

# JUNIOR PALEONTOLOGIST

Activity Book: Understanding Time – Mesozoic Era



# BECOME A JUNIOR PALAEOONTOLOGIST

**This activity book is part of the Craigleith Heritage Depot Junior Naturalist Program.**



This badge will introduce kids to palaeontology and local fossil history. The activities are designed to engage kids whilst teaching them about the science of palaeontology. By completing your Junior Palaeontologist Badge you will learn about ancient life, and explore your local area for fossils. There are six booklets, complete four of the six booklets and receive your Junior Explorer badge.

## HOW TO RECEIVE YOUR BADGE

**To receive your Junior Palaeontologist badge you must complete the activity book and bring it to the Craigleith Heritage Depot where the staff will look over the booklet and award you a stamp in your Field Journal, once you have completed four of the six books the CHD staff will award you your badge!**



## FUN FACTS ABOUT FOSSILS

- **The oldest fossils are 3.5 billion years-old.**
- **Some Fossils Are Huge - Patagotitan mayorum, possibly weighed 69 tonnes, over 150,000 pounds**
- **Fossilized poop is called coprolites. Scientists have found coprolites from Tyrannosaurus rex dinosaurs that contain bits of crushed bones.**



# UNDERSTANDING TIME

The Earth is really old, it formed 4.6 billion years ago. We can divide the Earth's history into smaller sections called eons, eras, and periods. Palaeontologist need to learn about the different periods because each had unique forms of life.

The colours below represent the 3 major eras of geological time - Paleozoic Era, Mesozoic Era, and Cenozoic Era.

Try to match up the creatures or plants to the right time period.



Trilobites and fish dominate the seas



Cycads and ferns grow on land



Dinosaurs like *Brachiosaurus* appear



*Saber-Toothed Cat* and other mammals dominate

Cenozoic

66 Million Years Ago

Mass Extinction

Mesozoic

252 Million Years Ago

Mass Extinction

Paleozoic

541 Million Years Ago

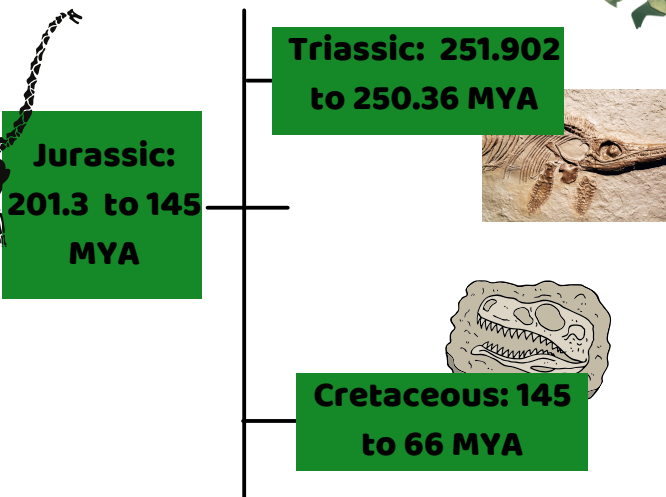
# MESOZOIC ERA

**Mesozoic Era** is best known as the time of **Dinosaurs**.

It was a 186 million years in length ending with an **extinction** level event that took out many forms of life!

The root meaning of the word Mesozoic comes from the Greek word for "**middle life**" as it is in the middle of the three main eras of life Paleozoic, Mesozoic and Cenozoic

Mesozoic 252 Million - 66 Million Years Ago



The Mesozoic Era is broken up into three periods the Triassic, Jurassic, and the Cretaceous

Age of **Reptiles**



Pangea

Age of **Conifers**



Age of **Dinosaurs**



**Birds**



**Small Mammals**



**Flowering Plants**



It was during this period of time where the **ancestors** of major plants and animal groups that exist today first appeared

The Earth's climate was generally **warm**, and there was less of a difference in temperature between the equator and the poles then their is today.

The **flora** and **fauna** that appeared during this period were very different than those that were found in the previous Paleozoic Era.

At the beginning of the Mesozoic the **continents** were joined together in a **supercontinent** called **Pangea**. Over the millions of years that make up the Mesozoic Era the continents began to move into their present day locations



[Britannica.com/science/mesozoic.era](http://Britannica.com/science/mesozoic.era)

Of the 5 largest mass extinctions in Earth's history, 3 occurred during the Mesozoic Era. This allowed for the **geologic** and **biological** transitions to happen. This **era** ended with an extinction level event that **devastated** many forms of life.



