

# JUNIOR PALEONTOLOGIST

Activity Book: Understanding Time – Cenozoic Era  
7-9



# 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

- **It can take a long time to dig up fossils. One dig in Antarctica started in 1989 and was completed in 2017!**
- **We once believed Mammoth and Mastodon fossils were the bones of giants.**
- **The Pokemon game franchise has 26 fossil Pokemon, including evolutions.**



# 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

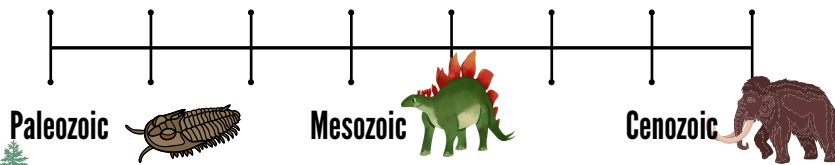
Mass Extinction

Paleozoic

541 Million Years Ago

# RISE OF MAMMALS

**Cenozoic Era, third of the major eras of Earth's history, beginning about 66 million years ago and we are currently living in this era!**

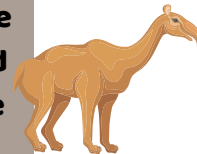


**It was during this time that the continents assumed their current shape and geographic positions and during which Earth's flora and fauna evolved toward those of the present.**

**Due to the the extinction level event at the end of the Cretaceous Period dinosaurs and their large reptile cousins died out**



**With the disappearance of Dinosaurs it allowed large mammals to take over**



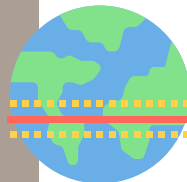
**The Cenozoic era is divided into three periods**

**Paleogene period (65-23 million years ago)**

**Neogene period (23-2.6 million years ago)**

**Quaternary period (2.6 million years ago to the present)**

**Each segment of the Cenozoic experienced different climates.**



**The global climate of the early portion of the Cenozoic period was much warmer than it is today, and the overall climate of the Earth was much more consistent regardless of proximity to the equator.**

**Without the dinosaurs, plant life had an opportunity to flourish during the Cenozoic era. Nearly every plant living today had its roots in the Cenozoic era.**

**Due to ice ages and environmental changes many of the large mammals disappeared allowing smaller species to thrive and diversify because their predators no longer existed**

**We are currently in the Cenozoic Period - humans have yet to see an extinction level event - however, some scientist have said we are in fact this periods extinction level event due to our over population, global climate change and the rapid extinction of many animal and plant groups**

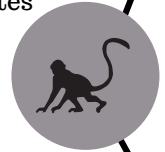
Dinosaur Extinction



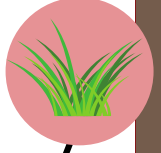
Age of Mammals



Primates



Grass



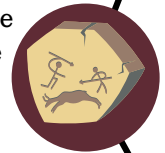
Modern Earth



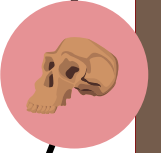
Apes



Stone Age



Homo Sapiens



Cities



**Cenozoic Period 66 Million - Today**

**Cenozoic Period 66 Million - Today**



# RISE OF MAMMALS

What type of mammals do you think lived during the Cenozoic Period!

You can borrow a book from the library or

Z O K V E U L N S N C X C S U  
Q G S H A H A P E S V L M N X  
N O M S R H S O H W I M B E S  
Q O W X T P G J L M X Z A I E  
U B I E H E B R A G Y S V P T  
A M D T N A C T H N T J H A A  
T H P E C E E E M M S M D S M  
E Q Y T V N G U N O N N L O I  
R A X D F C I O W O D O G M R  
N P D X S T C T E Q Z E J O P  
A E F S I G I F X L M O R H Y  
R P A S R D T F R E A L I N R  
Y R O U Y B I P M V U P W C L  
G L U X C G E A R E S T N U T  
M A M M A L S E G A E N O T S

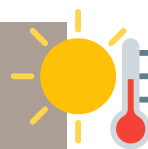
Apes - Cenozoic - Cities - Climate - Era - Extinction -Homo  
Sapiens - Grass - Mammals - Modern Earth - Neogene -  
Paleogene - Primates - Quaternary - Stone Age

# PALEOGENE PERIOD

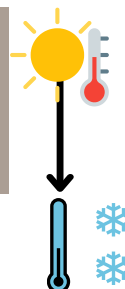
The Paleogene Period marks the beginning of the Cenozoic Era. It began 65 million years ago and lasted more than 40 million years



The beginning of the Paleogene Period was very warm and moist compared to today's climate. Much of the earth was tropical or sub-tropical. Palm trees grew as far north as Greenland!



