

EXCAVATION KIT

1 DIGIT! DINOS

T. REX TOOTH

THAMES & KOSMOS



Contents

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& Co. KG, Stuttgart
Pfizerstr. 5-7, D-70184 Stuttgart
Tel. +49 (0)711 2191-343
kosmos.de
service@kosmos.de

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Project management: Dr. Mark Bachofer
Text: Ruth Schildhauer, Mark Bachofer, Stefanie Bernhart
Manual concept: Atelier Bea Klenk, Berlin
Illustrations, layout, and typesetting: Frieder Werth, Horb
Photos: netsuthep@istockphoto.com (hand with foot imprint); creativcollection.com (meteor); Kosmos-Archiv (Pangaea); all other photos Frieder Werth, Horb.

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- › 1. Excavation block with *T. rex* tooth hidden inside
- › 2. Hammer
- › 3. Chisel
- › 4. Sponge



You will also need newspaper, water, small bowl, and paper towels.

If any parts are missing or defective, please contact Thames & Kosmos customer service:
US: techsupport@thamesandkosmos.com
UK: techsupport@thamesandkosmos.co.uk

Dear Parents!

Please provide your child with assistance and support when excavating the dinosaur tooth. Before starting the experiments, read through the manual together and be sure to follow it. That way, nothing will stand in the way of a successful dig. Please be careful not to let any parts of the kit get into the hands of small children, especially the plaster pieces that are left over after excavating. These can be disposed of in the household trash.

Safety Notes

WARNING. Not suitable for children under 7 years. For use under adult supervision. Read the instructions before use, follow them and keep them for reference.

This kit contains functional sharp edges or points. Do not injure yourself!

WARNING. Not suitable for children under 3 years. Choking hazard — small parts may be swallowed or inhaled.

Follow the instruction manual when performing the excavation. Keep small children and animals away from the experiment area. Do not eat or drink at the experiment area. Process the plaster block slowly and moisten it to prevent the formation of chips and dust. Do not place the plaster material in mouth or eyes. Clean all equipment and the work area after use. Wash your hands after the experiment.

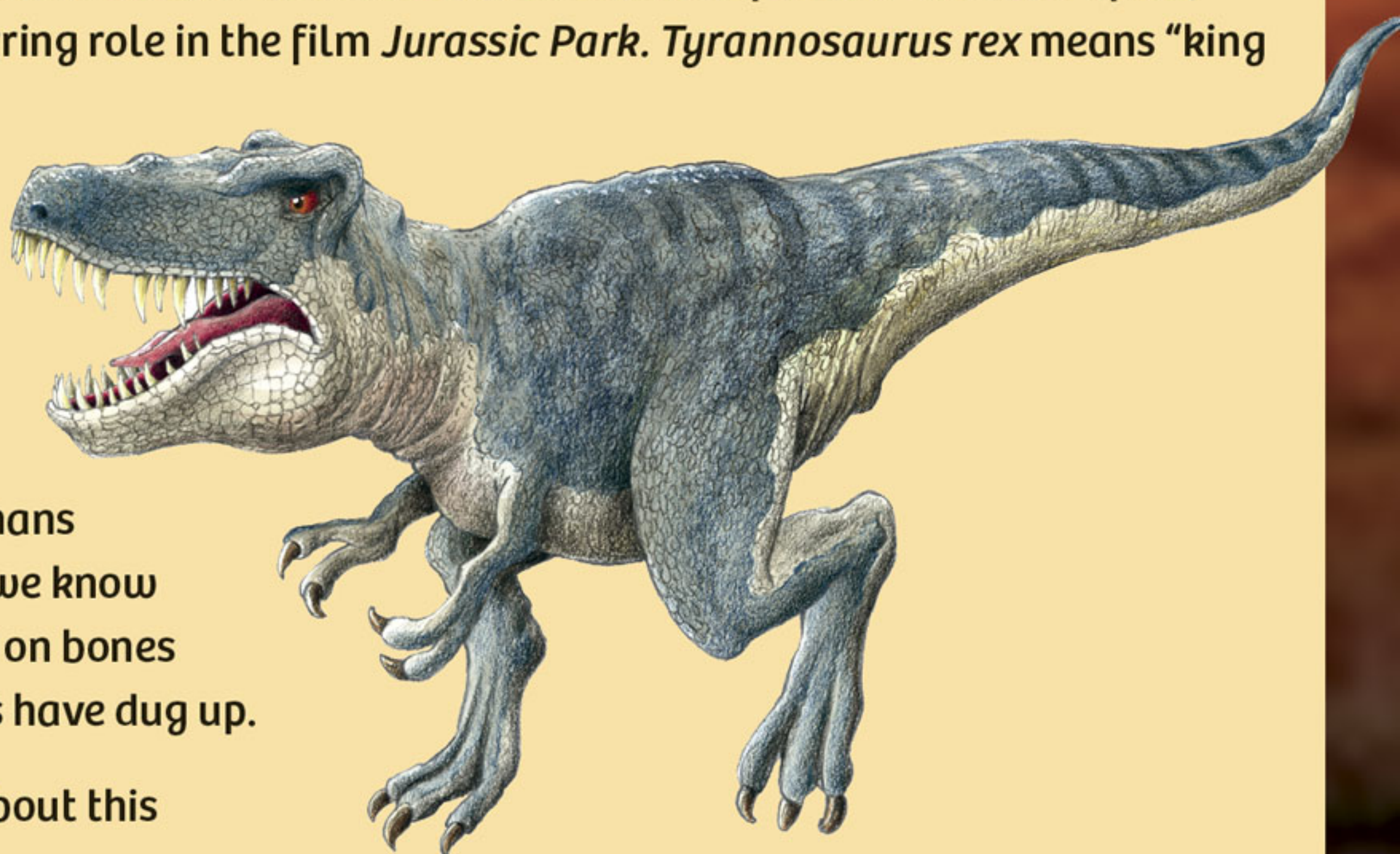
Keep the packaging and instructions as they contain important information.

