



Fossils in the NT - Teacher's Notes

Masses of megafauna

A fossil is the preserved remains or traces of an organism that lived a very long time ago and it is usually found in sedimentary rocks. Fossils give an insight into the past by providing evidence of past environmental conditions and landscapes.

Students may have the misconception that all fossils are dinosaur bones, but fossils of other animals are much more commonly found today. Fossils may also be of ancient plants, microscopic bacteria and algae or traces of organisms such as shells, preserved footprints or poo. It is actually rare for an organism's remains to be fossilised, as generally they would just rot away completely after they die. The conditions of their burial need to be just right for fossilisation to occur.

There are several types of fossils that we can describe by looking at the way they form.

- **Trace fossils** - preserved record of an organism's activity such as nests, footprints, teeth marks or burrows, as well as poo (coprolites). These can give information about animal behaviours such as how they reared their young or their diet. Footprints can help to determine how animals moved.
- **Mineralised fossils** - geological processes gradually replace organic matter with minerals which then crystallise to form rocks in shape of animal or plant. These are the most common type of fossil and can be very detailed records of both hard (commonly) and soft (less commonly) parts of organisms. Eg bones, petrified wood, invertebrate fossils such as ammonites and trilobites.
- **Impression fossils** - Imprint of organism left in sediment which then





Fossils in the NT - Teacher's Notes

changes to rock over time e.g. impressions of skin and leaves. Sometimes a hollow, three-dimensional impression called a mould may form. If this mould fills with sediments which subsequently harden, a cast is formed.

- **Unaltered preservation** - remains such as teeth and shells that resist being broken down e.g. shark teeth. Sometimes a whole organism, including soft tissues, may be preserved in materials such as amber or tar e.g. insects preserved in amber. Very rarely, entire organisms, like a mammoth, may be preserved in frozen areas like the Arctic Tundra.

To find out more about how fossils form:

- [BBC](#)
- [Australian Museum](#)
- [Natural History Museum](#)
- [Berkeley](#)
- [AusEarthEd - Fossil Formation](#)
- [AusEarthEd - Reading Rocks](#)

Fossils can be found in many places around the Northern Territory, with three sites that are of particular scientific interest as they contain significant fossils of Australian vertebrates, including megafauna. Megafauna are large animal species that lived millions of years ago including mammals, birds, marsupials, reptiles and monotremes. The three sites in the NT are Alcoota Scientific Reserve (approx. 150km northeast of Alice Springs), Bullock Creek (on Camfield Station approx. 375km southwest of Katherine) and Kangaroo Well (on Deep Well Station approx. 70km southeast of Alice Springs).

The Alcoota site is particularly rich in the diversity of species to be found



Santos & ESWA supporting earth science education



Fossils in the NT - Teacher's Notes

(particularly megafauna) as it is believed to have been the site of a waterhole in the later years of the Miocene Epoch (10.4 to 5 million years ago). The Miocene Epoch (lasting from approx. 23 to 5 million years ago) was a time of decreasing rainfall leading to many extinctions. It is thought that animals gathered at the Alcoota site as it may have been one of the last remaining water sources around. It is said that there are so many fossilised bones at Alcoota that it is difficult to excavate some bones without damaging others preserved underneath.

Some of the amazing megafauna species that have been found in the Northern Territory include:

- Several species of Thunderbird (*Dromornis*) - very large flightless birds related to geese that could be up to 3m tall and weigh several hundred kilograms.



Image: Nobu Tamura [Wikipedia Commons](#)



Dromornis skeleton at MAGNT Darwin

Fossilised skeletons and models of Thunderbirds can be seen at both the Darwin (Bullocky Point) and Megafauna Central (Alice Springs) facilities of the Museum and Gallery of the Northern Territory (MAGNT). More information on Thunderbirds can be found at the



Santos & ESWA supporting earth science education



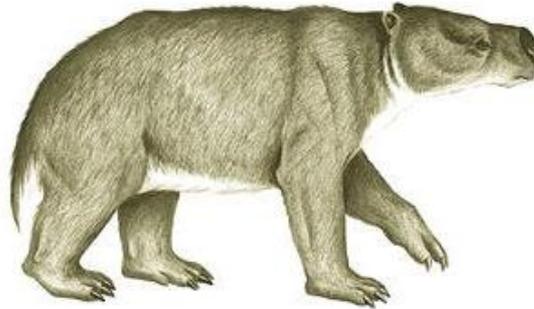
Fossils in the NT - Teacher's Notes

following websites:

- [Australian Museum](#)
 - [DoubleHelix](#)
- Several species of diprotodontid (animals with two forward facing teeth) including a marsupial 'rhinoceros' (*Neohelos stirtoni* - a herbivore weighing around 300kg) and one that is closely related to wombats and koalas (*Kolopsis torus*) that was about 1.5m in length with a large head but small brain.



