

SAT 1 APR – SUN 16 JUL



Sea Monsters

Seriously scary

See gigantic prehistoric predators,
real fossils and more!

Learning Resource | Primary Curriculum Links

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Introducing the Exhibition

Sea Monsters: Prehistoric Ocean Predators was developed by the Australian National Maritime Museum in partnership with Queensland Museum.

The exhibition showcases the mighty ancient marine reptiles that hunted the oceans at the same time dinosaurs walked the land: these were the plesiosaurs, ichthyosaurs and mosasaurs.

Through a range of interpretative panels, life size models, fossils, and engaging interactive experiences, you and your students will have a terrifyingly great time!

Key themes:

- **Palaeontology** – history, study of fossils, impact of technologies
- **Adaptations to life in the ocean** – movement, sensory information, reproduction, diet and salt excretion, camouflage
- **Ocean predators today** – extinct and extant (living) animal groups, convergent evolution, human impacts, conservation

Complementary messages:

- Our knowledge and understanding of ancient animals can change! Human eyes have never seen a living plesiosaur or dinosaur, so we interpret fossils for evidence of how they looked and behaved. New fossils or new technologies may reveal additional information.
- The largest known animal to have ever lived is the Blue Whale, *Balaenoptera musculus*.
- Marine reptiles which are alive today (extant as opposed to extinct groups) are the sea turtles, sea snakes, marine iguanas and crocodiles.
- It is scientifically incorrect to call ancient marine reptiles and flying reptiles “dinosaurs”. Dinosaurs are their own taxonomic group, evolving from separate common ancestors. You could think of dinosaurs as ‘ancient land reptiles’, occurring at the same time as other flying and swimming reptile groups.
- Megalodon is an extinct shark (fish) species, the largest that we know of so far. It lived approximately 16 to 3.6 million years ago, a long time after the ancient marine reptiles went extinct and before humans had evolved.

Stimulus Questions

Students visiting the exhibition

What are some of the adaptations (physical features) that allowed ancient marine reptiles to live in the oceans? *Think about how they moved, what they ate or what ate them, how they could breathe and how they reproduced.*

Can you describe any ways that these ancient animals are similar to marine animals that are alive today?

What would it be like to be a palaeontologist? How would you do your job and how has it changed over time?

What are fossils?

Describe some of your favourite animals (fossils, fossil casts, or models) in the exhibition and explain why you chose them.

What did the exhibition make you curious about (did anything make you think deeply, or want to find out more)?

Palaeontologist Profile



Dr Mikael Siversson is a palaeontologist and is the Western Australian Museum's Head of Earth and Planetary Sciences (the department that deals with fossils, minerals and meteorites). He is a leading expert in Cretaceous and Cenozoic sharks and rays.

A palaeontologist is a scientist who studies the past through fossils. Fossils are the remains of animals, plants and other organisms that lived some thousands to millions of years ago.

Mikael and his team manage the WA Museum's palaeontology collection, which is made up of around one and a half MILLION fossils from a wide range of animals and plants.

We asked Mikael a few questions about his job at the Museum.

How did you become a palaeontologist?

Some children want to be a palaeontologist when they are quite young. I wanted to become a palaeontologist around the age of 20 after picking up a book on dinosaurs in a library and realising that there are people getting paid to dig up fossils. I thought "That's what I want to do!"

I am from Sweden and I studied a PhD in Geology there. Most palaeontologists either have a geology background like myself, or a biology background.

What sorts of things do you do in your job?

I manage the collection of fossils at the Museum, which includes preserving them, storing them, making sure they are in good condition and sometimes loaning them out to other museums for their research.

When there is a new exhibition, we choose the best fossils to go on display and make sure they are displayed safely, and we write the information panels to describe them. One of the biggest exhibition jobs we have had in recent times was developing the fossil displays at WA Museum Boola Bardip in the city.

We work with model makers to make sure the models of the animals look as accurate as possible too.

I write scientific publications on prehistoric animals. My speciality areas include Cretaceous and Cenozoic sharks and rays, Cretaceous dinosaurs, turtles, pterosaurs, mosasaurs, plesiosaurs and mammals. I also deliver public talks or lectures at the Museum.

We go out on field trips at least once a year to search for new fossils.

I also help out with developing school programs or public programs, making sure all the information is accurate and providing talks or interviews like this one.

What are some of things you need to like doing to be a palaeontologist?

To be a palaeontologist, you must be patient as some fossils take a long time to find and an even longer time to remove the surrounding rock.

You also need to like solving mysteries - being a palaeontologist is like being a detective, especially when you only have a small part of an animal to work with, like a single tooth.

Our field trips often involve camping, so you need to like being outdoors and you can't mind getting dusty!

How many fossils have you found so far? Have you found any marine reptiles?

I have found thousands of fossils - too many to count. One of the most common fossils I find is sharks tooth fossils. I have also found fossils from Cretaceous ichthyosaurs, plesiosaurs and turtles in Western Australia.

What kind of technologies are you working with?

We work with things like automatic clay washing machines, CT scans and 3D printing. Even digital photography is much easier than in the past where we had to develop our own photos in a darkroom with chemicals.

What is your favourite fossil?

My favourite fossil animal is the giant shark 'Carcharocles megalodon'. It's my favourite because of its huge size, awesome dentition and the fact it's not closely related to any living sharks. Was it built like a white shark, a giant grey nurse shark or something entirely different? We don't know and may never know for sure...

Western Australian Curriculum Links

Primary

Ancient marine animals were once living things and therefore connect to *Science Understanding* content in past tense. For example, ancient marine reptiles had a variety of structural features and adaptations which enabled them to breathe, move, eat, reproduce and sense their surroundings in aquatic environments. The exhibition also supports *Science as a Human Endeavour* content by examining how palaeontology as a scientific discipline has changed over time and refers to the individual contributions of past and contemporary palaeontologists.

Primary Science	
Strand: Science Understanding	
Sub-Strand: Biological Sciences	
Pre-primary	Living things have basic needs, including food and water (ACSSU002)
Year 1	Living things have a variety of external features (ACSSU017) Living things live in different places where their needs are met (ACSSU211)
Year 2	Living things grow, change and have offspring similar to themselves (ACSSU030)
Year 3	Living things can be grouped on the basis of observable features and can be distinguished from non-living things (ACSSU044)
Year 4	Living things have life cycles (ACSSU072) Living things depend on each other and the environment to survive (ACSSU073)
Year 5	Living things have structural features and adaptations that help them to survive in their environment (ACSSU043)
Year 6	The growth and survival of living things are affected by physical conditions of their environment (ACSSU094)

Primary Science

Strand: Science as a Human Endeavour

Sub-Strand: Nature and Development of Science

Pre-primary	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE013)
Year 1-2	Science involves observing, asking questions about, and describing changes in, objects and events (ACSHE021) & (ACSHE034)
Year 3-4	Science involves making predictions and describing patterns and relationships (ACSHE050) & (ACSHE061)
Year 5-6	Science involves testing predictions by gathering data and using evidence to develop explanations of events and phenomena and reflects historical and cultural contributions (ACSHE081) & (ACSHE098)

This Teacher Resource was developed with the assistance of Queensland Museum Lifelong Learning and is intended to support teachers when planning a class visit to the Sea Monsters: Prehistoric Ocean Predators exhibition.