Calling All Dinosaur Researchers!

This kit will teach you what it's like to be a prehistoric animal researcher. A scientist who does this is also known as a paleontologist (pronounced "pay-lee-un-TAH-luh-just"). You will be using the tools included in the kit to excavate a *Tyrannosaurus rex* tooth. *T. rex* is without a doubt the most famous dinosaur of all, partly due to its starring role in the film *Jurassic Park*. *Tyrannosaurus rex* means "king of the tyrant lizards."

Nobody has ever seen a living *Tyrannosaurus* since they died out long before any humans existed. Everything we know about them is based on bones that paleontologists have dug up.

Have fun learning about this fascinating giant!



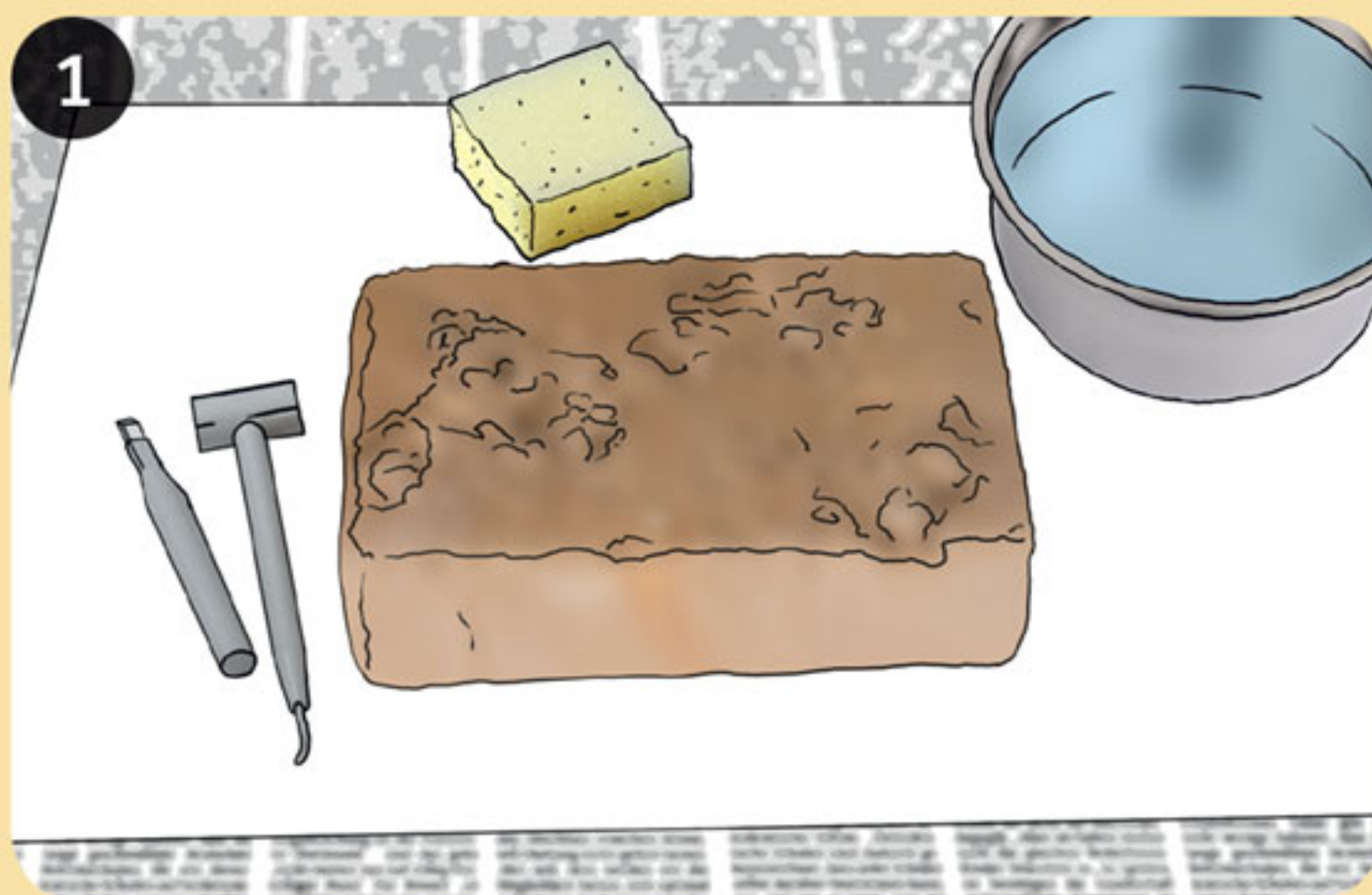
How to Excavate the Fossil

STEP 1

Start by looking for a suitable work place, someplace where it won't matter if a few bits of plaster fall here and there, and that won't be harmed by a little dust and water. If the weather is nice, you can also work outside.