# MESOZOIC ERA

See if you can find all the key words about the Mesozoic Era in the word search below!

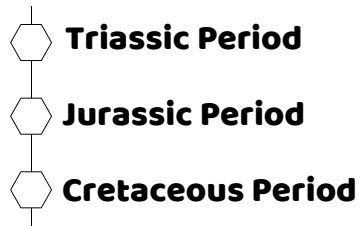


**MESOZOIC - DINOSAURS - EXTINCTION - MIDDLE LIFE -  
ANCESTORS - REPTILES - WARM - CONIFERS -  
CONTINENTS - FLORA - FAUNA - SUPERCONTINENT -  
PANGAEA - GEOLOGIC - BIOLOGICAL - ERA - DEVESTATED**

Mesozoic 252 Million - 66 Million Years Ago

# DAWN OF REPTILES: TRIASSIC

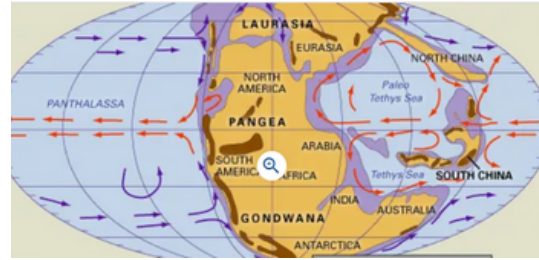
The first period of the Mesozoic era was the Triassic period.



It was the shortest of the three periods. It was roughly 50.6 million years in length!



During this period, there were no separate continents like there are today. Almost all the Earth's land mass was together in a single supercontinent called Pangaea ("all the land"); it was centered more or less on the equator.



[Britannica.com/science/mesozoic.era](http://Britannica.com/science/mesozoic.era)

Being a super-continental land mass, Pangaea had limited shoreline. Because of this, Triassic marine deposits – fossils from Triassic ocean life – are rare in most of the world

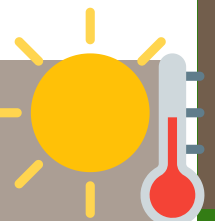
After the extinction level event that ended the Paleozoic it took 30 million years to re-establish diverse complex ecologies (fish, reptiles, birds and insects).

The beginning of the Triassic saw the rise of land reptiles, birds, and large insects.

Pterosaur were flying reptiles which were first found during the Mesozoic era at the same time as the dinosaurs. They continued to dominate the skies into the Cretaceous period.

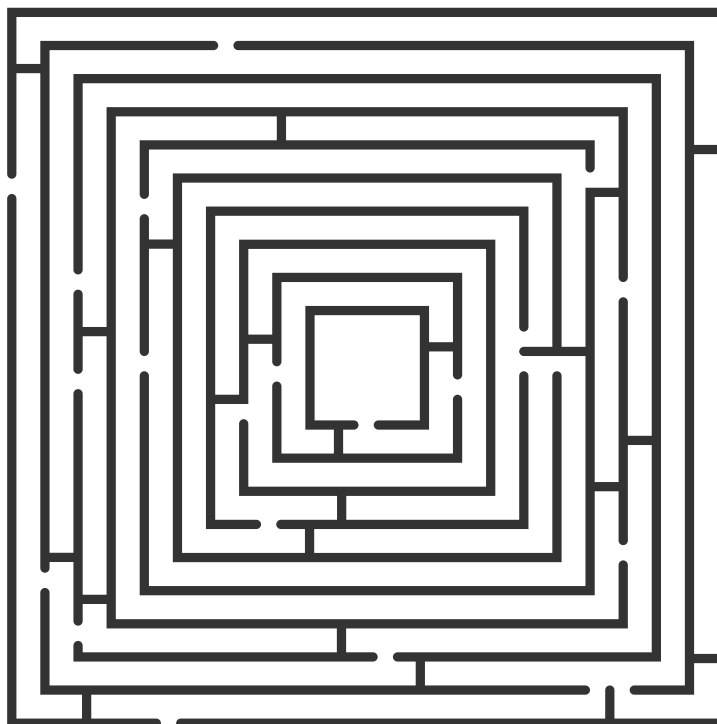
The earliest fossil turtle comes from the early Upper Triassic of China, about 220 million years ago. So turtles are one of the oldest surviving reptile groups and a more ancient group than lizards, snakes and crocodiles.

