

# Earth Time Line

Background: Scientists have developed a time scale for earth history called the Geologic Time Scale. This scale outlines the major events in Earth's history. Scientists use the principle of superposition, radiometric dating, and the fossil record to create the scale.

Goal:

Construct an Earth time line that shows major time divisions and major earth events using the following materials:

- Paper tape
- Scissors
- Metric ruler
- Table of Major Earth Events (provided on back)

Use the following scale for your model: 1 millimeter = 1 **million** years before present. (1mm = 1mybp).

Step 1: Use the above scale for your model and the age of Earth (4,600 mybp) to determine how long your paper tape needs to be.

Length of paper tape in millimeters = 4,600 millimeters

Length of paper tape in centimeters = 460 centimeters

Length of paper tape in meters = 4.6 meters

Step 2: Measure and cut the paper tape. Decide which end of the paper tape is today (0 mybp) and which end is the beginning of Earth (4,600 mybp).

Step 3: Use the information in the table below to show the four major time eras on your time line. Always measure from the "today" end of the tape. Color and label each era.

<b>Era</b>	<b>Time Range in mybp</b>	<b>Color</b>
Cenozoic	0-66	yellow
Mesozoic	66-251	green
Paleozoic	251-542	blue
Precambrian	542-4,600	red

Step 4: Add the key events information given on the Geologic Time Scale to your time line in the correct location. You may need to write very small and/or use arrows to label some key events.

Eon	Era	Period	Epoch	Key events
Phanerozoic	Cenozoic	Quaternary	Holocene	
		2.6 my	Pleistocene	<i>Homo sapiens</i> appears ~200,000 yrs
		Neogene	Pliocene	First species of <i>Homo</i> appear ~2.5 mybp
			Miocene	Beginning of Ice Ages ~2.6 mybp
		Paleogene	Oligocene	First species of hominids appear ~6 mybp
			Eocene	
	Paleocene			
	Mesozoic	65.5 million		<i>Late Cretaceous Mass Extinction</i> Chicxulub crater forms ~65.5 mybp
		Cretaceous		
		145.5 my		Flowering plants appear ~142 mybp Birds appear ~150 mybp
		Jurassic		
		200 my		<i>Late Triassic Mass Extinction</i> Mammals appear ~210 mybp Dinosaurs appear ~225 mybp
		Triassic		
	Paleozoic	251 million		<i>Late Permian Mass Extinction</i>
		Permian		
		299 my		Reptiles appear ~305 mybp
		Pennsylvanian		
		318 my		
		Mississippian		
		359 my		<i>Late Devonian Mass Extinction</i> Amphibians appear ~365 mybp
Devonian				
416 my			Land plants appear ~425 mybp	
Silurian			<i>Late Ordovician Mass Extinction</i> Insects appear ~450 mybp	
444 my				
Ordovician		Bony fish appear ~485 mybp		
488 my				
Cambrian				
Proterozoic	"Precambrian"	542 million		Beginning of Cambrian explosion ~530 mybp First Multicellular Organisms ~630 mybp
				Oxygen begins to accumulate in atmosphere ~2,000 mybp
Archean	"Precambrian"	2.5 billion		
				First one-celled organisms ~3,500 mybp
				Earliest evidence of oceans ~3,800 mybp
				Oldest known rocks ~4,000 mybp
		4.6 billion		Moon forms ~4,500 mybp Formation of Earth ~4,600 mybp

Highlights of the history of the Earth. Time is not drawn to scale.

## Earth Time Line Analysis

Refer to the Earth Time Line you constructed to answer the following questions.

1. Arrange the four eras in order from longest to shortest duration.

**Precambrian; Paleozoic; Mesozoic; Cenozoic**

2. During which era did the first life forms exist and what were they like?

**Precambrian; one-celled organisms**

3. How many millions of years went by after Earth formed before the first life forms appeared?

**1100 million**

4. Were mammals and dinosaurs ever on Earth at the same time? If so, when?

**Yes, during the Mesozoic Era**

5. What is a "mass extinction"?

**Episode during which a large number of organisms become extinct.**

6. How many mass extinctions have there been and what caused them?

**5; global cooling/sea level drop (3 times), volcanism, meteorite impact**

7. What relationship do you see between mass extinction and the start of the Mesozoic and Cenozoic eras?

**A mass extinction occurred at the start of each era.**

8. Did the mass extinction 66 mybp kill off **all** of the bacteria, fish, amphibians, birds, mammals, and flowering plants? How do you know?

**No, these species are present on the planet today.**

9. The Pleistocene Ice Age ended about 10,000 years ago. Are humans able to survive an ice age? How do you know?

**Yes, Homo sapiens were present on earth during the ice ages.**

10. How long have humans been on Earth relative to all of Earth time?

**A very short period of time.**