

# Worksheet: What is a fossil

## Intermediate Phase

Grade 4 – 6

**Learning area:** Natural Sciences

**Strand:** Life and living or Planet Earth and beyond

**Theme:** Biodiversity, Change and Continuity / The Changing Earth

**Specific Aim 1:** Acquiring knowledge of natural sciences

Activity sheet



## Activity 1: To be done before park visit

The word fossil is from the Latin word “fossilis” meaning ‘to dig’. It was originally applied to any animal, plant or object that was dug out of the ground. In time, the word came to be connected with any plant or animal remains. Fossils provide us with a valuable record of the plant and animal life and the type of environmental conditions from millions, and even billions, of years ago.

**Fossils can be grouped into types, according to how they were fossilized.**

1. **Mummies**

Sometimes an animal died in a very dry place, e.g. a desert cave. Its body would dry out quickly, without enough time to rot. This fast drying process can preserve body parts, such as the skin. The famous dinosaur fossil (Tyrannosaurus) ‘Sue’ was preserved like this.

2. **Body fossils** are the remains of the dead animal or plant that is turned to rock-like replicas when minerals replace the organic matter. For this type of fossilization to occur the animal or plant has to be buried in sediment.

The soft parts decay quickly, but the hard parts, such as the bones, teeth, or shells are much harder and more durable. The process of fossilization involves the dissolving and replacement of the original minerals in the object under-going fossilization with other minerals.

3. **Trace fossils** are not actually the remains of the animal but the marks, tracks, tail prints, eggs, teeth marks, animal faeces (coprolite) and burrows that show us how they behaved in life. Trace fossils are extremely important because they give us information about how and where the ancient animals lived and behaved

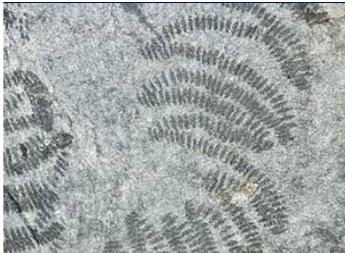


## Questions

1. Read each statement carefully and then decide whether it is true or false. Make a cross in the block; the first one has been done for you.

	True	False
Body fossils are when an animal or plant has been preserved in its original form.	x	
Fossils teach us about the history of life.		
A trace fossil is an example of mineralised bones and teeth.		
Amber is an insect found fossilized in rocks.		
Footprints on the beach are examples of trace fossils.		
All fossils are found in sediment.		
The word fossil is from the Greek word meaning 'to dig.'		
Fossils provide us with a valuable record of environmental conditions from millions of years ago.		
Coprolite is an example of a body fossil.		
Trace fossils are extremely important because they give us information about how ancient animals lived and behaved.		

2. Look at the pictures of different kinds of fossils. Identify whether they are examples of a mummified, body or trace fossil.





## Activity 2: To be done after park visit (work in pairs)

### Questions

1. What type of fossils can be found at the West Coast Fossil Park? Explain.
  2. How do scientists think that these animals may have died?
  3. What made their bones fossilize?
  4. What events made it possible for their fossilized bones to be discovered?
  5. Fossils can tell us about more than just the plants or animals that made them. Brainstorm what else you think we can learn from fossils at the West Coast Fossil Park?
  6. Discuss what the fossils found at the Fossil Park can tell us about the changes that have occurred on the west coast since 5 million years ago?
  7. Look at the following examples and then answer the questions that follow:
    - a frog living in a rainforest
    - a seal swimming in the sea
    - a mosquito living in a pine forest
    - a snake crawling through a desert
    - a fish living in a swamp
    - a sea snail living in the sea
- a) Looking at their features and the environment in which the organisms live, which ones have more potential to fossilize? Explain your answer.
- b) For the organisms that you said had the potential to fossilize, which of the organism's features do you think will be visible in the fossil?



