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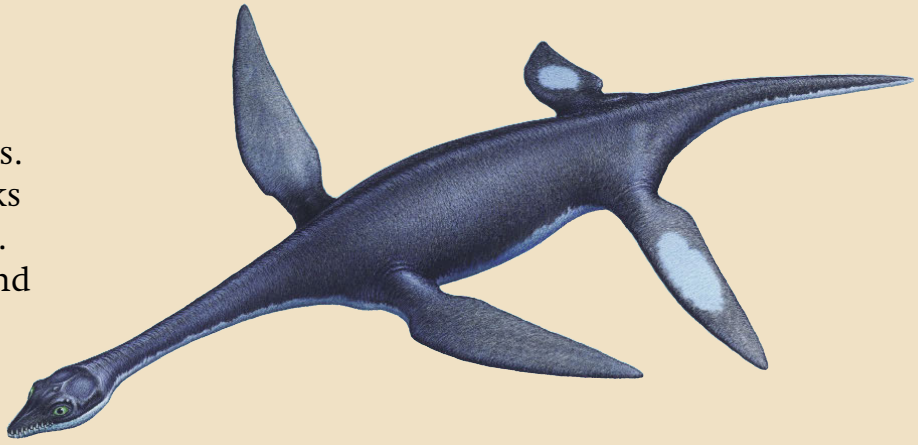
Why is a Marine Reptile not a Dinosaur?

Marine reptiles were not dinosaurs; they ruled the waters whilst dinosaurs ruled the land. All marine reptiles could swim and lived in water; dinosaurs, however, walked on land and had four legs, although some only walked on their hind legs. Unlike fish, these sea creatures were reptiles and had to come to the water's surface to breathe air and most had to drag themselves on to land to lay their eggs.

Pre-historic marine reptiles are mainly divided in to two types: the Ichthyosaur and the Plesiosaurs.

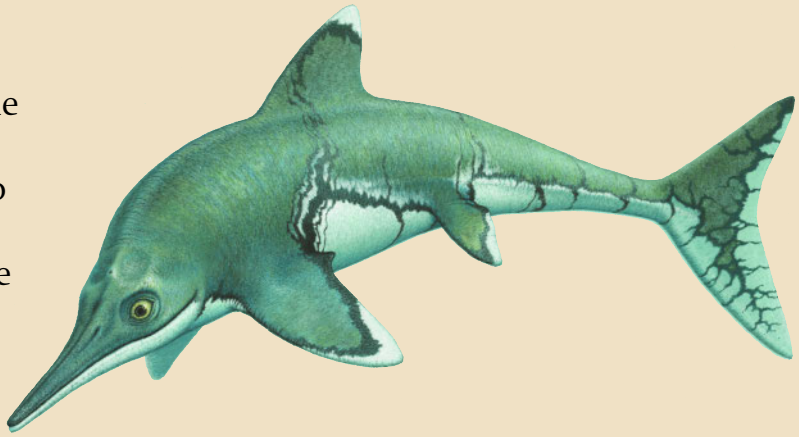
The Plesiosaur

These creatures had flippers. Some species had long necks and others had short necks. They came out on to the land to lay eggs, like turtles do, and maybe looked like a swimming dinosaur.



The Ichthyosaur

The Ichthyosaur did not leave the water as it was more adapted to the sea. It would still come up to the surface to breathe; however it did not lay eggs; i n stead it gave birth to live young like whales and dolphins do.



Marine reptiles had fins, flippers or paddle-like short legs to propel them through the water. Many were very streamlined and could swim fast. They were predators and ate other sea creatures. Many had large jaws and sharp teeth, perfect for taking lethal bites out of other creatures.

Marine reptiles like the Ichthyosaur and Plesiosaur died out with the dinosaurs about 65 million years ago.

Differences between a dinosaur and a marine reptile at a glance

	Dinosaur	Marine reptile
Reptile	✓	✓
Lays eggs	✓	sometimes
Breathes air	✓	✓
Has four legs	✓	×
Has flippers	×	✓
Scaly skin	✓	✓
Can fly	×	×
Can swim	×	✓

DID YOU KNOW?