The warm climate at the beginning of the period was perfect for the dense forest plants. As the climate cooled, open woodlands and grasslands became abundant. The grasses were important because they supported huge herds of grazing animals.



The Paleogene is made up of three epochs:

The Paleocene Epoch - The Eocene Epoch - The Oligocene Epoch



66.6-56  
MYA

56 - 33.9  
MYA

33.9 -  
23.03  
MYA

An "epoch" serves as a reference point from which time is measured



With the disappearance of Dinosaurs Mammals became the dominant animals.



With the dinosaurs and other large reptiles gone, mammals grew in size, numbers, and diversity. They filled ecological niches in the sea, on land and in the air.

Many of the animals that we know today evolved during the Paleogene Period.



Dog



Cat



Bat



Pig



The plants of the Paleogene Period are very similar to the plants that we have on earth today.



By the end of the Paleogene, during the Oligocene Epoch, the climate began to cool. The thick tropical forests would not be able to survive the cooler, drier climate.

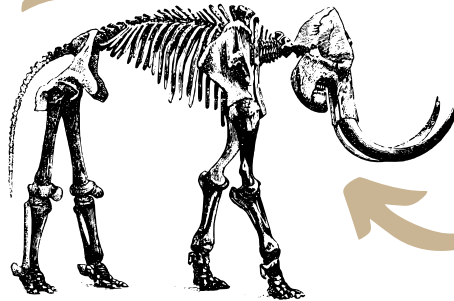


The animals and plants that flourished in the Paleogene would have to adapt or die with the changing climate.

# RISE OF MAMMALS

Many of our modern day animals are related to the first mammals that rose up after the Dinosaurs disappeared. Can you tell which modern animals are related to the prehistoric mammals below?

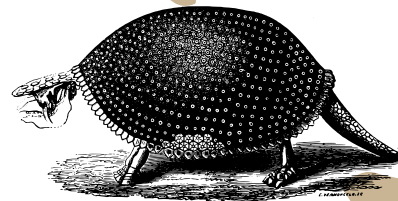
We are not sure why they died. Humans might have hunted them all, or perhaps they were unable to adapt to their changing habitat



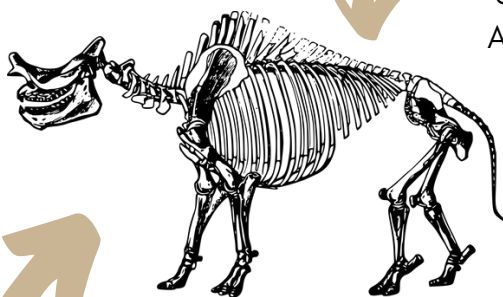
W\_\_\_\_\_ M\_\_\_\_\_

Bone-built dwellings were probably built of mammoth bones by Neanderthals in central Europe

Same size and weight of a Volkswagen Beetle car.



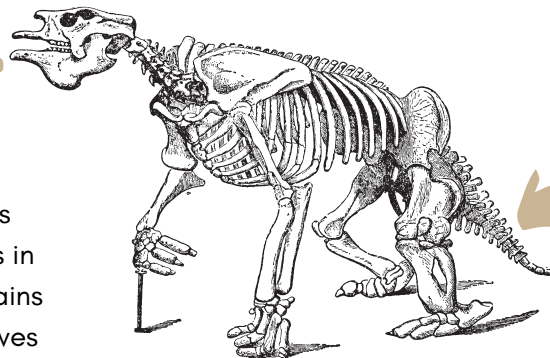
Once roamed the lands of present-day South America and North America



W\_\_\_\_\_ M\_\_\_\_\_

lived from at least 3 million to about 11,700 years ago

Its disappearance is linked to the changes in its habitat. Their remains are often found in caves where they would have been hibernating.



