

DINOSAURS

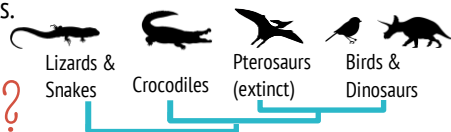
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Left: Life reconstruction of feathered dinosaurs *Sinosauropteryx* © Chuang Zhao and Lida Xing Middle: *T. rex* and *Triceratops* Right: Sophie the *Stegosaurus* © Trustees of the Natural History Museum

You have probably heard of *Tyrannosaurus rex* and *Triceratops* but what exactly is a dinosaur? What were the different types, and are there still dinosaurs on Earth today?

The **dinosaurs** were one of the most successful groups of **vertebrates** (animals with a backbone) to ever live on Earth. They **evolved** 245 million years ago (a long time before humans!) during a time period called the **Triassic**, and they went on to rule the land for over 170 million years.

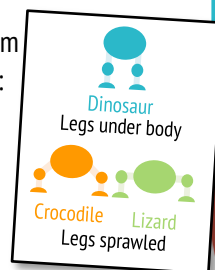


WHAT ARE DINOSAURS?

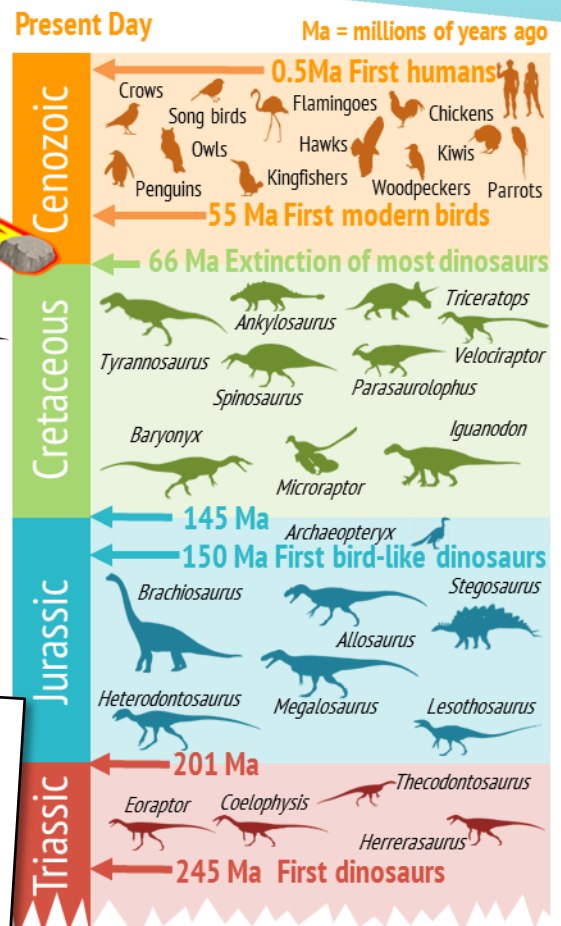
Dinosaurs have a backbone and limbs that have **digits** (fingers and toes) which makes them **tetrapods** (you are a tetrapod too!). Dinosaurs are tetrapods that belong to the **reptile** group like turtles, crocodiles and snakes. The name 'dinosaur' was invented by English palaeontologist, Sir Richard Owen, in 1842. 'Dinosaur' translates as 'terrible lizard'; however dinosaurs are actually more closely related to crocodiles than any of the other living reptiles.

Even though different dinosaurs may look and act very differently from one another, there are certain characteristics that all dinosaurs share:

- Dinosaurs walk with their legs directly under their bodies whereas other reptiles walk with their legs sprawled to the sides. This allows dinosaurs to support more weight.
- Dinosaurs stand on their toes rather than on their whole foot.
- All of the dinosaurs lived on land (so flying pterosaurs and swimming ichthyosaurs were not dinosaurs!)
- Dinosaurs built nests and laid hard shelled eggs.



Fossil therizinosaur nest with eggs
Image: Wikimedia/Ballista



Silhouettes: Phylopic/Scott Hartman, Phylopic/Jaime Headden



WHAT HAPPENED TO THE DINOSAURS?

All of the **non-avian dinosaurs** (dinosaurs that were not birds, see next page) went **extinct** 66 million years ago at the end of the **Cretaceous** period. At the same time lots of other plants and animals also died out including ammonites, ichthyosaurs and pterosaurs. Scientists think that these catastrophic extinctions were caused by an **asteroid impact** in the Gulf of Mexico, huge **volcanic eruptions** in India, gradual **climate change**, or a mixture of all three.