The climate throughout the Jurassic Period was hot and dry. The Earth's average surface temperature was about 3 degrees hotter than it is now



# DAWN OF REPTILES

Help the Mesozoic creatures get to their habitats



Turtles were already present when the first dinosaurs appeared, and they shared the ancient seas with ichthyosaurs, watched pterosaurs soar overhead, and saw the first small, furry mammals.



The earliest known turtle fossil, *Proganochelys*, are from the late Triassic (Norian) sedimentary deposits in Germany.



Pterosaurs were genuine fliers, able to flap or soar. Their bodies were covered with fine hairs, so they were able to regulate their temperature (they were warm-blooded).



The first Pterosaur fossils occur in the Upper Triassic, and the group continues until the K/T extinction event at the end of the Cretaceous

# AGE OF DINOSAURS : JURASSIC

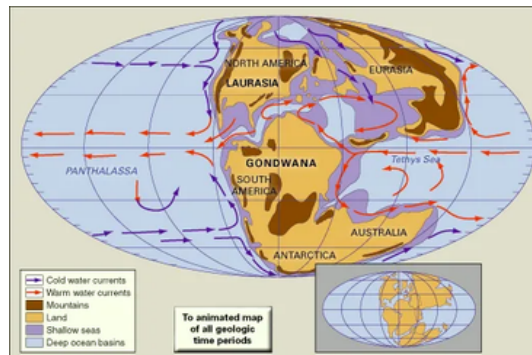
The Jurassic Period took place 199 to 145 million years ago, it came after the Triassic and predated the Cretaceous

During this period, Earth's climate changed from hot and dry to humid and subtropical

This period's mainly warm, wet climate gave rise to lush vegetation and abundant life

During the Jurassic period, the supercontinent Pangaea split apart

The northern half, known as Laurentia, was splitting into landmasses that would eventually form North America and Eurasia, opening basins for the central Atlantic and the Gulf of Mexico.



Britannica.com

The southern half, Gondwana, was drifting into an eastern segment that would form Antarctica, Madagascar, India and Australia, and a western portion that would form Africa and South America.

This rifting, along with generally warmer global temperatures, allowed for diversification and dominance of the reptiles known as dinosaurs.

Many new dinosaurs emerged—in great numbers. Among them were stegosaurs, brachiosaurs, allosaurs, and many others.

Dinosaurs may have been the dominant land animals, but they were not alone. Early mammals were mostly very small herbivores or insectivores and were not in competition with the larger reptiles