C\_\_\_\_\_ B\_\_\_\_\_

Native to North America and lived there for almost 1 million years

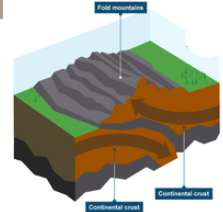
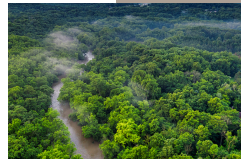
# RISE OF MAMMALS

The Neogene Period was a time of big changes for the earth.

The climate became cooler and drier.

Continents were crashing into each other

Grasslands replaced forests.



Mountains were being pushed up in many places. India continued its push into Asia. This created the Himalayan Mountain Range. Italy moved north into Europe raising the Alps. Spain crashed into France to form the Pyrenees. The Rocky Mountains and the Andes Mountains formed in North and South America during this time.



ScienceDirect.com

Neogene Period is broken into two Epochs:

**Miocene Epoch**  
23-5.3 MYA

**Pliocene Epoch**  
5.3-2.6 MYA

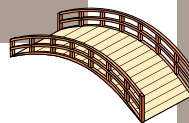
Changes in the plants meant many of the forest dwellers became extinct and new animals developed that could live on the grasses.

Drop in sea levels opened up land bridges between continents. This allowed animals to migrate between continents.

Megalodon first appeared in the Miocene Epoch about 16 million years ago. Megalodon was the largest of all the sharks. It grew to be nearly 50 feet long!



Armadillos, porcupines, ground sloths and opossums migrated from South America to North America. Dogs, cats, bears, and horses from North America crossed into South America.



By the end of the Pliocene Epoch the earth was locked in an Ice Age.

# RISE OF MAMMALS

Cave bear remains are often found in caves - which is the reason Palaeontologist named them cave bears



