

How fossils talk to us

This resource was developed by teachers within the Royal Society Schools Network



Fossil skull and jaws of the Proteosaurus [Ichthyosaurus], 1820. From The Royal Society, PT/73/8/15

Curriculum key words

Explain	Evidence
Fossil	Justify
Observation	Reasoning
Refute	Support

Curriculum links

Working scientifically:

- Reporting and presenting findings from enquiries... 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.

Evolution and inheritance (Y6):

- Recognise that living things have changed over time and that fossils provide information about living things that inhabited Earth millions of years ago.

Equipment needed

- cut up, enlarged sections of the 'Proteosaurus' image;
- ICT to support with creating presentations about the image (optional).

Upper KS2

Introduction

These activities encourage students to take close observations of a drawing of a fossil ([Fossil skull and jaws of the Proteosaurus \[Ichthyosaurus\]](https://making-science.royalsociety.org/s/rs/items/PT_73_8_15) https://making-science.royalsociety.org/s/rs/items/PT_73_8_15), created in 1820, to suggest theories about what the animal may have been like when it was alive, then communicate these ideas in a clear and engaging way, using appropriate scientific vocabulary.

Depending on the time available and what specific skills you would like students to focus on, the activities below could be covered in one lesson or split into two sessions, with students discussing and coming up with ideas in one session, then planning and creating their presentations in a second session.

Learning objectives:

To make careful observations and then report and present findings from enquiries, including conclusions, causal relationships and explanations and degree of trust in results, in oral and written forms such as displays and other presentations.

Success criteria (SC):

- SC1: I can decide, by looking at an image, if an image represents part a living thing.
- SC2: I can use my scientific knowledge of animal bones and parts to imagine what that living thing might look like.
- SC3: I can explain my ideas using clear and precise scientific language.

How fossils talk to us

Starter activity: what can you see

(Approximately 10 – 20 minutes) [SC1]

In small groups, give students different, enlarged sections of the image, '[Fossil skull and jaws of the Proteosaurus \[Ichthyosaur\]](#)' and ask them to look closely, discuss their observations and suggest what the whole picture could show.

You could ask them to consider:

- What do you think this is part of?
- Is the thing in the picture part of a living thing? If so, what kind of living thing and what part of it are you looking at? If not, what do you think the object is for?
- Where do you think this image might have been found?
- Where do you think the thing in the image originates?
- When do you think the image was created?
- Why do you think the image was created?

Throughout the discussion, encourage students to keep their image hidden from the rest of the class to prevent anyone from putting together a full picture.

Ask students to feedback what they thought about the image, encouraging everyone to think about how the ideas of others fit in with their own thoughts. Has anyone changed their mind based on the observations of others?

Activity A: generating ideas

(Approximately 10 – 20 mins) [SC2]

Show students the whole image using the *Science in the Making* website, zooming in on various details noticed by students. Discuss which of our original ideas still stand and which need to be changed now we have more evidence available.

Explain that this image is a drawing of sections of fossilised remains of an animal found in the UK around 200 years ago, and we are going to use it to reenact the process of science communication that is associated with new discoveries. Much like they write up findings from investigations at school, a large part of the job of many scientists in both the past and present is sharing their findings with the wider world and using their evidence to back up their theories. For the first part of today's task, students must use the evidence we have available in the image to decide what the animal might have been like, both in appearance and behavior. They could consider:

- What did the whole animal look like?

- How big was the animal?
- What sort of habitat did the animal live in?
- How did it move?
- What did it eat and how did it find/catch its food?
- How did it protect itself from predators?

For each suggestion they make about the animal, students must explain their scientific reasoning behind it, using the image and/or their scientific knowledge, for example, “We think the animal must have eaten other animals, because it has sharp teeth.”

Students could also identify further questions they have about the animal that they cannot decide on an answer to without further evidence.

To support students, word banks with definitions could be provided, including vocabulary such as:

Skeleton	Omnivore	Prey
Fossil	Mammal	Habitat
Vertebrate	Fish	Environment
Invertebrate	Amphibian	Adapted/adaptation
Herbivore	Reptile	Survive/survival
Carnivore	Predator	

Be sure to include words that may not be relevant to the animal (for example including both carnivore and herbivore) so that students don't automatically jump to conclusions based on the vocabulary they have been given.

Activity B: writing presentations

(Approximately 15 mins up to 2 hours depending on the level of detail) [SC3]

Once students have made some theories about the animal based on the evidence they have, they then need to communicate this to the wider world. Show students the [journal article](https://royalsocietypublishing.org/doi/pdf/10.1098/rstl.1820.0012) (https://royalsocietypublishing.org/doi/pdf/10.1098/rstl.1820.0012) containing the final draft of the image they have been looking at, and explain that this was how the scientist communicated his ideas to the wider world in 1820.

Discuss what students think of his article, and how it could be changed to better suit a modern audience, now that new technologies are available. Explain that the second part of their task is to create a presentation that communicates their ideas about the fossil in a clear and engaging way.

There is huge scope here to adapt the kind of presentation students make depending on skills you would like them to practise and who the audience their presentation is for, for example, students could:

- Create an oral presentation referring to the image displayed either on an interactive whiteboard or flipchart.
- Use PowerPoint to create a presentation with words and images explaining their theories about the image.
- Design an infographic or poster, with the image of the fossil annotated with their ideas about the animal.
- Use video creation and editing apps on tablet computers to produce a short video in which they describe their ideas, referring back to the original image.

Plenary

(Approximately 10 – 20 mins) [SC3]

When students have created their presentations, share them with the class and discuss the effectiveness of their science communication:

- Did they use appropriate scientific vocabulary?
- Did they explain the reasoning behind their ideas?
- Was the presentation engaging?

Further Research

The fossil depicted in this image was discovered by Mary Anning, although her name appears nowhere in this, and other journal articles about the fossil by the same author. Students could carry out some further research about her discoveries and the contribution she made to palaeontology, as well as the response to her work from the then male-dominated world of scientific research.

Assessment

Students will have partially met the learning objective, 'Report and present findings from enquiries, including conclusions, causal relationships and explanations and degree of trust in results, in oral and written forms such as displays and other presentations' if they:

- Can give justifications for the theories they have made about the animal.
- Can use appropriate scientific vocabulary when explaining their reasoning about the animal.

Please note, to have fully met the requirements for this National Curriculum statement students will have also needed to present findings in a range of different ways and contexts, including results from investigations they have carried out first-hand.