Dinosaurs evolved from marine reptiles. Over thousands of years, some marine reptiles broke free from the water and learnt to walk.

Look, find and discuss

* There are Ich thyosaur and Plesiosaur fossils on display. Can you find them? What are the main differences between the two skeletons?

* Does the shape of the Ichthyosaur remind you of another sea creature that lives today?

* Look at the eye socket of the Ichthyosaur. Why do you think it is so large?

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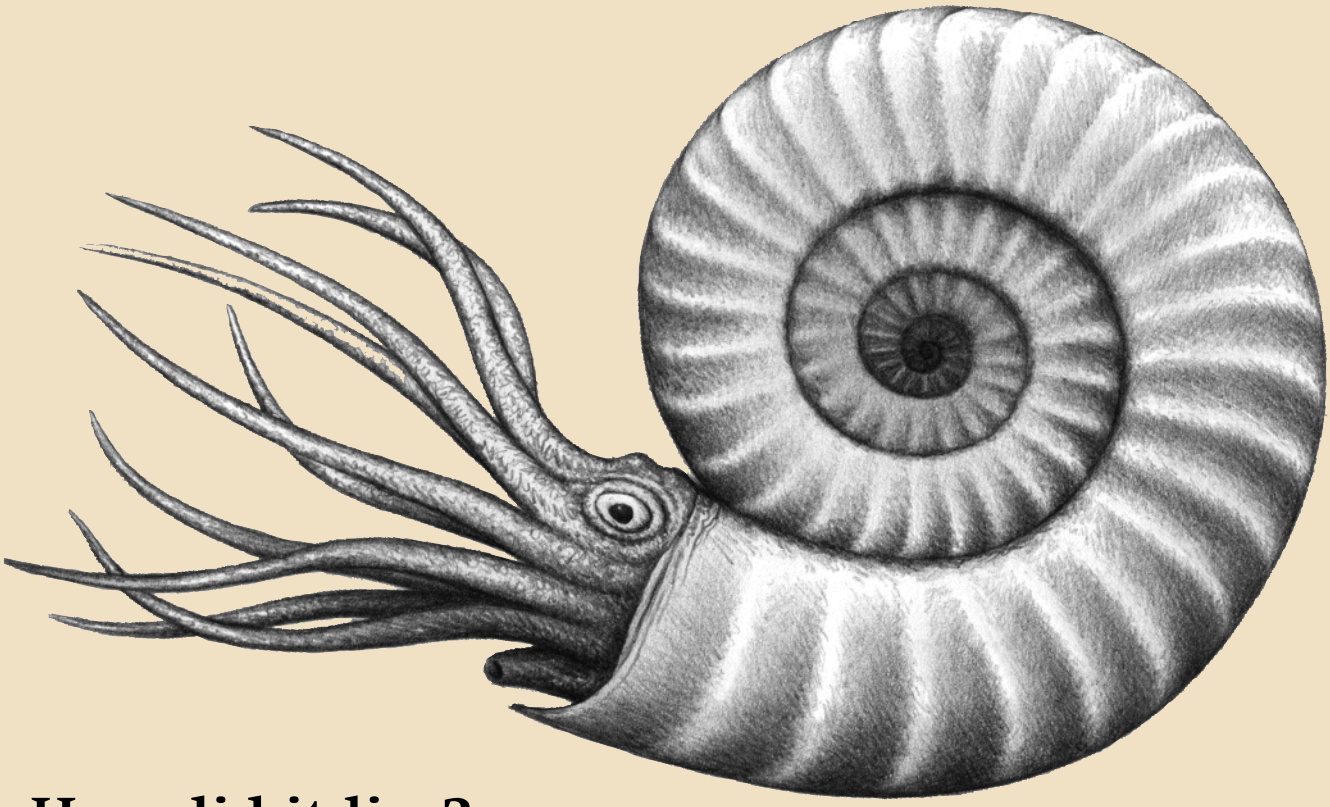
Ammonites

What is an ammonite?