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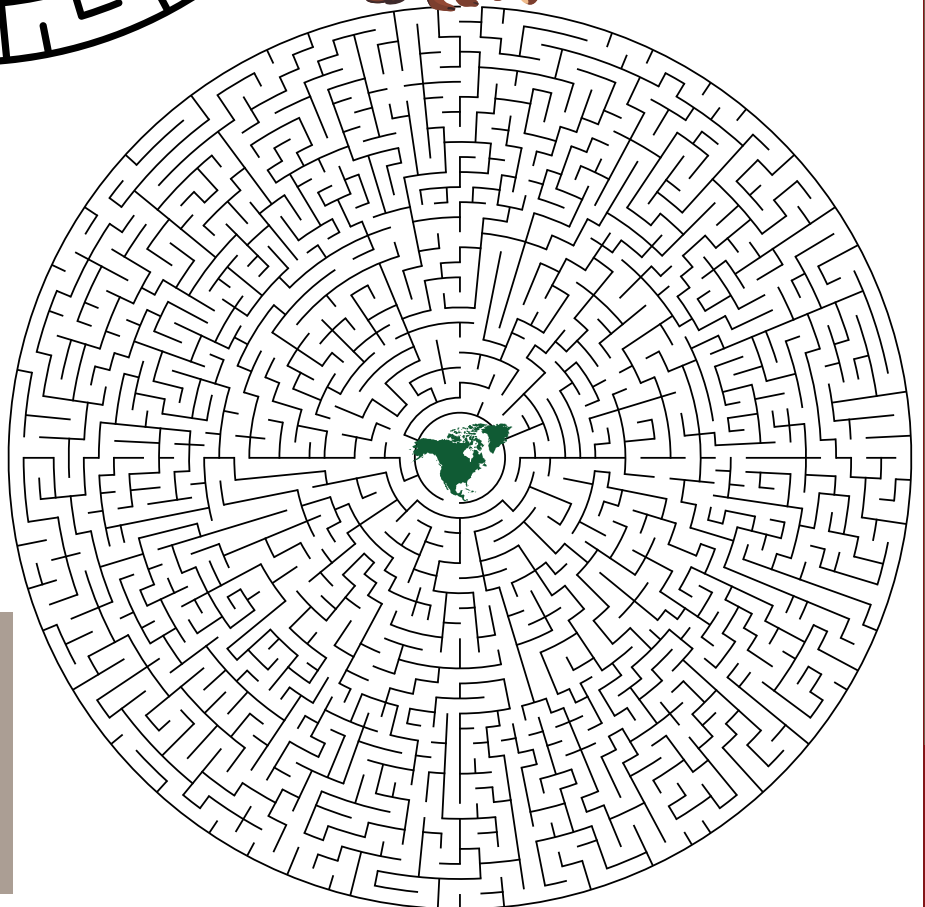
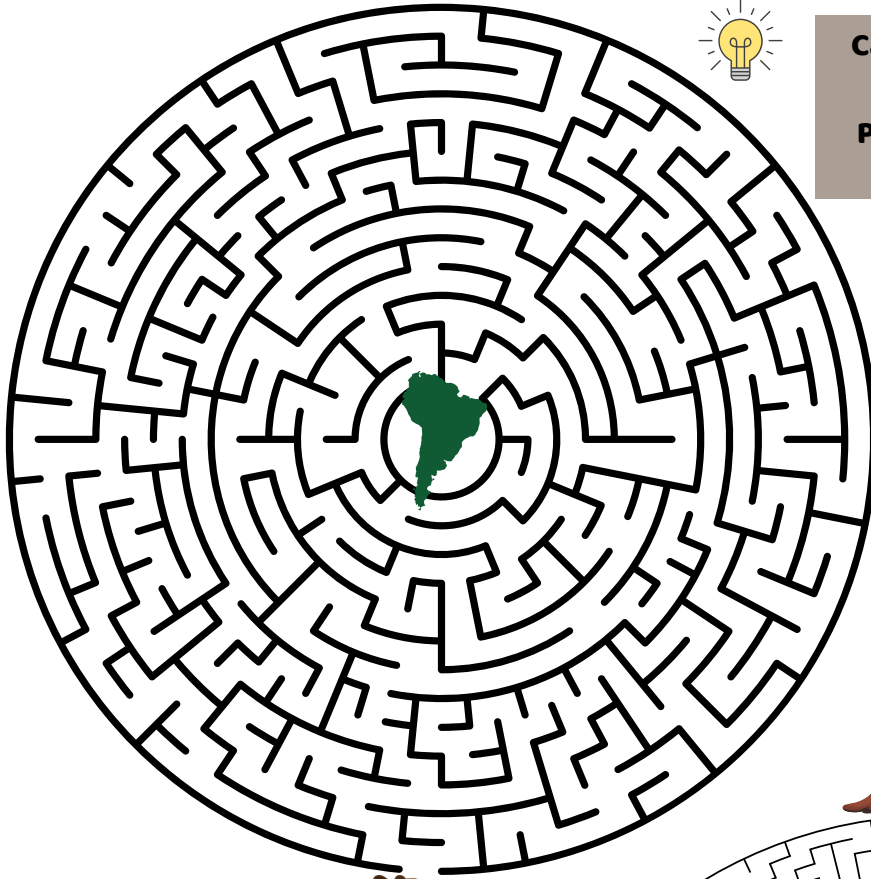
Sloth evolution took place during the late Paleogene and Neogene of South America.



Palaeontologists after looking at the fossils of Cave Bears that they were largely vegetarian.



With islands popping up between the American continents in the Miocene Epoch it allowed for sloths to migrate into North America.



Cenozoic Period 66 Million - Today

Cenozoic Period 66 Million - Today



# RISE OF MAMMALS

The Quaternary Period is the third and last of the three periods of the Cenozoic Era.

In fact you and I are living in this period, which began only 2.58 million years ago.

The Quaternary Period is famous for the many cycles of glacial growth and retreat, the extinction of many species of large mammals and birds, and the spread of humans.

The Quaternary Period is divided into two epochs:

Pleistocene Epoch

Holocene Epoch

The bridge allowed for migration of animals and early humans from one continent to another!

Both Epochs are known for the mammoths and mastodons, giant ground sloths and large predators such as the saber-toothed cat and short-faced bear.



The transition between the Pleistocene and Holocene can be marked by the warming of the climate and the disappearance of the continental glaciers.

We are currently living in the Holocene - currently we are in a period of no glaciers or ice but according to the fossil record we should eventually have another ice age

The Pleistocene Epoch is popularly known as the "Ice Age"

With so much snow and ice building up around the globe it led to a big drop in sea levels. This allowed for land bridges to form between Eurasia and North America



The change in climate caused many of the large mammals like mammoths, mastodons, giant ground sloths, saber-toothed cats, and short-faced bears to go extinct.



