

# L.I. To describe how fossils are formed

	Success Criteria
<b>NOVICE</b> ✓	I can name where fossils might be found
<b>CAPABLE</b> ✓✓	I can describe which types of rocks may contain fossils
<b>CONFIDENT</b> ✓✓✓	I can explain the process that leads to the formation of fossils
<b>PROFICIENT</b> ✓✓✓	I can explain how the discovery of fossils can teach us how things have changed over time

# Fossils



# Fossils discussion

Where can they be found?

Why are they there?

Who owns a fossil or has found one?

Why are fossils important?

## What is a fossil?

Fossils are the stone remains of dead animals or plants.

Fossils are usually the skeletons of animals and plants but not always. Fossils can also be things made by animals like footprints or poo!

A **fossil** is the preserved remains or trace of a dead organism.



# How fossils are formed.

**Fossils provide a record of organisms that lived a long time ago. They also provide evidence that animals and plants can change over long periods of time. The fossil record is often incomplete.**

**Fossils of ammonites - sea creatures that became extinct about 65 million years ago**



## How are fossils made?

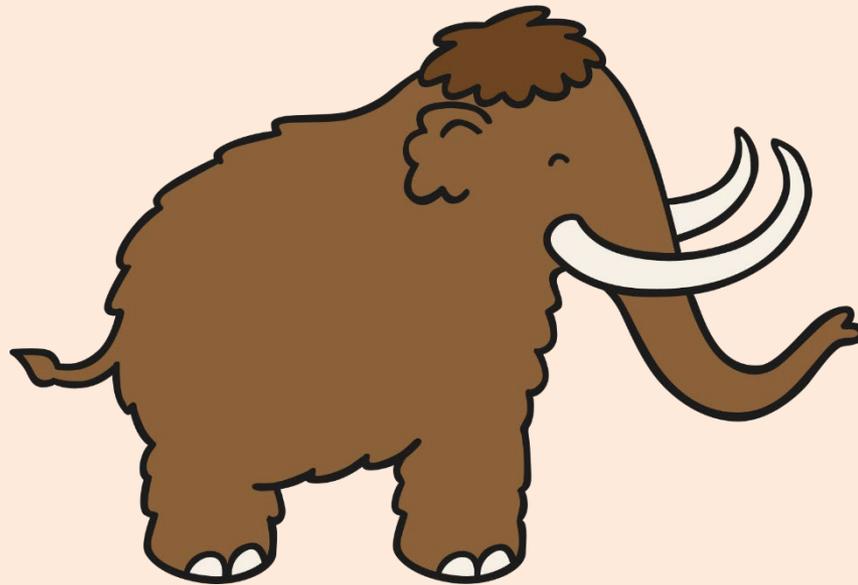
The most common ways that fossils are formed are...



When small animals like flies and spiders get covered by tree sap they get trapped. The tree sap hardens to form solid amber, preserving them for thousands of years.

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## How are fossils made?



Sometimes a whole animal can get trapped in ice, freezing them for thousands of years. Palaeontologists (people who study fossils) have found Woolly Mammoths that have been preserved this way.

## How are fossils made?

Ice is excellent at preserving whatever may be frozen in it. A mammoth thought to be about **10,000 years old**, recently discovered in Siberia, was preserved so well in the ice that the carcass still contained some of its blood. Scientists analysed the blood and found that the mammoth had evolved so that it's blood could supply more oxygen around its body which is vital in icy climates. This is something that modern elephants (which are related to mammoths) cannot do.



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# Plant fossil and living fossils

- Fossils can also tell us about plants over time.
- The Cycad plant has existed for millions of years (even around at time of the dinosaurs). Fossils have been found of it, it still exists today so it is called a living fossil.



# How fossils are formed.

## Video on fossil formation

- <http://www.planet-science.com/categories/under-11s/our-world/2011/10/what-makes-fossils.aspx>

# How fossils are formed

- Dead animals and plants can be preserved in amber - hardened tree resin - peat bogs, tar pits, or in ice.
- Casts or impressions, such as foot prints, can be covered by layers of sediments. These eventually become rock, so preserving the casts.
- Hard body parts, such as bones, shells and leaves, can be covered by layers of sediments. Over time the parts are gradually replaced by minerals.