Ammonites are extinct sea creatures that lived in prehistoric times. They died out with the dinosaurs and now only exist as fossils.

Ammonites were predators of the sea. Some species were very tiny whilst others were over one metre in diameter. These creatures had tentacles, like an octopus or squid and lived inside coiled shells.



How did it live?

Ammonites lived in warm, shallow waters and would feed off other small sea creatures.

The inside of an ammonite's shell was divided into chambers which were filled with gas and liquid. The ammonite could move liquid to and from these chambers to increase or decrease it's weight; allowing it to sink to the bottom of the water or float to the top.

How are ammonite fossils formed?

Ammonite fossils were formed when the creature died and sank to the bottom of the water. Over time the dead body became buried with mud from the water's bed. The soft parts of the body rotted away, leaving only the shell; the mud eventually turned to rock which gradually fossilised the shell.

Shape and texture

Ammonite fossils are instantly recognised from their spiral shape and ornamentation. Some shells are smooth, ridged or spiney.

Many are often displayed cut in half and polished to show off the patterns of the internal chambers.

DID YOU KNOW?

Ammonites are fairly common in England. There are a few 'hot spots' where they are found, such as North Yorkshire and Dorset.

Look, find and discuss

* Have a look around the gallery to see how many ammonites you can find. Look at their different sizes.
* Describe the different textures you can see or touch. (Please only touch the ones you are allowed to).
* Look for polished ammonites. Can you see the gas and liquid chambers which make up the intricate patterns?
* Does the coiled shell remind you of anything else? How many other creatures can you think of use a shell as protection?

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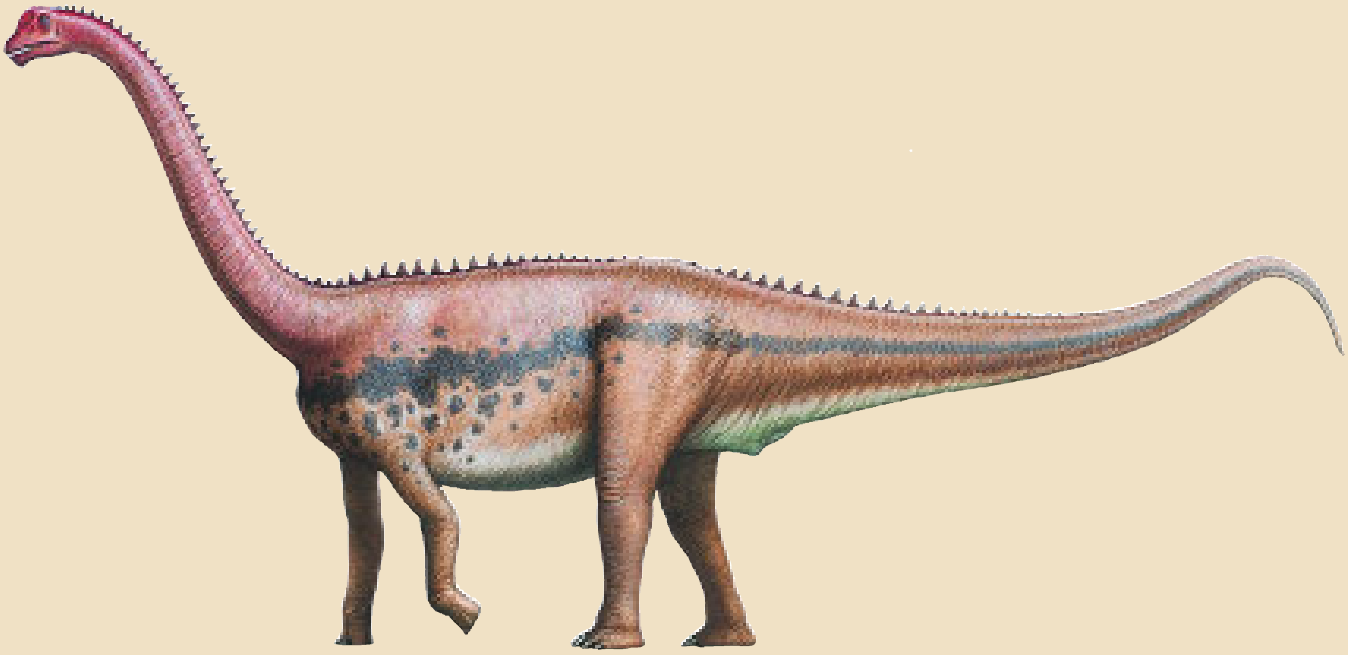
The Rutland Dinosaur



Where was the dinosaur found?

