

Geologic Time Scale Activity

Introduction

Geologic time covers a very large span of years. Though much of geologic time was without life, geologic interpretation often involves the observation of fossils, the remains or evidence of living things. Fossil evidence often tells its own story and, in the process, presents valuable information on the appearance of different kinds of life.

The geologic time scale is a type of classification system based on fossil evidence and geologic events. The time scale is a model that organizes many years of evidence and interpretation to help you understand the history of the Earth.

Geologic time has been divided into categories. These categories were defined by the type of plant and animal life that existed at the time. The largest divisions are eons. Each eon is divided into eras. Eras are divided into periods. Periods are divided into epochs. There are more divisions the closer we get to current times since there was more variety of life and since there is more fossil evidence of that life.

Objectives:

- To identify and understand the divisions of the geologic time scale.
- To analyze what geological and biological changes have occurred throughout geologic time.
- To create a scale model of the geologic time scale to describe the different eras and periods.

Procedure:

1. Look at the chart on the back of this paper which shows the eras and periods and when each started in time. You may also use your Chromebook to find more images of organisms which were common during these time segments.

<http://www.zo.utexas.edu/faculty/sjasper/images/25T.1.gif>

<https://ucmp.berkeley.edu/help/timeform.html>

2. Obtain 5 meters of paper tape for each lab group.
3. For 4.6 billion years to fit on 5 meters of paper, **1 million years = 1 millimeter**.
4. Using this scale, calculate where each time division will be on the paper tape. Fill out the chart on your data sheet to help you.
5. Draw a line (using different colors for each time division) to show the start of each era and period.
6. Also label the lines with the names of each era and period and how many million years ago when each started.
7. Illustrate or make brief notes on the paper tape showing the life forms of each time period.
8. Answer the conclusion questions at the end.

The Geologic Time Scale

| Relative Time Span of Eras | Era | Period | Epoch | Age (Millions of Years Ago) | Some Important Events in the History of Life |
|----------------------------|-------------|------------|---------------|-----------------------------|---|
| Cenozoic | Cenozoic | Quaternary | Recent | | Historical time |
| | | | Pleistocene | 0.01 | Ice ages; humans appear |
| Mesozoic | Cenozoic | Tertiary | Pliocene | 1.8 | Apelike ancestors of humans appear |
| | | | Miocene | 5 | Continued radiation of mammals and angiosperms |
| | | | Oligocene | 23 | Origins of many primate groups, including apes |
| | | | Eocene | 35 | Angiosperm dominance increases; continued radiation of most modern mammalian orders |
| | | | Paleocene | 57 | Major radiation of mammals, birds, and pollinating insects |
| | | | | 65 | Flowering plants (angiosperms) appear; many groups of organisms, including dinosaurs, become extinct at end of period (Cretaceous extinctions) |
| Mesozoic | Mesozoic | Cretaceous | | 144 | Gymnosperms continue as dominant plants; dinosaurs abundant and diverse |
| | | | Jurassic | 206 | Cone-bearing plants (gymnosperms) dominate landscape; radiation of dinosaurs |
| | | | Triassic | 245 | Extinction of many marine and terrestrial organisms (Permian mass extinction); radiation of reptiles; origins of mammal-like reptiles and most modern orders of insects |
| Paleozoic | Paleozoic | Permian | | 290 | Extensive forests of vascular plants; first seed plants; origin of reptiles; amphibians dominant |
| | | | Carboniferous | 363 | Diversification of bony fishes; first amphibians and insects |
| | | | Devonian | 409 | Diversity of jawless fishes; first jawed fishes; diversification of early vascular plants |
| | | | Silurian | 439 | Marine algae abundant; colonization of land by plants and arthropods |
| | | | Ordovician | 510 | Radiation of most modern animal phyla (Cambrian explosion) |
| | | | Cambrian | 543 | Diverse soft-bodied invertebrate animals; diverse algae |
| Precambrian | Precambrian | | | 600 | Oldest fossils of eukaryotic cells |
| | | | | 2,200 | Atmospheric oxygen begins to increase |
| | | | | 2,700 | Oldest fossils of cells (prokaryotes) |
| | | | | 3,500 | Earliest traces of life |
| | | | | 4,600 | Approximate time of origin of Earth |

Geologic Time Scale Activity Name _____ Period _____

Time scale data sheet:

| ERA | PERIOD | MILLIONS OF YEARS AGO | SCALE DISTANCE |
|-------------|---------------|------------------------------|-----------------------|
| Precambrian | | 4600-543 = 4057 | 4000 mm = 4 meters |
| Paleozoic | Cambrian | 543-510 = 33 | 33 mm = 3.3 cm |
| | Ordovician | 510-439 = 71 | 71 mm = 7.1 cm |
| | Silurian | | |
| | Devonian | | |
| | Carboniferous | | |
| | Permian | | |
| | Mesozoic | Triassic | |
| Jurassic | | | |
| Cretaceous | | | |
| Cenozoic | Tertiary | | |
| | Quaternary | 1.8-0= 1.8 | 1.8 mm |

Conclusion Questions:

1. At the beginning of what period did there appear to be a dramatic increase in the number and diversity of life forms?
2. When did plants first appear? How far along the tape is that?
3. When did animals begin to invade the land? How far along the tape is that?
4. What periods were dinosaurs around?
5. Which period do you think is called the “Age of Man”?