plasticine and ask them to roll it out into an oval shape about 3cm thick on a rectangle of thick card as a base *The plasticine represents the sediment (thick mud and sand) that lies at the bottom of the sea*
2. Each child should now choose a shell with an interesting shape or markings and press it down hard into the plasticine. Explain that the bit of the shape of the shell that is pressed down into the plasticine will be the "fossil" because the shell is pressing out the mould – the empty space that will become the fossil. So, they should turn the shell and press down the most interesting side. *Imagine your shell is a creature that lived millions of years ago. It has died and sunk to the bottom of the sea where it becomes buried in the sediment. The soft parts of the creature would rot away or be eaten by other creatures so only the hard parts like your shell or a skeleton would be left. More sediment would settle on top of it until it would be completely buried. We are not going to completely bury our fossils though.*
3. Ask the children to gently remove their shells from the plasticine to reveal a shell shaped mould. *Over millions of years the sediment turns to rock. Water seeps down through the shell or skeleton and gradually dissolves it away leaving a mould (a hole that is exactly the same shape).*
4. They should now each make a cardboard wall around their mould to keep the plaster in place. Give each child a strip of thick card and 2 paper clips. Ask them to write their name on the strip then show them how to bend it into a circle and join it up with a paperclip at the top and bottom. The circle (or oval) can then be pressed down into the plasticine so it surrounds the mould. They may need to adjust the size by increasing or decreasing the overlap of card. The card should not touch the shell mould but leave a gap of at least 1cm all the way round. Make sure everyone's wall is pressed down well into the plasticine (2-3mm all the way round).
5. Mix up your plaster in a large plastic jug. Generally, the proportion of plaster of Paris to water is a 2:1 ratio, with two parts plaster of Paris to one part water. For 10 small fossil moulds add 100ml water to the jug first, and then slowly sprinkle 200ml of plaster of Paris across the entire surface. Each child could add their own spoonful if very carefully supervised. Between each spoonful tap the sides of the jug to release air bubbles. **Avoid inhaling the dust and be aware that heat is generated by the reaction of the**

plaster and water so the sides of the jug will become warm. Once all the plaster has settled evenly over the base of the jug, mix the contents with a spoon. Add some poster paint to colour it a rocky shade of brown or ochre and pour or spoon it into each mould. *Water seeps into the mould and minerals from it build up inside. After millions of years a fossil is formed that is exactly the same shape as the shell or skeleton that once made the mould.*

6. Encourage each child to use the back of a teaspoon to lightly smooth the plaster across their mould gently taking it to the edges
7. Carefully lift all the “fossils” (using their cardboard bases) onto a tray or board
8. After half an hour or so the children could gently scratch their initials into the surface of their plaster so they can identify them
9. Leave for at least 24 hours before removing the cardboard and gently separating the plasticine. *One day the rock may come to the surface of the earth, perhaps because of a rock fall or because wind and rain have eroded the rock around it. Humans may then find the fossil just as Mary Anning did!*

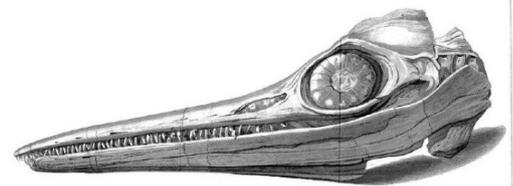
Mary Anning



- She was born in 1799 and died in 1847 aged 47.
- She lived her whole life in Lyme Regis in Dorset.
- Her father (Richard) was a carpenter, her mother was called Molly.
- There were 9 children but only Mary and Joseph survived to adulthood (this was not unusual in those days because there were no cures for many diseases). Joseph was 3 years older than Mary.
- Their house was so close to the sea it would flood when there was a storm at high tide.