The ideal work surface is a level, sturdy table covered with a few layers of newspaper.

Get the excavation block and tools ready, along with a small bowl of water.

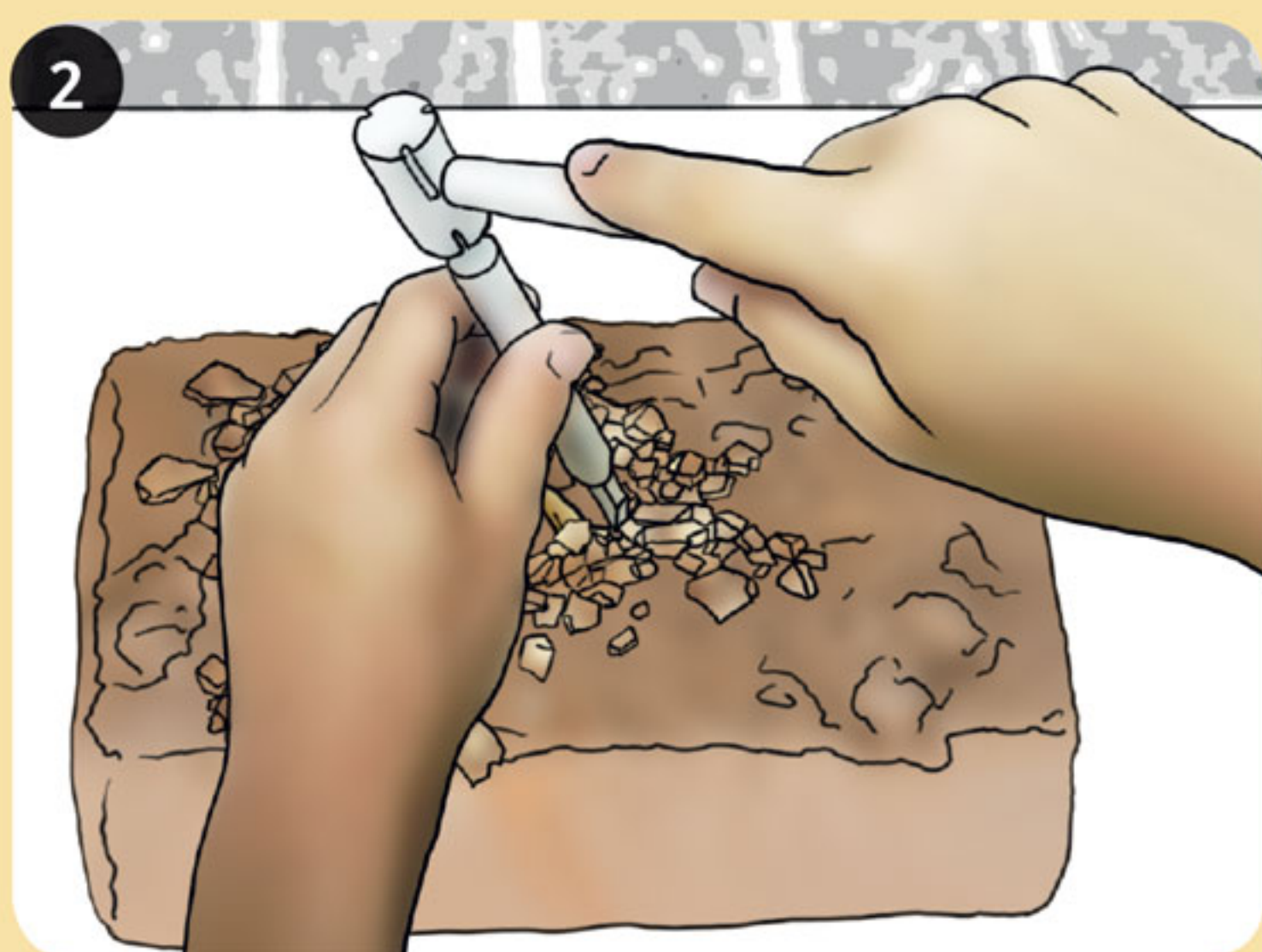


TIP! Don't just dig straight down. Also dig out sideways from your starting point.

STEP 2

Select an area of the plaster block to begin excavating. Moisten this area thoroughly by repeatedly dipping the sponge in water and squeezing it out at the selected location. Then place your chisel there and push the softened plaster material to the side. If you encounter spots where it doesn't go so easily, try tapping the chisel carefully with the hammer.

