

Evolution

National curriculum objectives:

- recognise that living things have changed over time and that fossils provide information about living things that inhabited the Earth millions of years ago
- identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Science in the news today

FOUND - A GIANT SWIMMING DINOSAUR!

Scientists have recently been studying the fossils of a dinosaur and, from the shape of its tail, have discovered that this is the first dinosaur ever to be known to swim!

We know that when dinosaurs were alive, millions of years ago, that there were other creatures that could swim, crocodiles for example, as well as fish the size of cars, but what we call dinosaurs strictly lived on land.

The incredible dinosaur, called Spinosaurus, was bigger than a Tyrannosaurus Rex and was more than 15 meters long - longer than the length of a bus. It had four legs, so before now scientists thought it walked. However, after studying the shape of the tail, scientists saw that it was streamlined and notched. They are now sure that it could swim, and that it used its tail like an oar to guide it through the water.

This is really amazing because it opens up a whole new world of possibilities for what dinosaurs looked like, what they did and where they lived, that we didn't know possible before.

Here is a picture of the Spinosaurus fossil

A Spinosaurus foot bone peeks out from red sandstone at the Moroccan dig site.



What is a fossil?

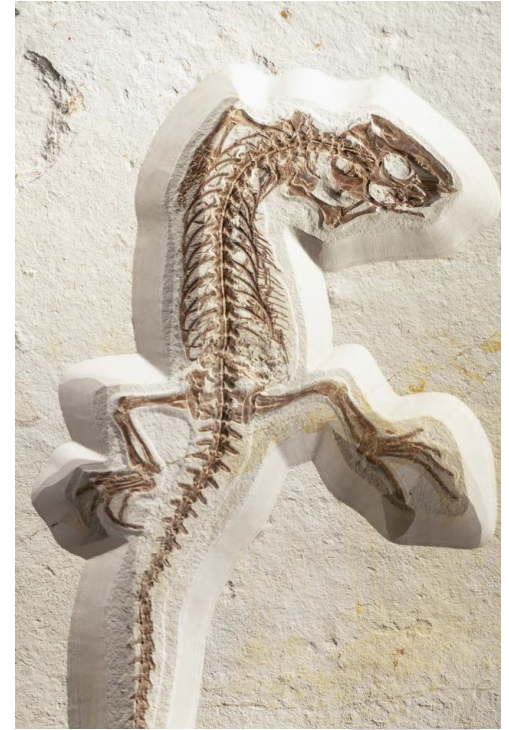
Fossils are the remains of living things that are found in rocks. They are from living things that were alive a really long time ago, from 10,000 years ago to millions and millions of years ago. The oldest fossil ever found was thought to be over **3 billion** years old!



Fossils can be from plants or animals, and are found all over the world. They can be really small, you may have found one yourself on the beach, or they can be really big, like the dinosaur from the article.



All of these are fossils.



Can you try and imagine what the living thing that has been fossilised once looked like?



What is a fossil?

Not all living things turn into fossils, but if the conditions are just right, some of them do.

The people that find and study fossils are called paleontologists. They do some very important work to find information about the things they find in fossils.

They travel across the world to dig out fossils from the ground and take them back to the lab to study.



How does something become fossilized?

Let's look at a very common fossil - an ammonite. When these little creatures were alive, about 100 million years ago, they lived under-water. After one of the creatures died it's body would have fallen to the bottom of the ocean.

Layers of sand from the ocean bed would cover the ammonite, protecting its hard shell from damage while the fleshy parts of the body would have degraded away. Over many many many years, more and more sand would cover the ammonite. And after even more years that sand turns into hard rock - leaving the shell preserved inside. And that's how we get a fossil!



How do we know how old a fossil is?

We know fossils are the remains of living things from a very long time ago, preserved in rock. But we also said that the time frame was pretty big - 10,000 years to 3.5 billion years.

Paleontologists can find out how old a fossil is by dating the rock that it was found in. Fossils found in the same type of rock will have been alive during the same time.

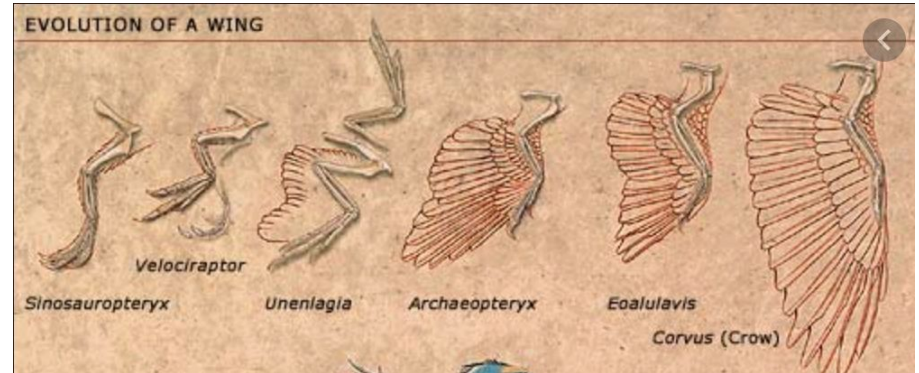


Why are fossils important?

By finding fossils and studying them we can find out information about animals and plants that inhabited the world millions of years ago, just like the swimming dinosaur from the article.