- When Mary was a baby a strange event happened - she was out one day with a neighbour and 2 other women when it began to rain. They sheltered under a tree which was struck by a bolt of lightning. The 3 women were killed instantly and the lifeless baby was rushed back to her parents' house. They were heart broken and bathed her body in warm water. But a miraculous thing happened – Mary opened her eyes. Apparently returned from the dead. A doctor declared that it was a miracle.
- Baby Mary became famous in the town. People said that she was different after the lightening strike – brighter, stronger, more curious and confident – all the qualities that would help her become much more famous as an adult.
- Lyme Regis was a popular seaside town for visitors in Mary's time.
- Mary's family were poor. She did not go to school for long but learnt to read and write at a Sunday School.
- Mary's father would take her and Joseph to the beach to collect strange rocks that they called curiosities. They would sell these rocks to the tourists from a table outside their house.
- When Mary was 11 her father died after he had been injured in a rock fall on the beach.
- The family were now poorer than ever as there was no money coming in from her father's carpentry.
- Mary continued to hunt for the strange rocks on the beach that some people were now calling fossils. Scientists were excited by these mysterious rock creatures but no one was quite sure what they were.
- The rock on the cliffs was soft and unstable. After every storm there would be falls of rock, but these would often reveal new fossils. It could be dangerous at times. Mary was once trapped by a rock fall and on another occasion cut off by the incoming tide.
- Mary had a little black and white dog called Tray who was always at her side.
- When Mary was 12, she and her brother were out hunting when they found a huge fossil skull encased in rock. It seemed to be some sort of sea monster. With the help of some local quarrymen, they freed it from the surrounding rock using picks and hammers and carried it back to her house.
- Over the next weeks and months, Mary cleaned the fossil skull by skilfully chipping away the surrounding rock one small chip at a time. It was painstaking work as a mistake could ruin the find.



Everyone thought it was the skull of a strange sort of crocodile.

- A few months later, Mary found the rest of the skeleton and cleaned it in the same way. She laid it out in her father's old workshop and people flocked to see it. It was the most important fossil ever found.
- The family sold it to a collector for £23 which was a lot of money in those days. Later it would be sold to The British Museum and given the name Ichthyosaur which means fish lizard.

- Mary continued to hunt for fossils and sell them to tourists. Her better finds she sold to scientists for higher prices. Lyme was famous by now as a fossil collecting site and many collectors and scientists would also hunt among the cliffs. But it was dirty and dangerous work and none of them had such a good eye for spotting fossils as Mary.



- Ammonites and belemnites (which were known as devil's fingers) gave some of her best trade.
- Despite her very limited schooling, Mary borrowed books and scientific papers on fossils and through her reading kept up to date with scientific ideas on these strange creatures from another time that were trapped in the stone.
- Her reputation as an expert as well as a fossil hunter spread and she was visited by many important scientists and collectors of the day.

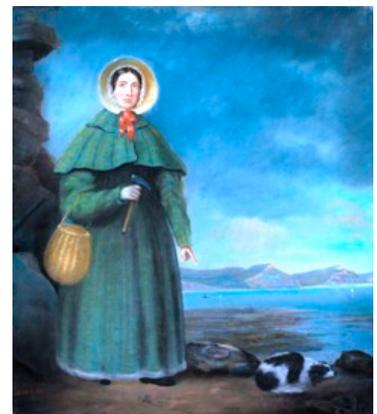


- When she was 24 she found the first complete skeleton of a plesiosaur and a few years later the first British skeleton of the strange flying lizard called a Pterosaur. This skeleton was bought for the British Museum.



- By the age of 27 Mary had saved enough money to buy a house with a proper glass fronted shop window where she could display her fossils and attract more trade.

- Scientists and collectors continued to visit her, talk about fossils with her and even ask her to take them out hunting on the cliffs because she was so much better at finding fossils than anyone else.
- Sometimes these scientists took the credit for new ideas and fossil finds that were actually Mary's, which wasn't fair.
- Mary died of a disease at the age of 47 (unmarried and childless).
- She had lived in a time when no woman could vote or go to university and she had been a poor woman with very little education, yet she had made a huge contribution to science. Her fossils can still be seen in museums all around the world.
- Mary Anning is now recognised as one of the greatest fossil hunters the world has ever known.