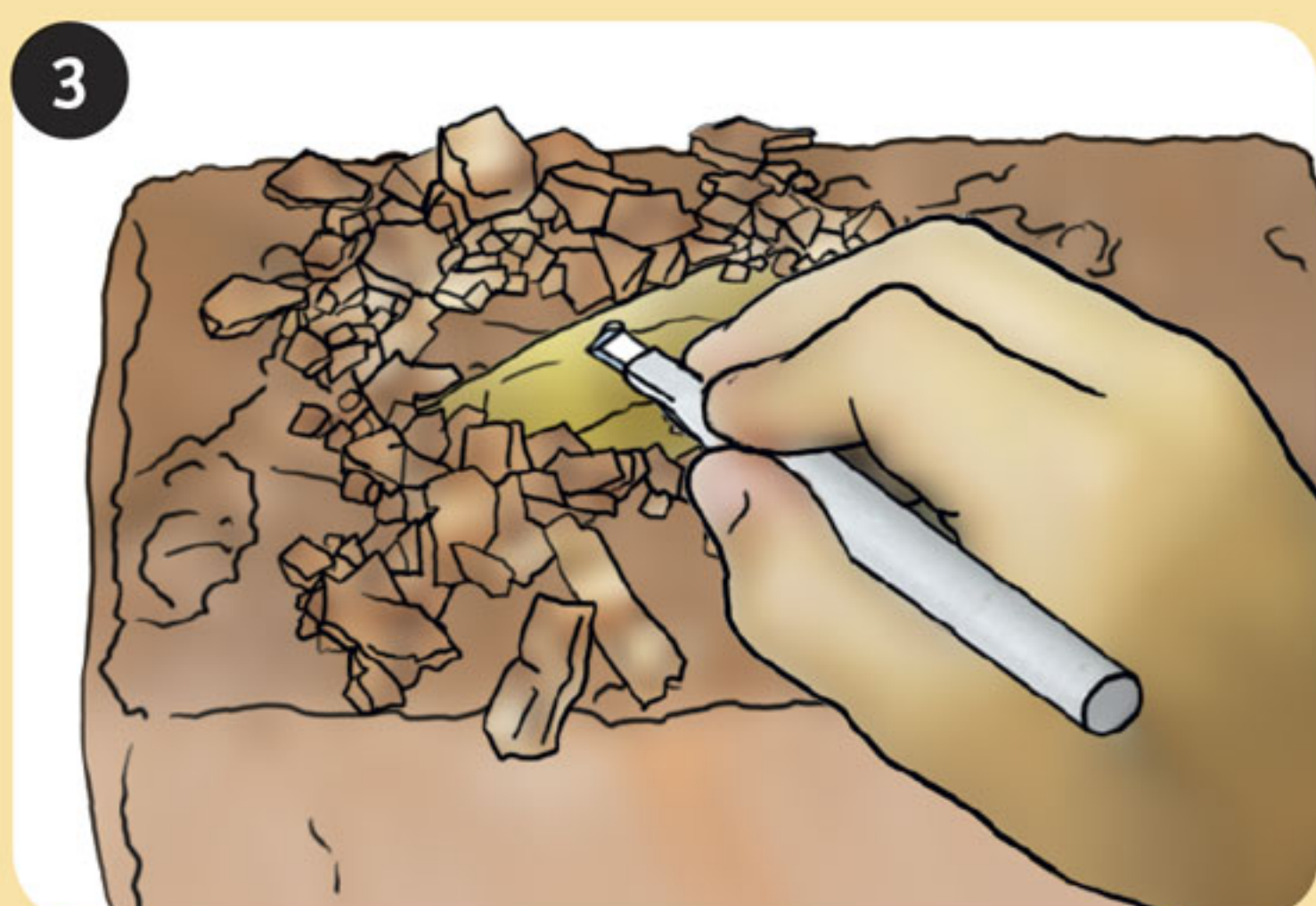
In this way, the plaster will gradually turn into a crumbly mass that is easy to remove. Be sure to keep moistening the spot with the sponge wherever you are digging. The plaster should not be worked while it is dry or it will create a lot of plaster chips that will make it hard to see what you are digging.



STEP 3

When you reach the tooth, carefully clear the plaster away on all sides until you can remove the tooth from the plaster.

NOTE! To avoid chips and dust, keep moistening the excavation block with the sponge as you dig.





