



# What is a fossil?

Fossils are the remains of once living **animals** or **plants**. Fossils represent the **ancestors** of animals and plants that are alive today.



There are many different types of fossils to be found. People who study fossils, called palaeontologists, divide fossils into two major types – **body fossils** and **trace fossils**.

**Body fossils** show us what a plant or animal looked like. They are the fossilised remains of an animal or plant, like bones, shells and leaves.



The fossilised dinosaur skeletons and big bones we see, petrified wood and whole body fossils (mammoths caught in ice or insects trapped in amber) are all body fossils.



**Trace fossils** record the activity of an animal. These include footprints, trackways, and coprolites (fossil poo!).





# How do fossils form?

Not many plants and animals are lucky enough to be turned into fossils. When an animal or plant dies its remains usually rot away to nothing. Sometimes, though, when the conditions are just right and its remains can be buried quickly, it may be fossilised.

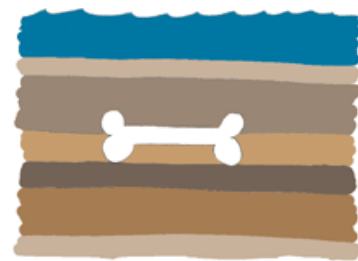
## Stage 1

An animal dies and its body sinks to the sea floor. The soft parts of the animal rot away and the skeleton gets buried by mud and sand.



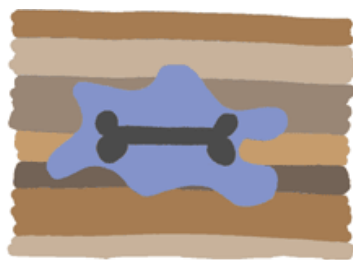
## Stage 2

The sediment surrounding the skeleton gets thicker as new layers form above. The pressure from above turns the layers to hard rock.



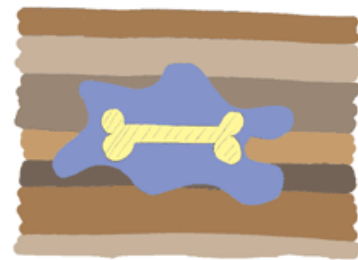
## Stage 3

The skeleton dissolves, leaving a cavity (or hole), and a mould the shape of the skeleton is formed.



## Stage 4

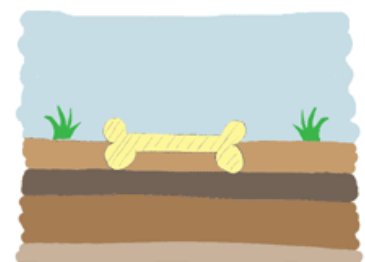
Water rich in minerals fills the cavity. The minerals crystallise inside the mould and a cast is formed.



## Stage 5

Millions of years later the rock surrounding the skeleton rises to the Earth's surface.

The rock is worn away by wind and rain, and the fossil is now exposed, waiting to be found by a palaeontologist!



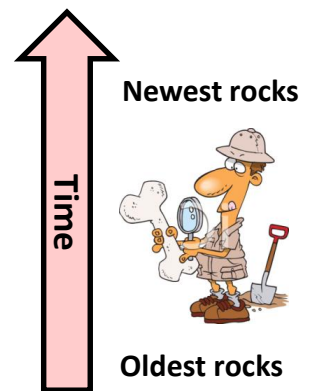
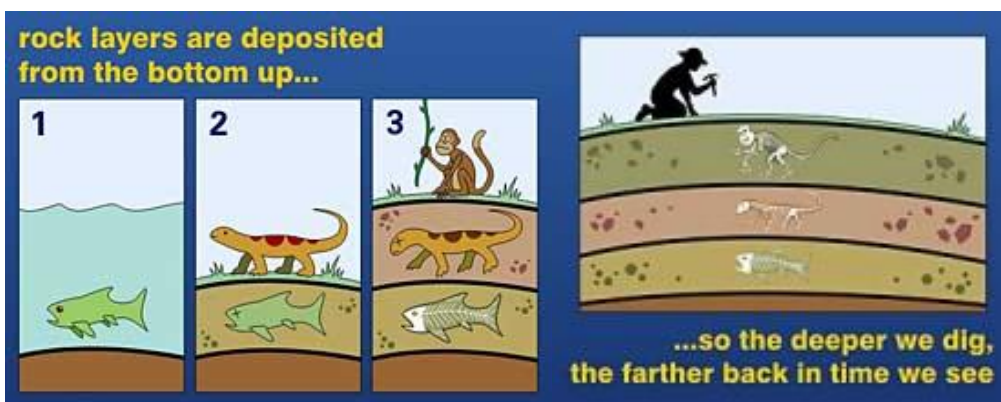


# What can fossils tell us?

## How long ago animals and plants lived

Fossils are found in sedimentary rocks, which form in layers under water a bit like the layers of a trifle. If we look at some layers of rock the oldest layers will always be at the bottom and the most recent layers will always be nearer the top.

More recent fossils, then, are found nearest the Earth's surface. Older fossils are found much lower down in the rock layers.



## What the environment was like

Did you know that palaeontologists found a hippo skeleton underneath Trafalgar Square in London? This tells us that London used to be much warmer than it was today and that there was probably water nearby.



What do you think you would learn about ancient environments if you found monkeys fossils? Or polar bears? Or petrified palm trees?

## How animals and plants lived their lives

There are all sorts of interesting facts that fossils can tell us about how animals and plants lived their lives. Did you know...?



- Fossilised eggs tell us that dinosaurs laid eggs instead of giving birth to live young.
- By measuring how far apart fossil footprints are we can calculate how tall an animal was.
- Fossilised poo can contain animal bones and pollen that tell us what food the animals ate.



# Fossils as evidence for evolution?

Palaeontologists have spent a long time looking at different fossils from different time periods. Patterns in the fossils tell us that:

1. The variety of life on Earth today did not arise all at once.
2. The first life was in the water – life on land came much later.
3. As each new type of animal evolved, the older ones became extinct because they were less well adapted to the environment.

In particular, the fossil record shows evidence for evolution in two key ways. The first is the existence of transition fossils and the second is the changes we see in fossils over time.

## Transition fossils

Transition fossils show a mix of characteristics linking one group of animals or plants to another.

*Archaeopteryx* lived 150 million years ago. Fossils show that it had feathers like birds, but also teeth like reptiles. So this fossil provides a link between two sets of living animals and also suggests that birds and reptiles shared a common ancestor millions of years ago.



*Darwinius*, nicknamed 'Ida' is another famous transition fossil. It is a primate that shares characteristics with both monkeys and apes, and lemurs and lorises. This means that it could be one of our very old ancestors!



## Changes over time

Palaeontologists have pieced together the fossil record to show how some species have evolved over time.

A good example of this is the horse – we can see gradual changes in the horse foot bone over time as it adapted to changing environments.

