Life History

Significant developments and extinctions of plant and animal life can be explained on the geologic time scale.

Scientists have developed a model of the history of life on Earth called the geologic time scale.

The geological time scale is based on studies of Earth’s geology and the fossil record.

- Most of Earth’s changes have occurred slowly, over millions of years.
- But occasionally, Earth’s history has been interrupted by catastrophes such as massive volcanic eruptions or meteor impacts.
- These events had a significant effect in shaping Earth’s surface and on the evolution of life.

Paleontologists divide the geologic time scale into blocks of time called eras and periods.

- Eras are determined by the dominant life forms that were present at the time.
- Each era is divided into smaller blocks of time called periods.
- Periods are based on types of fossils found within each era.

Geological History

Precambrian Time

4.6 BYA - 570 MYA
The atmosphere lacked oxygen, but was abundant in carbon monoxide, carbon dioxide, hydrogen, and nitrogen.

- Meteorites crashed on Earth and radiation bombarded the planet.

Thunderstorms and volcanic eruptions were constant.

Ultimately, from nonliving matter, life on Earth formed.
- The first cells, prokaryotes, appeared more than 3 billion years.
- Prokaryotes are organisms whose DNA is not contained within a nucleus.
- These first living organisms were anaerobic - they didn’t need oxygen.

Eventually, photosynthetic bacteria (cyanobacteria) evolved and began to add oxygen to Earth’s atmosphere.
- Some of that oxygen reached Earth’s upper atmosphere and formed the ozone layer blocking harmful radiation from the sun.

Then, about 2.1 billion years ago, the first eukaryotic cells appeared.
- Eukaryotes are organisms much larger than prokaryotes, and their DNA is contained within a nucleus.

The Paleozoic Era
542 to 251 MYA
Paleozoic is a Greek word meaning “ancient life.”

Rocks dated from the Paleozoic era contain fossils of trilobites, snails, clams, and corals.

- Early in the era, many new, complex life forms developed, but glaciers covered the Earth in the Ordovician period, causing many of these new organisms to become extinct.

Fish, the earliest animal with a backbone, appeared during this time period.

Next, plants and air-breathing animals began to populate the land.

- Toward the end of the Paleozoic era, much of the land was covered with forests of palm trees and giant ferns.

By the end of the era, insects and amphibians had appeared.

Therapsids are a group of animals that dominated the land in the Permian period.

- Scientists believe that mammals evolved from therapsids.
Mesozoic era
251 to 65 MYA

Mesozoic is a Greek word meaning “middle life.”
• This era is often called the Age of Reptiles.

Dinosaurs are the most well-known reptiles of the Mesozoic era and dominated Earth for about 150 million years.

The Jurassic period was marked by the appearance of the first birds.

Flowering plants evolved during the Cretaceous period.

• By the end of the period, there were many that we would recognize today, such as magnolias and water lilies.

At the end of the Mesozoic era, 65 ya, geologic evidence indicates that a giant meteor hit Earth creating a humongous dust cloud and worldwide fires.
Much of the sunlight was blocked out causing many plants to die out.

- The plant-eating dinosaurs and subsequently the meat-eating dinosaurs died.
- Global temperatures dropped for many years.

Cenozoic Era
65 MYA to present

Cenozoic means “recent life.”

- Fossils from the Cenozoic era are closest to Earth’s surface, making them easier to find.
- Therefore, scientists have the most information about life in this era.

The Cenozoic era is often called the Age of Mammals because many species of mammals appeared.

- Eohippus appeared in the Cenozoic era.

The first human ancestors appeared about 4 million years ago.

- Modern humans appeared 100,000 years ago during the Quaternary period.

The Bushmen of southern Africa are believed to be direct descendants of the first evolved Homo sapiens over 100,000 years ago.