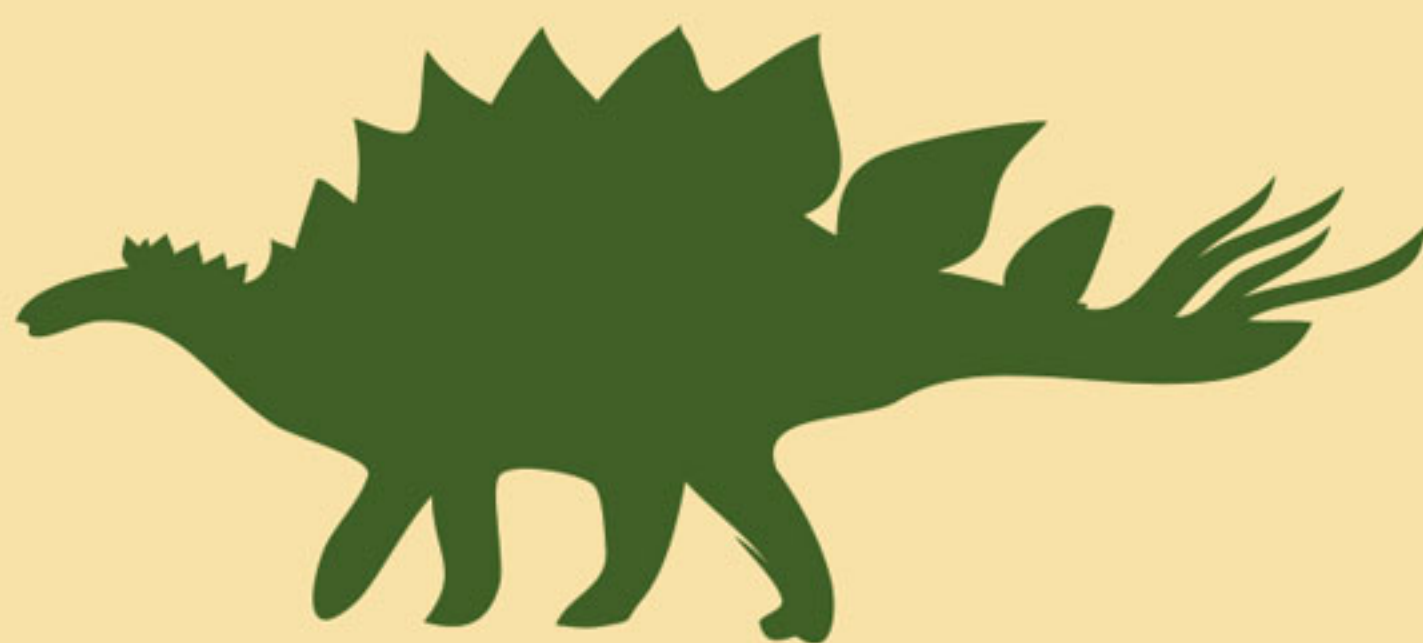
STEP 4

This is how your *Tyrannosaurus rex* tooth will look:



STEP 5

Finally, clean any remaining plaster from the tooth. It's easiest to do this under running water using the sponge.



NOTE! After excavating and cleaning the tooth, wash your hands thoroughly and clean the work area. Dispose of the newspaper along with any bits of plaster in the household trash.

Check It Out



? HOW DO WE KNOW SO MUCH ABOUT DINOSAURS?

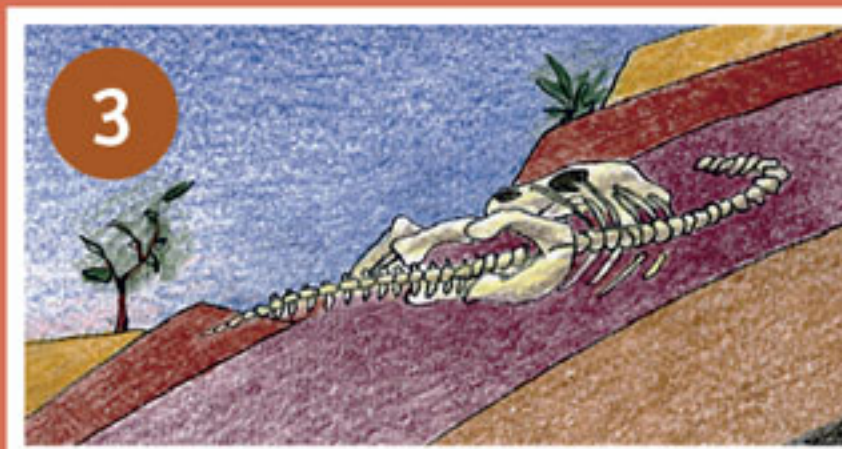
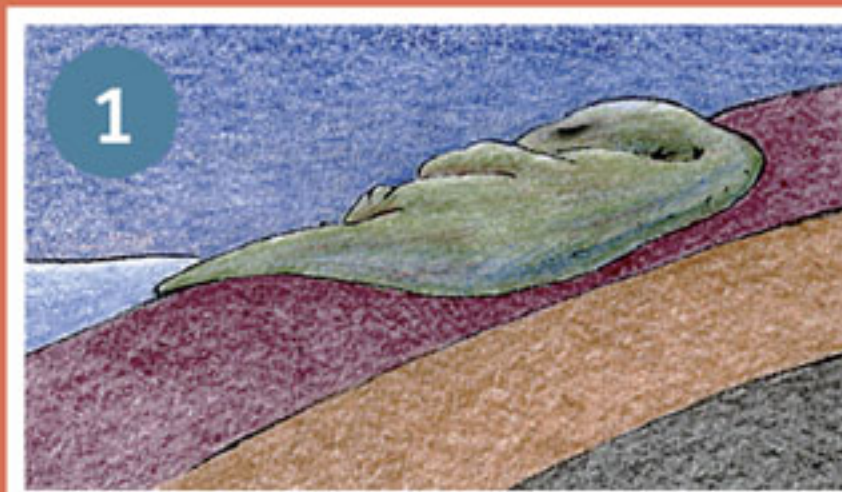
A long time ago, there were many animals and plants that no longer exist today. The dinosaurs, for example, became **extinct** millions of years ago. But some remains of their bodies have been preserved. When that has happened, bones, skin impressions, or footprints — in other words, **fossils** — may show up in stone.

Researchers dig up these discoveries, study them, and compare them to others. In this way, **scientists** figured out about 200 years ago that some of these fossil remains came from enormous animals. Before then, people had thought they were the remains of human-like giants!