Session 4 Teachers' Notes

Teacher in Role

During this session it is suggested that you take on the role of the great fossil hunter Mary Anning. She will be introduced as a time travelling visitor. Typically with "teacher in role" sessions, you have costume props and one of them, usually a hat, signals when you are the character and when you are the teacher. Whenever you are wearing the hat, you will be Mary Anning, and whenever you take it off, you are the teacher again. Teacher in role sessions can be quite a powerful way to draw children into a connection with a historical character. They can ask questions, listen to "first hand" accounts and interact with the character in a meaningful way.

There is no reason why a male teacher cannot play Mary but if for any reason you are not comfortable with the idea, you could ask a friend, parent or other member of staff to take on the role instead. If a different person than you plays Mary, they could enter the room at the appropriate moment wearing a full outfit rather than just a few costume props.

Costume

A straw hat and shawl are the basic props required but if an actor other than the teacher takes on the role a long plain dress or skirt with blouse would be perfect. A wicker basket with a small wooden-handled hammer would also add to the effect.



Research

You (or the person playing Mary) will need to do some research on her life and memorise the main events. This should not be too hard as it is a fascinating life story and a session resource is provided with all the main events bullet pointed (Mary Anning Notes).

Role play

It will work best if the children are able to engage with the character by asking questions and interacting a bit. Try to moderate your voice to help the children believe in Mary as a different character from you the teacher. Obviously, all the tales of your life as Mary will be told in the first person. A Dorset country accent would be ideal. To hear an actor playing Mary follow this link <http://www.bbc.co.uk/education/clips/z4r4d2p>. It will really hook the children in if you give lots of first hand details and convey the emotions she felt, e.g.

- the feeling of being different to other children – the tale of the lightning strike
- pain of frozen fingers whilst hunting on the beach for hours in the winter
- desperation- not wanting to come home unless she had found something that day because no fossils to sell meant no food on the table
- love of Tray her faithful little dog and sadness when he died (a rock fall on the beach)
- fear of rock falls and being cut off by the tide (both of these happened to Mary)
- exhilaration of finding the first huge skull and later the rest of the skeleton
- excitement – having the interest of the important men of science
- pride that her fossils were on display at the British museum
- anger that scientists were taking the credit for her ideas and her finds
- satisfaction and pride when she was eventually acknowledged as one of the greatest fossil hunters the world has ever known

Tricky questions

The best questions are those that will help you to recount the stories that bring out the emotions above. If a question is “closed” or irrelevant, twist it around to what you want to say, e.g.

Did you eat cornflakes for breakfast?

We were lucky to have even dried bread for breakfast. Many a time I was searching for curiosities with an empty tummy and frozen fingers. In fact one such day I was ...

The children will quickly become hooked in and be excited to find out who you are and what you did. Reveal information gradually and drop in teasers to arouse their interest, e.g.

Well of course people were always a little afraid of me because I was different to all the other girls of my age. It wasn't just that I spent all my days roaming the beach – it was the strange miracle that happened when I was a baby that really made them whisper about me.

Then wait for them to ask about the strange miracle.

Do not come out of role even for a second whilst you are wearing the hat. If a question is about a detail of her life that you do not know, use one of the following replies

It all happened such a long time ago and the details are rather hazy now

Time travellers are restricted in the answers they can give

I am a bit confused by your question – perhaps you want to know ...

Alternative

Teacher in role is an exciting and powerful way for children to explore the life and contribution of a historical figure. Even if you have no experience of acting, it is worth giving it a try. You will be surprised how easy it is to totally captivate even the liveliest of classes and give them a high quality memorable learning experience! If for any reason you are unable to give it a go, use this film clip <http://www.bbc.co.uk/education/clips/z4r4d2p> as an alternative.