

Making a Geologic Time Line



Problem/Question

How old is the Earth? What events are defining points in the Earth's History? How can we model the history of the Earth?

Background:

Most geologists agree that the Earth is approximately 4.6 Billion years old. This vast time period can be represented by using a geologic time scale. It is difficult, however, for a geologic time scale to show the relative lengths of the epoch and periods. You can draw a geologic time line to help you better understand the duration of geologic events.

Objectives:

- Compare and contrast the relative lengths of the geologic eras and periods.

Materials:

- 5-meter length of adding machine tape
- Meter stick
- pencil (colored pencils if possible)

Procedure:

1. Obtain a piece of adding machine tape about 5 m long. Measure 10 cm from one end of the tape and draw a line across the tape. Write your names in the 10-cm space.
2. Label the line at 10 cm **NOW**. Write this label on the 10-cm side of the line. All of your measurements will be made from this line that indicates the present.
3. Measuring from your **NOW** line, mark off your tape in 1-m intervals. At each interval make a line on your tape. Label the lines 1 billion (the line closest to the **NOW** line), 2 billion, 3 billion, and 4 billion.
4. Measuring from your **NOW** line and using the scale 1 m = 1 billion years, plot on your tape the events listed in the table below. At each measurement draw a straight line across the tape. Label each line with the number of years and the name of the event. For example, the oldest event listed in the table is the origin of Earth 4.6 billion years ago. To plot it on your tape, measure 460 cm (4 m + 60 cm) from the **NOW** line. Draw a line across the tape and label it 4.6 Billion—Origin of the Earth.
5. On your new scale, label and draw pictures to represent the following events: age of the oldest rocks, occurrence of the first single-celled organisms, the first multi-celled organisms, the age of fishes, the first reptiles, the first bird, and the first human. Do the same for five more events of your choosing. (you may need to do some research in order to accomplish this step)

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Geologic Eras, Periods and Epochs	
Number of Years Ago	Event
11 thousand	End of Ice Age
2 million	Beginning of Pleistocene
3.5 million	Hominid footprints in Footprint Tuff
5 million	Beginning of Pliocene Epoch
23 million	Beginning of Miocene Epoch
38 million	Beginning of Oligocene Epoch
53 million	Beginning of Eocene Epoch
66 million	Beginning of Cenozoic Era and Paleocene Epoch
135 million	Beginning of Cretaceous Period
200 million	First mammals
213 million	Beginning of Jurassic Period
225 million	First Bird
248 million	Beginning of Mesozoic Era and Triassic Period
290 million	Beginning of Permian Period
320 million	Beginning of Pennsylvanian Period
350 million	Beginning of Mississippian Period
410 million	Beginning of Devonian Period
435 million	Beginning of Silurian Period
560 million	Beginning of Paleozoic Era and Cambrian Period
1.2 billion	First known animals
2.5 billion	Beginning of Proterozoic Era
3.5 billion	Oldest known rocks
3.8 billion	Beginning of Archeozoic Period
4.6 billion	Origin of Earth

Analysis/Conclusions

Directions: Answer each of the following on a separate sheet of paper.

- Which two events on your tape are separated by the longest duration of time? By how many years are they separated?
- From your tape, determine the duration of each of the following:
 - Archeozoic Era
 - Proterozoic Era
 - Paleozoic Era
 - Mesozoic Era
 - Cenozoic Era
- Which of the following eras listed in question 2 was the longest? Which was the shortest?
- Dinosaurs lived only during the Mesozoic Era. If geologic time started 4.6 billion years ago, during what percentage of geologic time did dinosaurs exist?
- If the age of the Earth was one 24-hour day, how many seconds would have elapsed since humans appeared?