HOW FOSSILS ARE CREATED

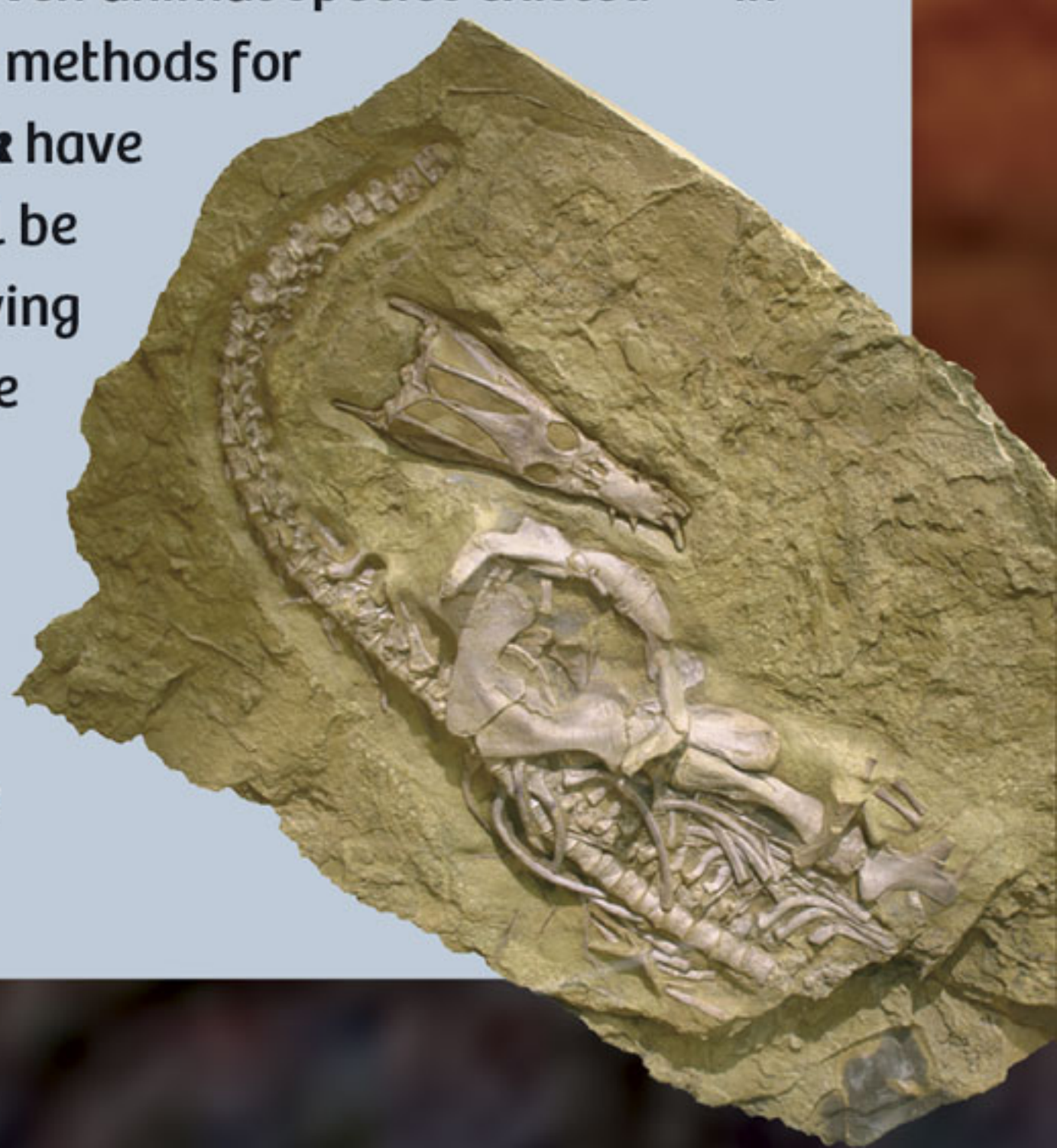
- 1 When animals die, scavengers eat their remains or they decay over time. Only in very rare cases are their **bones** or **imprints** saved. This may happen, for example, when they become embedded in sludge, which can preserve the remains due to its low oxygen content.
- 2 Over time, extra **layers** may settle on top of them and protect the animals' remains. Although the flesh itself will quickly decay, mineral-rich groundwater may penetrate the spaces that remain behind. This causes the embedded bones to "**turn to stone**": the bone material is replaced by minerals, with the shape of the bone remaining intact.
- 3 In some areas, **rain** and **wind** may then carry off the superimposed layers over millions of years, revealing the fossils at the surface, where they can be dug up.



? HOW DO WE KNOW HOW OLD A FOSSIL IS?

Of course you would want to know when a given animal species existed — in other words, how old a fossil is. There are several methods for that. For example, you know that if **layers of rock** have been left undisturbed, the ones on the bottom will be older — just like a stack of newspapers in your living room. So that gives you a relative sequence for the fossils embedded in the rock.

Also, there are **radioactive** atoms in nature that change into other atoms at a certain rate. Based on the ratio of the two types of atoms, you can determine the age of the fossil or the layer of rock in which it is located.





THE TOOTH OF A *TYRANNOSAURUS REX*

T. rex had over 60 teeth, all long and sharp as knives. The longest ones found have been over 20 centimeters (7.8 inches) long. Most have measured 10 to 13 centimeters (4 to 5 inches), or about the size of your fossil. So there is little doubt that this giant dinosaur was a **meat eater**.

They would even have been able to bite into hard bone, aided by powerful chewing muscles and a massive **skull** made of tightly knit bone.

There was no escape from the meter-long jaws of a *T. rex*.

Their **upper jaw** was wider than their **lower** one.

Thanks to this overbite, they would have been able to tear huge pieces of flesh from their prey in a single bite. One mouthful would have weighed as much as an entire calf.