The fossils of the dinosaur were found in a quarry near Rutland by workmen in 1968. The dinosaur had been buried for 168 million years.

What kind of species is the dinosaur?

The Rutland Dinosaur is a *Cetiosaurus*.

Cetiosaurus belonged to a group of dinosaurs called sauropods. These were characterised by their long tail, long neck, small head, large body and four strong pillar-like legs.

What did a Cetiosaurus eat?

A Cetiosaurus was an herbivore and only ate plants. The Rutland Dinosaur would use its long neck to gather food from a large area and to reach up to graze from tree tops. The long tail would be used to balance its weight. The absence of sharp claws and jagged teeth are further clues that this dinosaur was a plant eater.

How did the dinosaur move?

The Rutland Dinosaur walked on all four legs and would move in a similar way to an elephant. It was very heavy and weighed about nine tonnes, which is the equivalent to approximately six family sized cars. The enormous size, combined with a long neck and tail, made it impossible for the dinosaur to run.

DID YOU KNOW?

At the time of discovery, the Rutland Dinosaur was the most complete dinosaur ever found in Britain. About 40% of the skeleton on display is made up of real fossils.

Look, find and discuss

* Have a close look at the skeleton and see if you can spot the real fossils. There is a picture on display which you could use to help you.
* Discuss why the Rutland Dinosaur was a slow mover. Why was it not necessary for a Cetiosaurus to run fast?
* Talk about the clues which reveal that the Rutland Dinosaur ate plants.

What did dinosaurs eat?

look read think discuss

Like animals and creatures today, dinosaurs either ate meat or plants. Some ate both plants and meat.

Creatures that just eat plants are called herbivores; those that just eat meat are called carnivores; and the ones that eat both plants and meat are called omnivores.

Herbivore or Carnivore?

Experts can tell what a dinosaur ate by examining their fossils. Most dinosaurs were either a herbivore or carnivore. The following factors give clues as to whether a dinosaur was a meat or plant eater.

Are the teeth rounded or sharp?

Dagger- like or jagged teeth are necessary to rip flesh and belong to a carnivore. Herbivores' teeth are flat or rounded; ideal for grinding or crushing plants.

Dinosaur Claw

Claws

Meat eaters had sharp, lethal claws, to cut into their prey. Herbivores did not need claws for ripping flesh so they were more rounded. They had feet and toes similar to an elephant.

Did the dinosaur walk on two legs or four legs?

Dinosaurs that ate meat tended to walk on their two back legs and could run fast after their prey. They had short, stumpy arms with sharp claws; perfect for holding their victim.

Plant eating dinosaurs walked on four legs.
They did not need to catch prey and so they were slower movers.

Neck

Most dinosaurs with a long neck were herbivores. They would usually walk on all fours and use their long neck to reach up in to the trees to eat leaves. They could also bend down to the ground and gather food from a large area. Herbivores had small heads at the end of their long necks.

Meat eaters had short necks and big heads. They were ferocious creatures with big strong jaws. Some species of carnivorous dinosaurs used their heads as a battering ram.

DID YOU KNOW?