alchetron.com

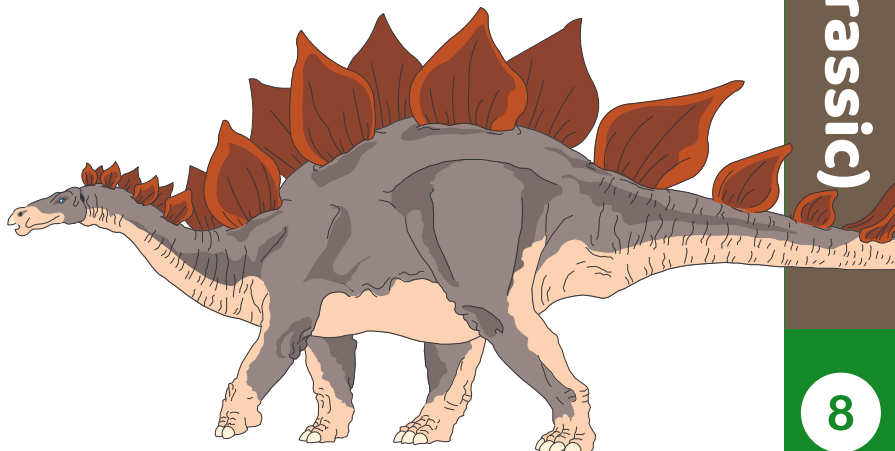
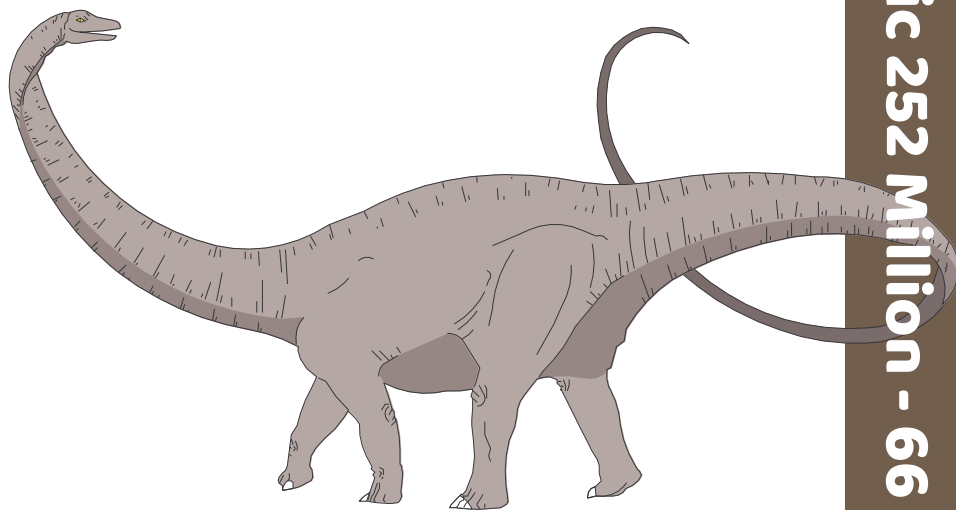
Sauropods, the "lizard hipped" dinosaurs, were herbivorous quadrupeds with long necks balanced by heavy tails. Many, such as Brachiosaurus, were huge.

The largest marine carnivores were the Plesiosaurs. These carnivorous marine reptiles typically had broad bodies and long necks with four flipper shaped limbs

Brachiosaurus obtained lengths greater than 100 feet and weights over 100 tons, making them the largest land animals ever to walk the earth

# AGE OF DINOSAURS

Draw what you think a Jurassic landscape would have looked like for each of the dinosaurs below. Add dinosaurs to the ones below that you think would have lived during the Jurassic.



Mesozoic 252 Million - 66 Million Years Ago (Jurassic)



# THE GIANTS OF LATE : CRETACEOUS



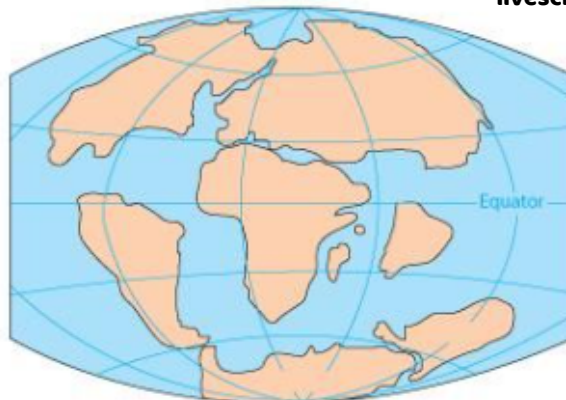
The Cretaceous period lasted for 79 million years, the longest of the 3 Mesozoic periods.

This period essentially began with two continents, Laurasia in the north and Gondwana in the south. An equatorial seaway separated the two continents.

By the middle of the period, ocean levels were much higher; most of the landmass we are familiar with was underwater.

By the end of the period, the continents were much closer to modern configuration. Africa and South America had assumed their distinctive shapes; but India had not yet collided with Asia and Australia was still part of Antarctica.

livescience.com



CRETACEOUS  
65 million years ago

The climate was generally warmer and more humid than today, probably because of very active volcanoes on the sea floor.



During the Cretaceous period, more ancient birds took flight, joining the pterosaurs in the air.

Some of the dinosaurs that lived during the Cretaceous Period were the Tyrannosaurus rex, Triceratops, Ichthyosaurs and the Parasurolophus



Large "duck-billed" dinosaurs, Parasurolophus



Giant marine reptiles ichthyosaurs,

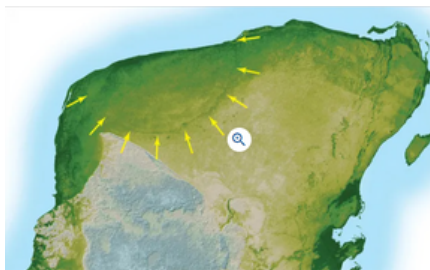


Horned forms, such as Triceratops

The Tyrannosaurus Rex



The end of the Cretaceous Period saw the extinction of the dinosaurs. This was called the Cretaceous-Paleogene extinction event and believed to have been caused by an asteroid or comet impact event.