Check It Out

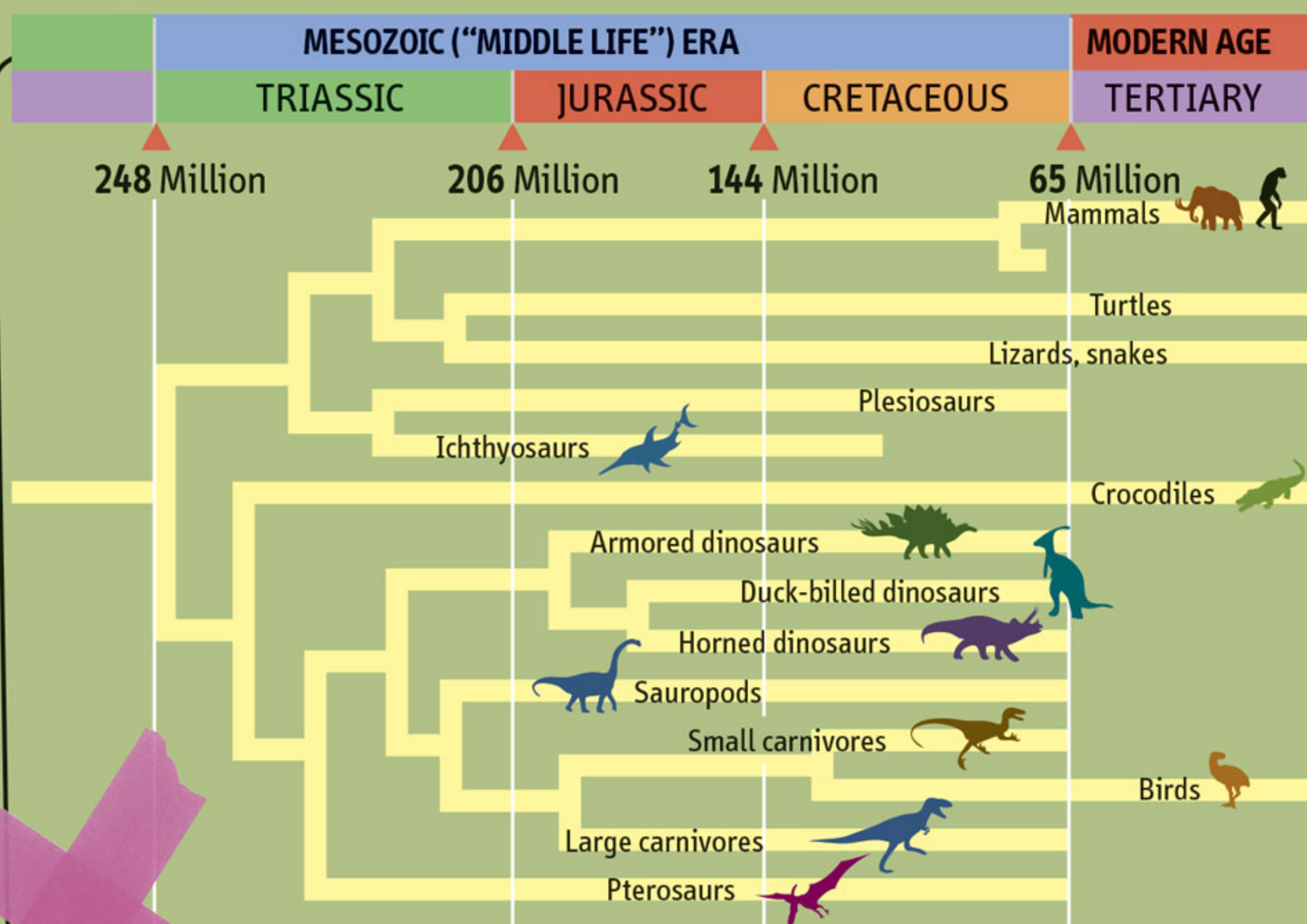


WHEN DID THE DINOSAURS LIVE?

It was **230 million years** ago that the first dinosaurs evolved from reptiles. For over 160 million years after that, they ruled Earth. As a point of comparison, consider that humans of our species have only been around for about 150,000 years.

The time period during which dinosaurs lived is called the **Mesozoic ("Middle Life") era**. The Mesozoic era is divided into three periods: **Triassic**, **Jurassic**, and **Cretaceous**.

During these periods, many new dinosaur species arose, existed for a few million years, and then died out again. So the many different dinosaurs that we know of by no means lived at the same time.



HOW DID THE WORLD LOOK AT THE TIME OF THE DINOSAURS?

There was a much warmer and wetter climate across the entire globe. The plant-eating dinosaurs fed on ferns, conifers, redwoods, and ginkgo trees. Flowering plants and broad-leaved trees did not develop until the end of the dinosaur age.

Even the globe itself looked quite different in the time of the dinosaurs. At the beginning of the dinosaur age, all the land masses lay together in one giant continent, known as **Pangaea**. Later, this supercontinent broke apart and the pieces became the various **continents** of today. That is also the reason why dinosaur remains can be found on all of today's continents.