## Demonstration: How is a fossil made?

An animal or creature dies. Its remains get covered in mud and dirt over time.



## Demonstration: How is a fossil made?

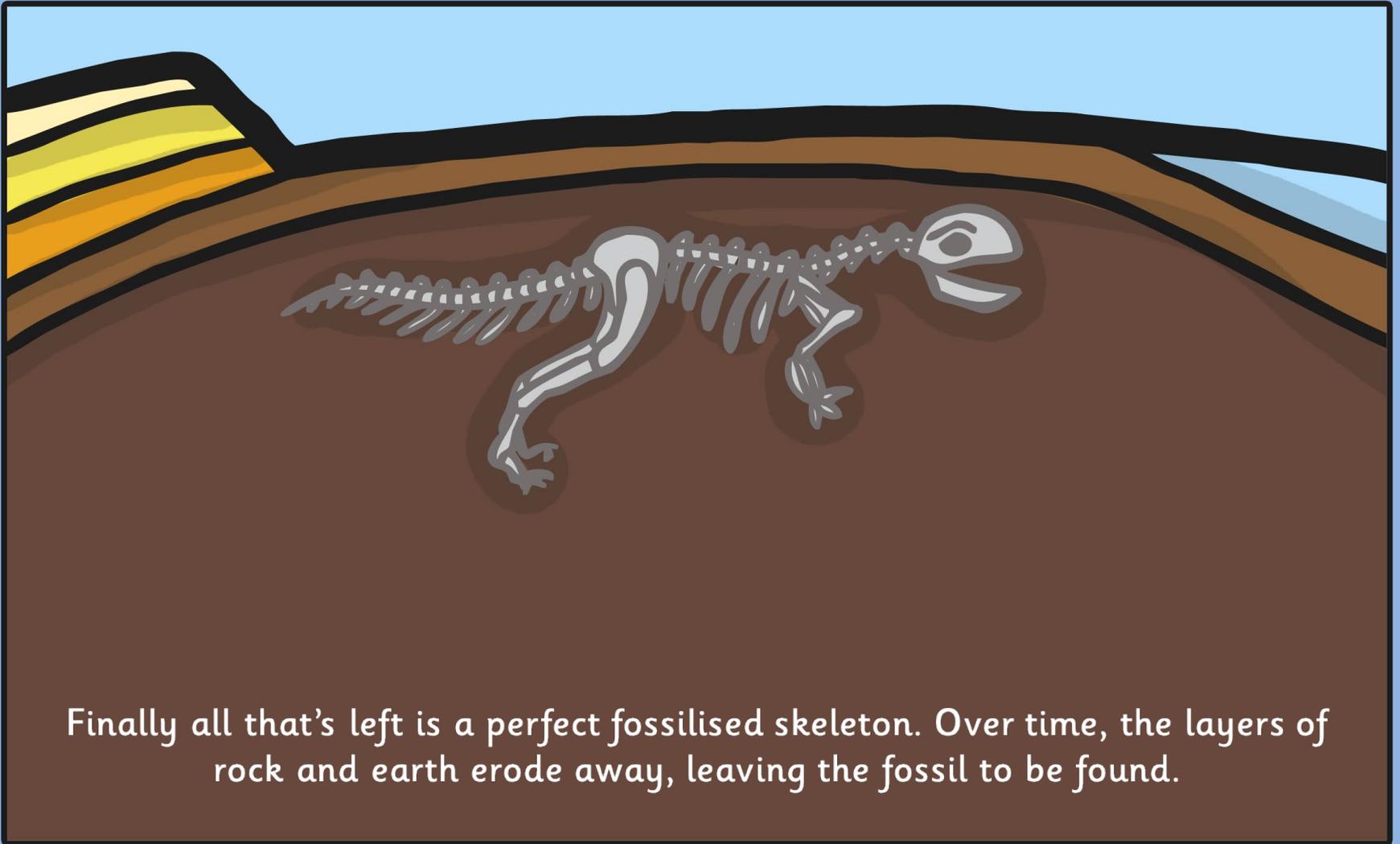
Over thousands of years, pressure builds up from all the layers of rock and mud covering the skeleton. The skeleton is dissolved by ground water. This makes a perfect mould of the skeleton.