We can start to build up a picture of how these living things have changed over time, by comparing older fossils to newer ones, and to animals and plants that are alive now.

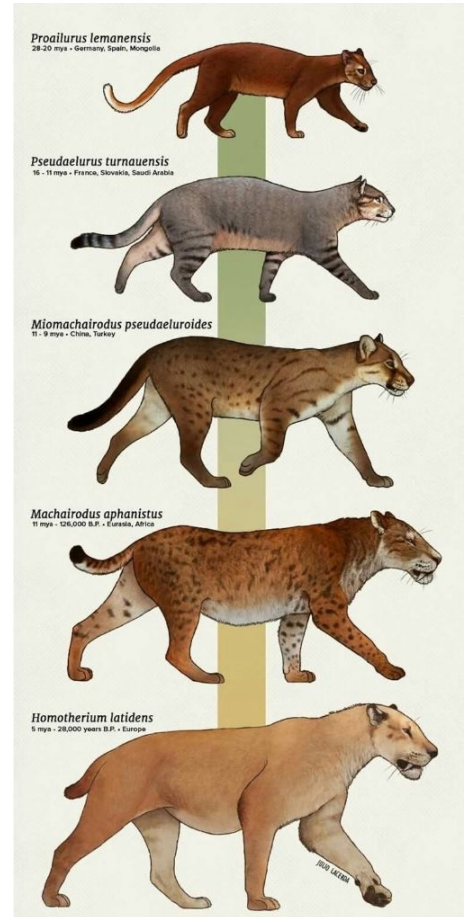
The process of living things changing over time is called evolution.



What is evolution?

Evolution is the process of change over time. It is the reason that there are so many different types of animals and plants on Earth.

All living things on Earth evolved from living things that were around millions of years ago. By looking at fossils we can compare the physical properties of a species over time, and see how it has evolved.



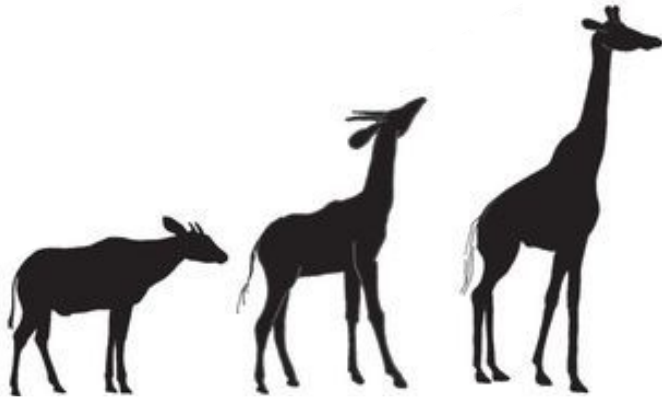
Adaptation leads to evolution

Plants and animals adapt to their environments over time. If a certain adaptation develops that means the plants or animals with that adaptation are more likely to survive, they are more likely to pass that adaptation on to their offspring.

For example, a polar bear with layers of fat is more likely to survive, as it will keep warm in the cold environment. That polar bear then has offspring and passes this adaptation on. Their offspring are more likely to survive and pass the adaptation on to their offspring. *Their* offspring are more likely to survive and pass the adaptation on to their offspring. *Their* offspring are more likely to survive and pass the adaptation on to their offspring.

And eventually, over thousands or millions of years, the whole species has changed to have that adaptation. And that's evolution.

Evolution discovered through fossils



This shows the evolution of the giraffe over time, from the short creature on the left to the one we know today.

By studying the fossils of animals from 9 million years ago, scientists have discovered that the giraffe didn't used to have a long neck. It *evolved* to have a long neck.

The animal as we know it evolved from a creature with a small neck, which adapted over time into the giraffe as we know it today. There are 2 main reasons scientists believe the animals evolved this way. Firstly to be able to reach higher food and leaves than other animals, and secondly to regulate their temperature.

Just imagine!

What do you need?

- Paper
- Pencil (including colouring pencils if you have them)
- Your imagination!



Instructions:

1. First imagine a new planet is discovered. You are the first to take a step onto this amazing new world. Close your eyes and picture it. Now answer these questions:
What is the weather and temperature like?
What is the landscape like? Are there beaches or forests or meadows?
What kind of plants are there? What food is growing?
1. Next, close your eyes again and imagine seeing a creature slowly emerge from behind a rock. What does it look like? What features does it have that make it suited to live on this planet? Thick fur to protect it from the cold? Sharp claws for digging through the rocky ground? Long legs to wade through the muddy waters?
2. Then, draw your creature. Try to use colours, as this will help to show the features more clearly too.
3. Finally, label the newly discovered animal with its features and reasons for those features.

A toy investigation

What do you need?

- A few different toy dinosaurs or animals (if you do not have any, try looking at photos of animals instead)



Instructions:

1. First, holding the toy in your hand, observe and feel its features carefully.
2. Next, make a list of the features you have observed e.g. a long neck, sharp claws, a horn or large teeth.
3. Then, try to guess why the dinosaur, or animal you are observing, has these features. Is it for digging, reaching food, fighting, hunting or eating reasons?
4. Repeat with other animals and try to become familiar with the different features animals have and the reasons they may have evolved like that.
5. Finally check your guesses. Ask an adult to help you look it up online or talk to you about their thoughts. Maybe they could guess too and then you research it together.