Check It Out

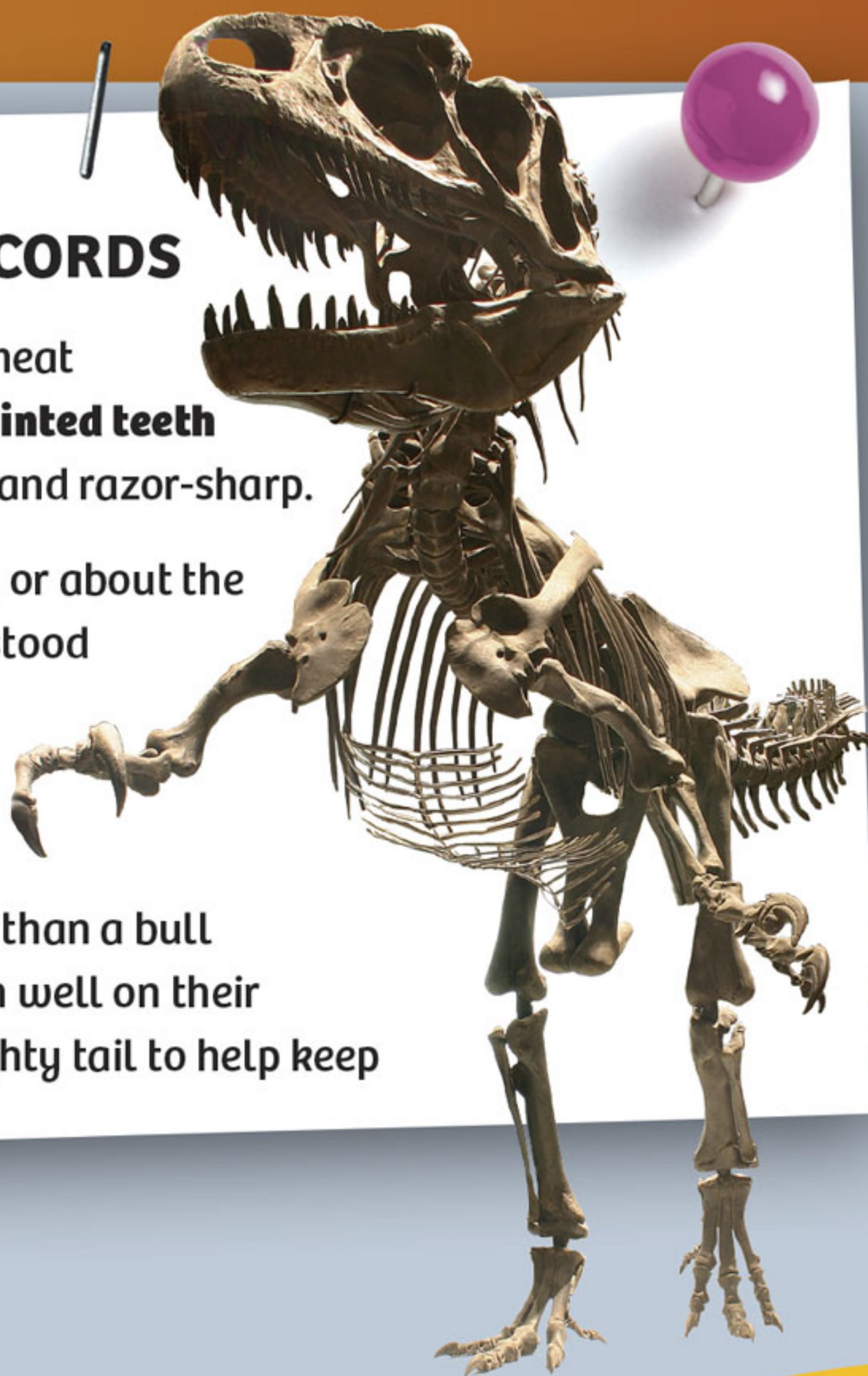


TYRANNOSAURUS — AUTHENTIC DINOSAUR RECORDS

These giant dinosaurs were definitely meat eaters, as evidenced by their over **60 pointed teeth** — which were over 20 cm (7.8 in.) long and razor-sharp.

A *T. rex* could reach 13 meters (43 feet), or about the length of four cars. When these giants stood upright, they were **6 meters (20 feet) tall**, or about three times the height of a human.

Although they were somewhat heavier than a bull elephant, around **7 tons**, they could run well on their powerful rear legs. They used their mighty tail to help keep their balance.



? WHY ARE THERE NO MORE DINOSAURS TODAY?

At the end of the Cretaceous period, the last dinosaur species died out. But why?



The most plausible theory is that a meteorite crashed into Earth. A **meteorite** is a solid object from space that does not burn up as it approaches Earth and impacts with the ground. The dinosaurs may have been buried by it, killed by the resulting **tidal wave**, or died from **dust clouds** that covered the sun and turned the weather cold.

It is also possible that there was a very powerful **volcanic eruption** that changed Earth's climate. Or, new plants and animal species may have evolved so that the dinosaurs could no longer find their usual food.

? WHERE AND HOW DID *T. REX* LIVE?

They lived near the end of the dinosaur age in North America. Most researchers believe that they were hunters. Evidence for this is provided by the eyes mounted at the front of their skull, which permitted **depth perception**. Their relatively large brain is also an indication that they hunted since hunting animals have to track down and outsmart their prey.

Tyrannosaurus babies hatched from **eggs**. If all went well, a *T. rex* would have been able to live to be about 30 years old.