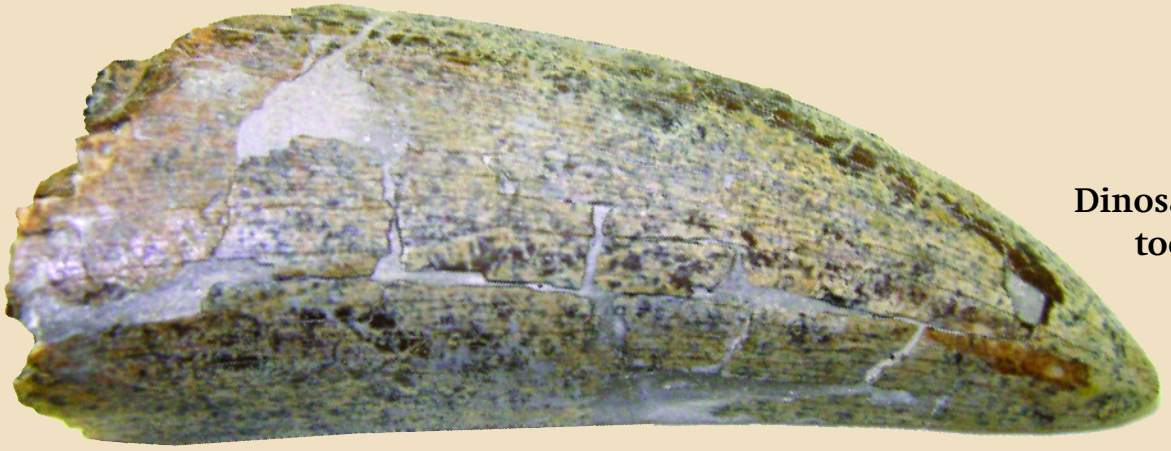
There were more plant eating dinosaurs than flesh eating dinosaurs. Fewer carnivorous dinosaurs sustained the food chain.

Look, find and discuss

Look closely at the different dinosaur skeletons on display.

* Can you find both a carnivore and an herbivore?
  Compare and contrast their skeletons.
  What are the differences which reveal clues to their diets?

* There is one skeleton on display of an omnivorous dinosaur called a Plateosaurus. Examine it carefully.
  How do we know it ate both plants and flesh?



Dinosaur tooth

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Fossils

What is a fossil?

Fossils are the remains or imprints of animals and plants that have been preserved in the earth.

What can be fossilised?

Any living thing could become a fossil one day. The most common fossils found are those of bones, teeth, shells and plants.

Different types of fossils

There are two categories of fossils; body fossils and trace fossils.

Body fossils: These are the remains of an animal or plant, for example bones, shells or leaves.

Trace fossils: These are fossilised imprints rather than actual remains. Typical imprints might be footprints or track ways. These fossils are rare but show evidence of an animal's behaviour.

How is a fossil formed?

Not everything becomes a fossil. The environmental conditions have to be right. It is a bit like a lottery as to whether something is made into a fossil.

Body fossils

These are formed when an animal dies near water or when a plant is preserved in rock. The fossils of the Cetiosaurus, the Rutland Dinosaur, are body fossils and would have been formed like this:

- The dinosaur died and its body was washed into a lake.
- Over many, many years the body became buried with mud from the lake bed.
- The mud turned to rock...

- The soft parts of the dinosaur's body, like his flesh rotted away, leaving only his skeleton encased in the rock.
- Eventually the skeleton bones rotted away too leaving behind a hole or cavity where the bones once were.
- Minerals then filled the hole and hardened to form a fossil in the exact same shape as the bone.

Ammonite

Trace fossils

Trace fossils are formed in a slightly different way. For example:

- An animal walks in mud, leaving behind a footprint.
- The mud dries and hardens preserving the footprint.
- This footprint becomes covered in layers of soil and sediment.
- Each layer of soil and sediment pushes down more and more into the footprint and overtime becomes hard creating a fossil.

DID YOU KNOW?

We only know about extinct animals and organisms by examining fossils.

Experts can find out a lot of information by looking at fossils, such as how long ago the specimen lived and what kind of environment it lived in.

Trace fossils are a very important as they can reveal a lot about the creature's behaviour. Footprints, for example can reveal how fast a creature was moving.

Look, find and discuss

In the gallery, see if you can find an example of a body fossil and an example of a trace fossil.

* Some experts believe that trace fossils are more important than body fossils. Why do you think this is?
* Impressions of skin have been found in fossils. Look for an example of this in the gallery.
* Discuss why the colour of skin can not be preserved.