Neohelos skeleton at MAGNT Darwin



Kolopsis torus found at Alcoota
Image: A. Musser [Australian Museum](#)

More information on these diprotodontoids can be found at the following websites:

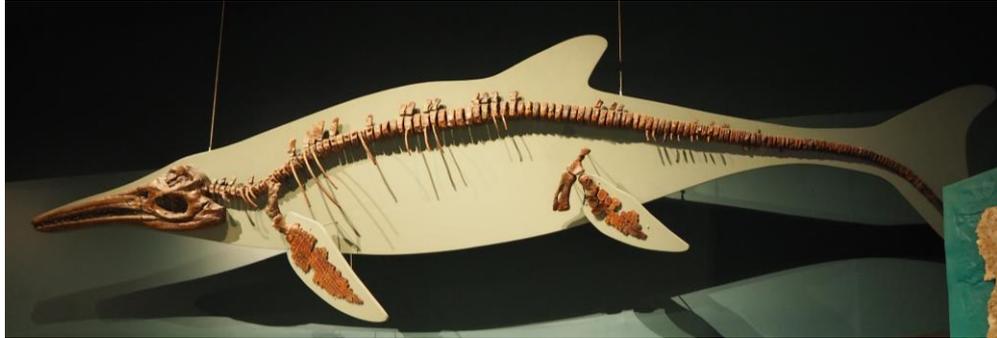
- [Melbourne Museum](#)
 - [Australian Museum](#)
- Ichthyosaur (*Platypterygius longmani*) were air breathing marine reptiles that looked something like a cross between a dolphin and a fish. A partial 7m long ichthyosaur skeleton is on display at the MAGNT Darwin located at Bullocky Point.



Santos & ESWA supporting earth science education



Fossils in the NT - Teacher's Notes



More information on Ichthyosaurs can be found at the following websites:

- [Australian Museum](#)
 - [Kronosaurus Korner](#)
-
- Two species of large semi-aquatic crocodiles (*Baru darrowi* and *Baru wickeni*) found at Alcoota and Bullock Creek. Baru had long, blade-like teeth and lived in fresh water. They were of a similar length to present-day crocodiles (4-5 metres) but had larger teeth, a deeper head and stronger jaws to hunt large prey. Fossilised Baru skulls can be seen at both MAGNT Darwin and Megafauna Central.

More information on Baru can be found at the following websites:

- [Everything Dinosaur](#)
 - [MAGNT](#)
-
- Two species of dog-like Thylacinus (*Thylacinus potens* and *Thylacinus megiriani*), larger than the related Tasmanian Tiger or thylacine, have been found at Alcoota. It is believed that *T.potens* weighed around 38kg but *T.megiriani* was even larger at around 57kg and they were similar in size to wolves. Until 2014, the only fossil that had been found of the *T.potens* species was part of a jaw, discovered in 1967. In 2014, more specimens were discovered such as teeth and



Santos & ESWA supporting earth science education



Fossils in the NT - Teacher's Notes

more pieces of jawbone.



Thylacinus potens found at Alcoota. Image: A. Musser [Australian Museum](#)

More information on Thylacinus can be found at the following websites:

- [Australian Museum](#)
- [Wikipedia](#)
- Trilobites were ocean dwelling arthropods with their fossils found in many locations around the world (including the NT). They are some of the most common fossils found today. Trilobites were a very successful species, surviving for around 300 million years with thousands of species being identified in the fossil record. Some species can be used as index fossils to help determine the age of the rocks they are found in.



Image: [Wikipedia Commons](#)



Santos & ESWA supporting earth science education



Fossils in the NT - Teacher's Notes

- Ammonites were ocean-dwelling cephalopods (related to cuttlefish, squid and octopus) with the majority of species living in chambered, coiled shells, which is usually the only part to be fossilised. Like trilobites, ammonites are very common fossils found all over the world with more than 10,000 species being identified. It is believed their soft body resembled a squid with tentacles around their mouth and they lived in the outermost chamber of the shells. The inner chambers of the shell were connected by a thin tube which allowed gases to be passed in and out of the shell. Scientists believe this was one of the animal's methods of moving around. Ammonites are also used as index fossils to help date rock strata and other fossils.



An ammonite fossil split in half to show the internal chambers which would have been empty when the animal was living



Fossils in the NT - Teacher's Notes

There are several hands-on PALMS activities for students on the topic of fossils that you may like to try with your class.

- [Fossil Tales](#) is a list of stories about fossils.
- [Fake Fossils](#) helps students learn more about fossils by making their own.
- Students can create their own 'dinosaur eggs from simple materials then crack them open in the [Budding Palaeontologist](#) activity. This activity is also demonstrated in this [video](#) and more information is also given in this [blog post](#).
- [Making Tracks](#) has students construct their own trace fossils in the sandpit and learn more about dinosaur trackways in Broome.
- Fossil Clues asks students to examine a range of photos to determine what fossils can tell us about past environments. This activity provides [Teacher Notes](#) and a supporting [Student Worksheet](#).
- There is also an AusEarthEd video on [Fossil Formation](#).

Further resources:

- Explanation of what fossils are from [Australian Museum](#)
- The Museum and Gallery of the Northern Territory ([MAGNT](#)) [home page](#) provides locations of the various branches of the Museum and more information on visiting where you can view several of the fossils mentioned above
- Several of the fossils described here and other items in the MAGNT natural sciences collection can be viewed online through this [virtual exhibit](#)
- Information about [index fossils](#)
- [MAGNT pages](#) with information about Alcoota fossil site and megafauna fossils found there
- Australian Museum webpage with more information about the [Alcoota fossil site](#)





Fossils in the NT - Teacher's Notes

- Newsletter of Alice Springs Field Naturalists Club (August 2016) containing a report on a [field trip to Maloney Creek](#)
- ABC news report on scientists working at the [Bullock Creek fossil site](#)



Santos & ESWA supporting earth science education