## Demonstration: How is a fossil made?

Minerals in the ground water begin to fill the mould of the skeleton. These minerals form rock within the mould (this takes at least 10,000 years).





Finally all that's left is a perfect fossilised skeleton. Over time, the layers of rock and earth erode away, leaving the fossil to be found.

# Why are fossils rare?

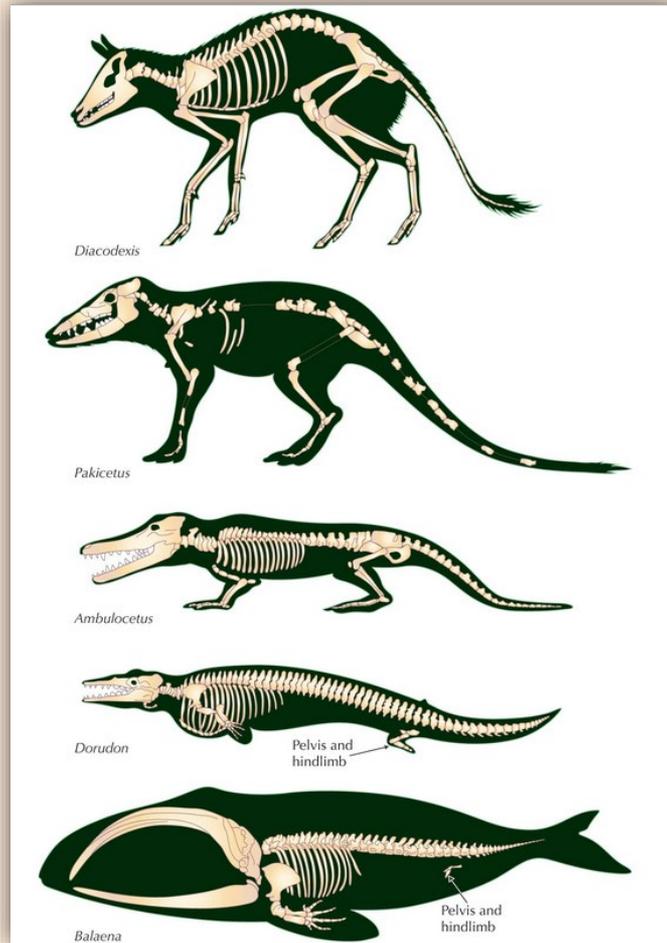
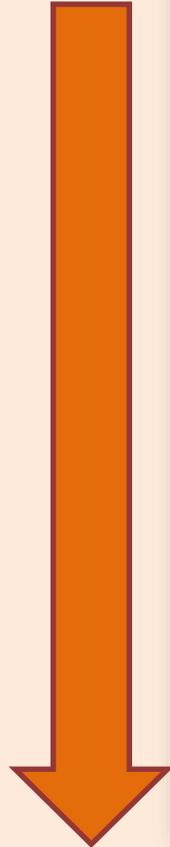
- They are rare because all the elements have to fall into place. The animal needs to die in the right place (usually near water like a river or lake). The dead animal needs to be compressed under the sediments. Many dead animals would have been eaten by carnivores.

# What can we learn from fossils?

- The fossil of a skeleton can tell us what the animal looked like ( although scientists have to make informed guesses).
- The remains of bones in the stomach area of a fossil or a skeleton can show what was eaten by the larger organism.
- The teeth might indicate the type of diet.
- The remains can be carbon dated, fossil faeces (coprolites) show the kinds of food eaten, etc.

# Fossils and Evolution

Fossils are very useful for telling us more about how animals and plants have evolved over time.



For example, palaeontologists think that these fossil skeletons show how **whales might originate from land animals.**