DID YOU KNOW?

The first ever dinosaur to be named was **Megalosaurus** which means 'great lizard'. It was found in a quarry in Oxfordshire and named by Reverend William Buckland in 1824. *Megalosaurus* was a carnivorous dinosaur from the mid Jurassic and probably hunted stegosaurs and sauropods for its dinner!

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ORNITHISCHIANS

The **ornithischians** were a very diverse group of **herbivorous** (plant eating) dinosaurs. The group included:



Hadrosaurs

Duck-billed dinosaurs with large hollow crests on their heads - probably used like trumpets to make loud noises for communication.



Ankylosaurs

Armoured dinosaurs with clubbed tails, used to ward off predators.



Pachycephalosaurs

Dinosaurs with thick dome shaped skulls - may have been used for fighting or to impress mates.



Stegosaurus

Dinosaurs with large bony plates along their backs - probably used to appear more impressive and/or control body temperature.



Ceratopsians

Horned dinosaurs (including *Triceratops*) with large neck frills - likely used to protect against predators or to attract mates.

Dinosaur silhouettes: Phylopic/Scott Hartman

SAUROPODS

The **sauropods** were **herbivorous** dinosaurs that walked on four legs, had extremely long necks and tails, tiny skulls and huge stomachs. The smallest sauropods were probably about 5-6m long, but giants like *Argentinosaurus* grew to be over 30m from head to tail!

Some sauropods, like *Brachiosaurus*, held their necks high like giraffes whereas others, like *Diplodocus*, held their necks horizontally. This would've allowed the dinosaurs to reach different types of plants. Different tooth shapes allowed sauropods to eat different foliage. Sauropods with **peg-shaped teeth** could eat ferns and strip soft leaves from trees, whereas sauropods with **leaf-shaped teeth** were better at grinding down on tougher vegetation.



Camarasaurus

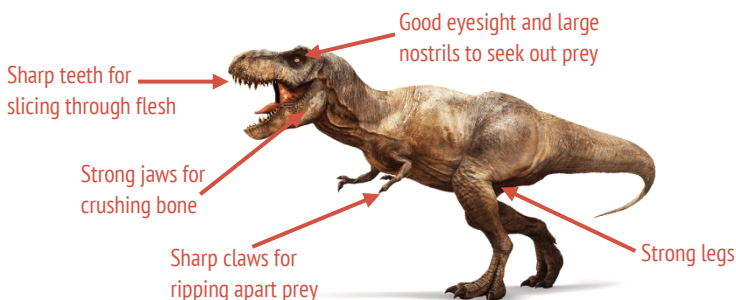


Diplodocus

Eating plants doesn't give you as much energy as eating meat, so sauropods had to eat a colossal 400kg of greenery every day to survive. To take in all of this food sauropod stomachs were enormous. To help with digestion, some sauropods swallowed stones, called **gastroliths**, to help them grind up plants and twigs in their stomachs.

THEROPODS

Theropods walked on two legs (**bi-pedal**) and ranged in size from small crow-like forms up to massive 6-tonne giants like *Tyrannosaurus rex*. Most of the theropods were meat-eating **carnivores**; either **predators** who hunted down their prey, **scavengers** who fed on dead animals, or a bit of both. Palaeontologists know this because most theropods share these carnivorous characteristics:



Not all of the theropods were meat-eaters however; in the **Cretaceous** some theropods evolved different diets. The beaked **therizinosaurs** mostly ate plants and *Spinosaurus*, which has long jaws like a crocodile, is thought to have caught fish.

EVOLUTION OF BIRDS

Birds are living dinosaurs! They evolved from a group of theropods that included *T. rex* and *Velociraptor*. Over millions of years this group of dinos gradually started to evolve bird-like characteristics - first they evolved simple **feathers**, then **wishbones** and eventually **wings and beaks!**



All birds are living dinosaurs!



Theropod dino *Deinonychus* is known to have had feathers
Image: Wikimedia/Emily Willoughby



Archaeopteryx is one of the first dinosaurs to really look like a bird. It still has teeth and a bony tail like a theropod dinosaur but it has feathers, wings and a wishbone like a modern bird. Palaeontologists think that *Archaeopteryx* could either fly or glide between trees.