Chicxulub crater

Britannica.com

The extinction level event paved the way for mammals to dominate the planet Earth and ultimately the rise of humans.



# THE GIANTS OF LATE

Compare yourself and things to the giants of the Cretaceous Period.

How tall are you? \_\_\_\_\_

How tall is one of your parents? \_\_\_\_\_

How many people your height could fit in the wingspan of a Pterosaurs?

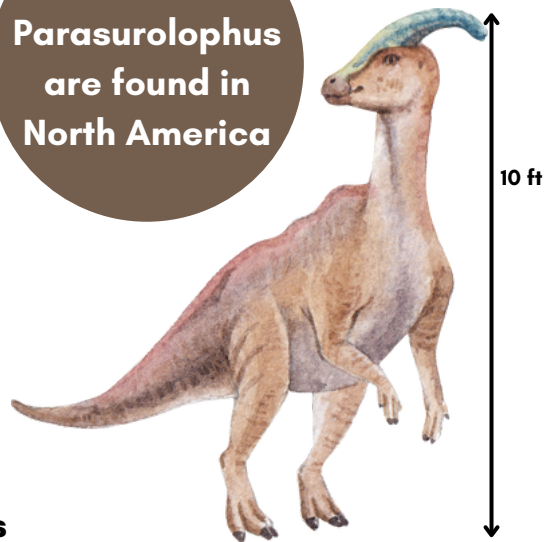
\_\_\_\_\_

How many people your parents heights could fit on the back of a Plesiosaurs from tip of its mouth to the tip of its tail ?

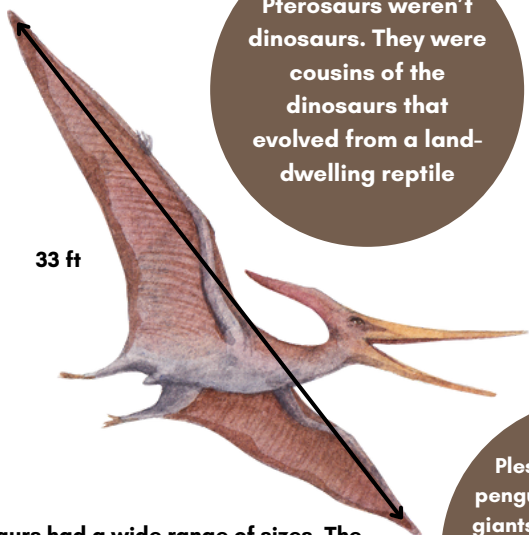
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How many people your height and your parents height make up the height of a Parasurolophus? \_\_\_\_\_

Fossils of Parasurolophus are found in North America



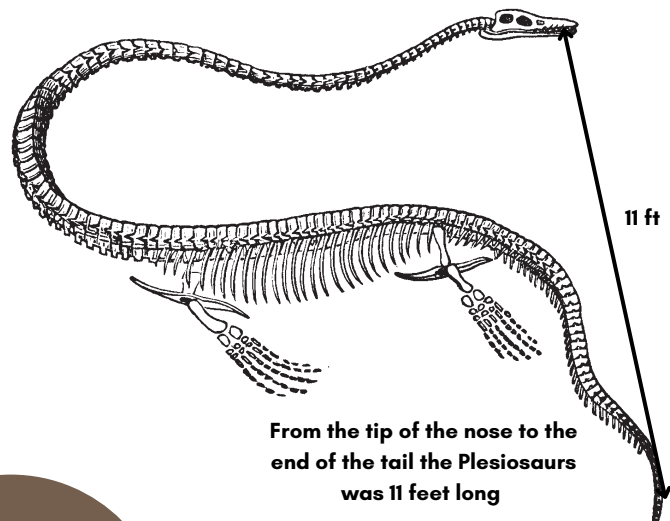
Parasurolophus



Pterosaurs weren't dinosaurs. They were cousins of the dinosaurs that evolved from a land-dwelling reptile

Pterosaurs had a wide range of sizes. The smallest species had a wingspan no less 10 inches. The most sizeable forms had a wingspans of up to 33-36 feet

Plesiosaurs flew like penguins. These ancient giants did not swim, they flapped their front flippers and literally flew underwater like penguins do today.



