

PALAEONTOLOGY

WITH DR DAVIDE FOFFA

Talking *points*

KNOWLEDGE

1. When did the Permian-Triassic Mass Extinction occur?
2. The Elgin Reptiles contain ancestors of which modern animals?

COMPREHENSION

3. Why are the Elgin Reptiles an important group of fossils to study?
4. What are the problems with the casting technique traditionally used to study the Elgin Reptiles?
5. How does the technique of micro-computed tomography work?

APPLICATION

6. If you were looking for a new site to discover fossils, what questions would you need to consider before beginning your fieldwork?
7. How did Davide use new information about *Scleromochlus*'s anatomy to better understand its behaviour? What other anatomical information do you think palaeontologists look for to find clues about a species' behaviour?
8. What other fields of science might benefit from micro-computer tomography?

ANALYSIS

9. What do you think are the similarities and differences in the skills needed and methods used by palaeontologists when conducting fieldwork compared to visiting museum collections?
10. Fossils are one of the only ways in which we can learn about past life. What challenges could this pose when piecing together the evolutionary tree of life? What additional data might help overcome these challenges?

SYNTHESIS

11. Davide hopes his research will help us understand more about how life responds to mass extinctions. How could we use his research findings to address the looming biodiversity crisis?

Activities

1. Mass Extinction Events

The Elgin Reptiles contain fossils from both the Permian and Triassic periods. They are particularly interesting because the Permian-Triassic Mass Extinction separates the two groups of fossils. This was the largest extinction event that life has experienced; however, there have been five mass extinction events since life began:

- The Ordovician-Silurian Extinction
- The late Devonian Extinction
- The Permian-Triassic Extinction
- The Triassic-Jurassic Extinction
- The Cretaceous-Palaeogene Extinction

Choose one of these extinction events and create an eye-catching and engaging poster about it, including the following information:

- What caused the extinction event?
- Which species died out and which survived?
- What allowed these species to survive?
- What new groups evolved or became dominant after the extinction?
- How did the extinction affect the evolution of life on Earth?

2. The 6th mass extinction

Many scientists believe we are currently facing a 6th mass extinction. Thanks to human activities such as deforestation, pollution, over-fishing and the excessive consumption of fossil fuels, species are dying out at a much faster rate than usual.

However, other people argue that current extinction rates do not constitute a 'mass extinction'. Conduct your own research online into the 6th mass extinction and answer the following:

- Do you believe we are in a 6th mass extinction? Why, or why not?
- What would the consequences of a 6th mass extinction be for life on Earth?
- How would it affect human lives around the world?
- What can society do to prevent a 6th mass extinction? What can you personally do?

More resources

- Palaeocast is a podcast about all things palaeontology. Listen to Davide talk about his *Scleromochlus* research: www.palaeocast.com/scleromochlus
- This article from National Geographic discusses Davide's *Scleromochlus* research: www.nationalgeographic.co.uk/science-and-technology/2022/10/230-million-year-old-mystery-fossil-sheds-light-on-origins-of-pterosaurs
- In this video from the Elgin Museum, Davide talks about using new technologies to study the Elgin Reptiles: www.youtube.com/watch?v=YuVIIPzUWFg
- Explore this digital 3D model of *Scleromochlus*, created by Matt

Humpage © Northern Rogue Studios: www.sketchfab.com/3d-models/scleromochlus-taylori-38458d11987c45a184d29787835e3735

- The Society of Vertebrate Paleontology (www.vertpaleo.org/resources-for-educators-and-students), the Paleontological Society (www.paleosoc.org/educational-resources) and the American Museum of Natural History (www.naturalhistory.si.edu/education/teaching-resources/paleontology) all provide educational resources about palaeontology.
- Dawndinos has a selection of fun palaeontology-related activities for students: www.dawndinos.com/activities