## Teacher notes

### Activity 1: To be done before park visit

#### Questions

1. True or false  
TRUE - Body fossils are formed when an animal or plant has been preserved in its original form.  
TRUE - Fossils teach us about the history of earth.  
FALSE - A trace fossil is an example of mineralised bones and teeth.  
FALSE - Amber is an insect found fossilized in rocks.  
TRUE - Footprints on the beach are examples of trace fossils.  
FALSE - All fossils are found in sediment.  
TRUE - The word fossil is from the Greek word meaning 'to dig'.  
TRUE - Fossils provide us with a valuable record of environmental conditions from millions of years ago.  
FALSE - A coprolite is an example of a body fossil.  
TRUE - Trace fossils are extremely important because they give us information about how ancient animals lived and behaved.
2. Picture identification  
Trace fossil                      Mummy                      Body fossil  
Body fossil                      Trace fossil                      Body fossil

### Activity 2: To be done after the park visit

1. Fossils of the now extinct animals which lived some 5 million years ago. The bones are heavily mineralized, but not petrified.
2. Five million years ago a herd of sivathere drowned trying to cross the river in flood. Their bodies floated downstream and many got trapped on an outcrop of phosphate rock jutting out from the north bank of the estuary about 1 km from the sea. During the following months, the sivathere carcasses were scavenged by hyenas and vultures. As the flesh rotted the skeletons fell apart and bones fell into the in the pool next to the rock. Larger animals like sivatheres and gomphotheres that came to drink at the pool accidentally trampled on some of the bones, pushing them down into the waterlogged sand and breaking them. Thousands of tiny bones of shrews, mice and moles came from pellets regurgitated by owls that regularly roosted on the rock.

Over subsequent years, summer dry periods caused the larger animals to congregate around the pool. Some got stuck in the quicksand, others got killed by predators. Frogs and small freshwater fishes lived and died in the pool. Some years, winter storms caused strong south westerly winds resulting in tidal surges that carried whale, dolphin and seal carcasses into the river estuary. One or two carcasses came to rest against the phosphate rock and as they rotted, their bones too rolled into the pool. Over the next century or so, the sea level gradually rose to flood the valley and submerge both the pool and the rock under salt water. The bones then became buried deeper under layer upon layer of phosphate rich sand (the phosphate being generated by organisms in the upwelling cold currents offshore). Over the next million years or so underground water gradually dissolved the deeply buried bones and replaced them, molecule by molecule, with silica to become fully mineralized fossils. The fossil bones lay undisturbed 20m underground for another 4 million years until one day in 1976, whilst mining the phosphate sand that buried the bones, the excavator operator accidentally uncovered them.



Fortunately palaeontologist Dr Bret Hendey of the South African museum was allowed to rescue the bones. He collected over 1 million specimens and proved this ancient bone-bed to be the richest and most diverse accumulation of land animals of early Pliocene age ever found. The excavations you see today were done by Dr Roger Smith of Iziko museums helped by staff from the West Coast Fossil Park. The larger bones are left years ago.

The other fossils just died of the usual natural causes that affect a natural population in an area eg predation, disease.

3. These bones did not turn to stone, they became increasingly mineralized over time as they fossilized, but they are not petrified.
  4. The fossil park fossils were found only through mining – otherwise fossils are generally exposed through erosion.
  5. Fossils tell us about the environment at the Fossil Park some 5 million years ago. The fauna tells us about the climate, the environment, and the habitats occupied by the animals.
  6. The fact that so many species went extinct indicates that their preferred habitats disappeared or became scarce, and they were unable to adapt to the changing climate and environment. Remember that if you look at any long stretch of time covering hundreds of thousands or millions of years many taxa will have gone extinct. Extinction is common!
- 7a) a frog living in a rainforest - No, the wet conditions encourage decay and disintegration of the body and bones  
a seal swimming in the sea – yes, bones may sink to the sea bottom, become covered in sand and fossilize.  
a mosquito living in a pine forest – yes, if the insect got stuck in amber, as in Jurassic Park, it would be preserved as a fossil  
a snake crawling through a desert - yes, dry conditions are generally good for fossilisation and preservation, as long as the bones get covered quickly  
a sea snail living in the sea – yes, shell may sink to the sea bottom, become covered in sand and fossilize
- b) a seal swimming in the sea – bones and teeth  
a mosquito living in a pine forest – the whole body of the insect, plus the wings, will be preserved in amber could be preserved  
a sea snail living in the sea – Only the shell would remain