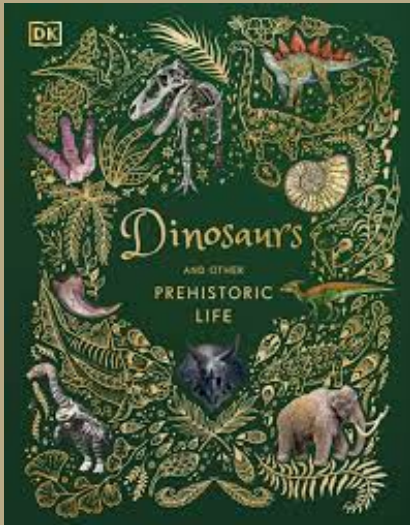
From the tip of the nose to the end of the tail the Plesiosaurs was 11 feet long

When you go outside in the spring or summer, you can probably see lots of different types of flowers. It was during the Cretaceous Period when the very first flowers appeared on earth.

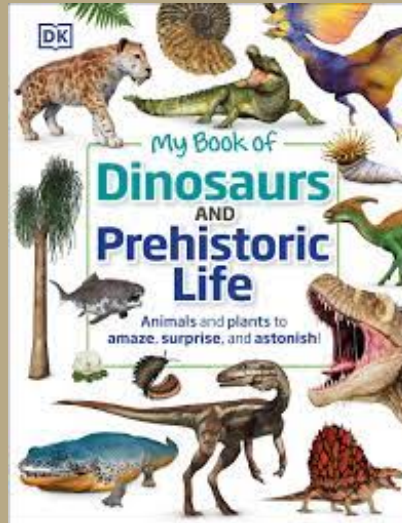
# LEARN MORE!

WANT TO LEARN MORE ABOUT LOCAL ANIMALS CHECK OUT SOME OF THE ONLINE AND LIBRARY RESORUCES!

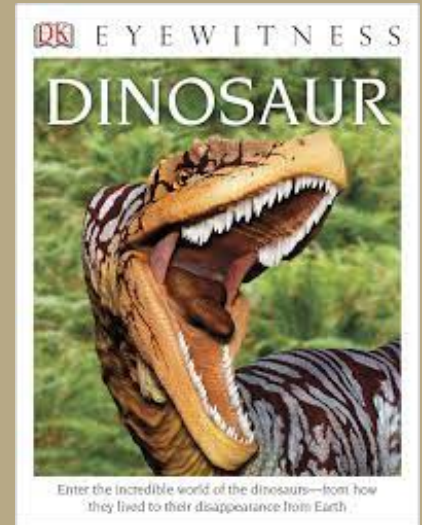
## GREAT BOOKS



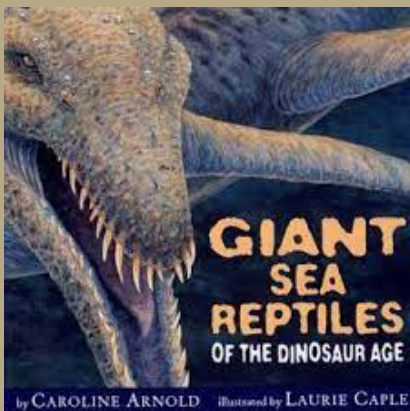
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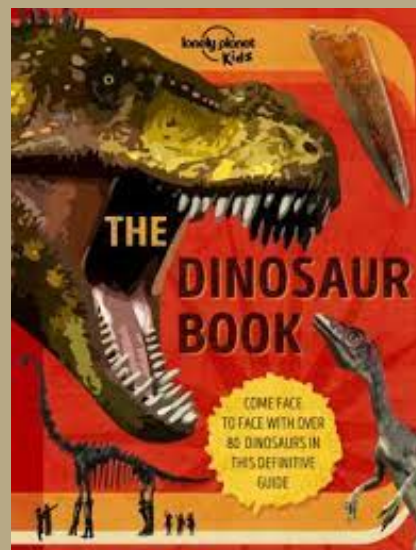
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