With the rise in human activity with fossil fuels it has changed the natural pattern of earth's geological patterns



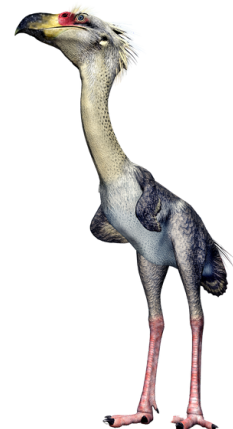


# RISE OF MAMMALS

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**What type of habitat do you think these Cenozoic creatures would have lived in?**

**If you need some hints why not borrow a book from the library!**



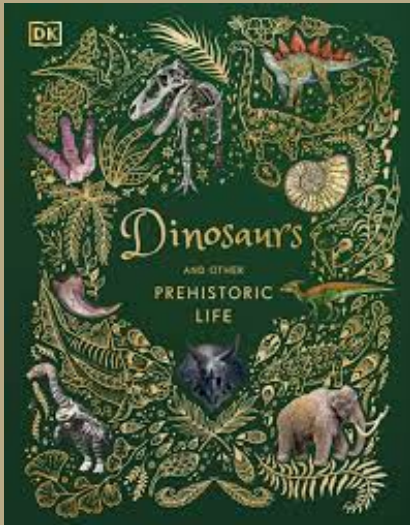
Cenozoic Period 66 Million - Today

Cenozoic Period 66 Million - Today

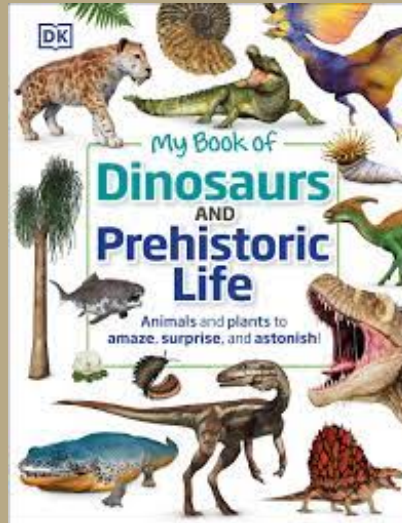
# LEARN MORE!

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

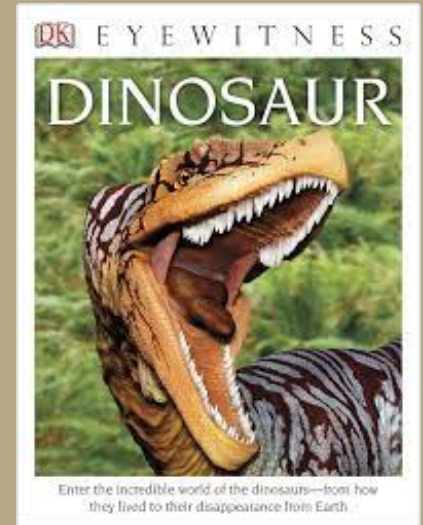
## GREAT BOOKS



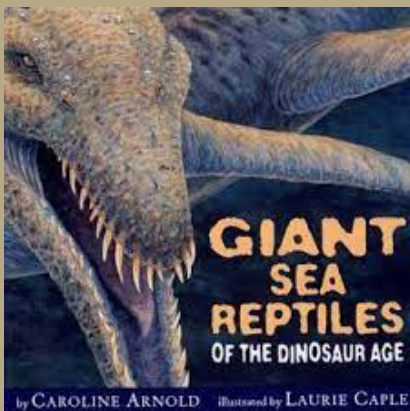
J 567.9 CHI



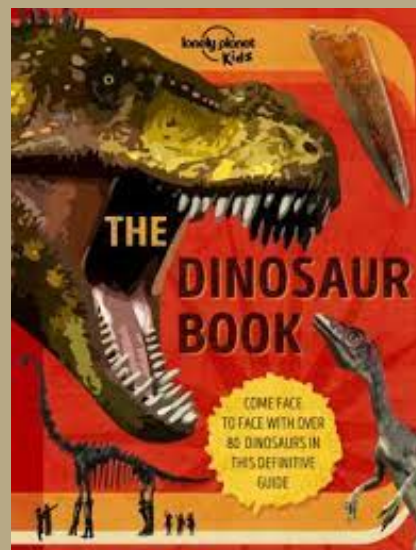
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