UNIT SIX: Earth's Structure

- Chapter 18 Earth's History and Rocks
- Chapter 19 Changing Earth
- Chapter 20 Earthquakes and Volcanoes

Chapter Eighteen: Earth's History and Rocks

- 18.1 Geologic Time
- 18.2 Relative Dating
- 18.3 The Rock Cycle

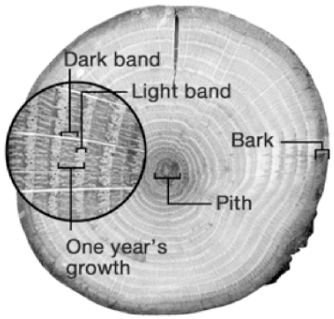
18.1 Learning Goals

- Discuss the events associated with periods of Earth's history.
- Apply knowledge of isotopes to explain how radiometric dating is used to find out Earth's age.
- Analyze cross-sections and cores of trees to learn about their histories and ages.

Investigation 18A

Time and Tree Rings

- **Key Question:**
  Do tree rings tell a story?



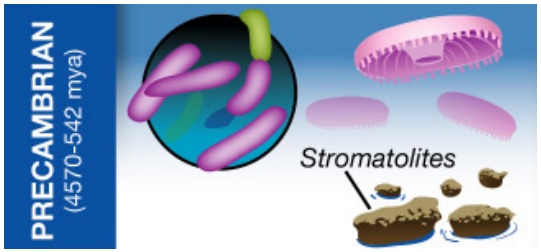
18.1 Geologic Time

- Scientists have developed a model of the history of life on Earth called the geologic time scale.
- Paleontologists divide the geologic time scale into blocks of time called eras and periods.

TIME	
Units for One Day	Units for Geologic Time
One **day** is divided into...	One **eon** is divided into...
hours which are divided into...	**eras** which are divided into...
minutes.	**periods.**

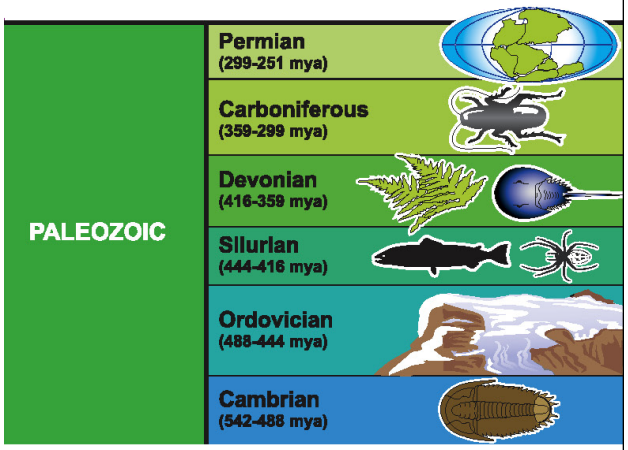
18.1 Precambrian era

- The Precambrian era lasted from Earth's formation 4750 until 542 million years ago (mya).
- The first cells appeared in the Precambrian era.



18.1 Paleozoic era

- The Paleozoic era lasted from 542 to 251 mya.
- Paleozoic is a Greek word meaning "ancient life."

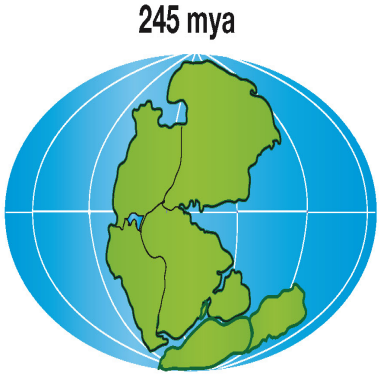


18.1 Paleozoic era

- Rocks from the Paleozoic Era contain fossils of snails, clams, corals, and trilobites.

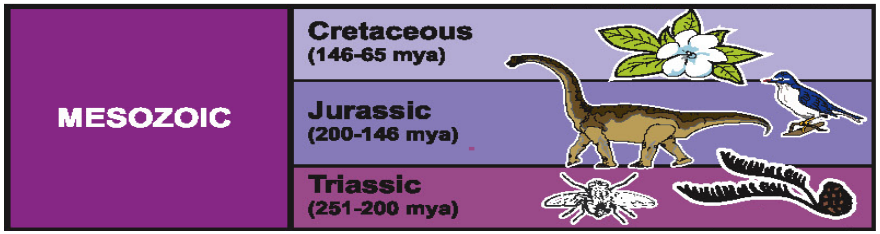
18.1 Paleozoic era

- Animals with backbones began to appear during the Paleozoic Era.
- At the end of this era, the continents that existed during this time period collided to form a new



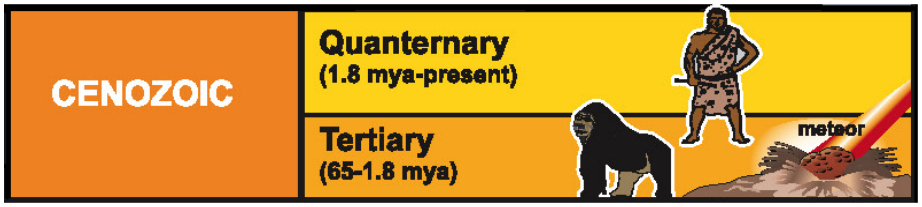
18.1 Mesozoic era

- The Mesozoic era lasted from 251 to 65 mya.
- This era is often called the Age of Reptiles.

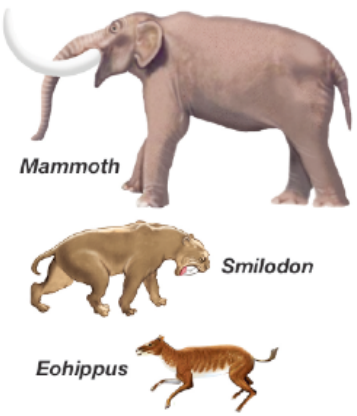


18.1 Cenozoic era

- The Cenozoic era began 65 mya and is still going on.
- The common name for the Cenozoic Era is the Age of Mammals.

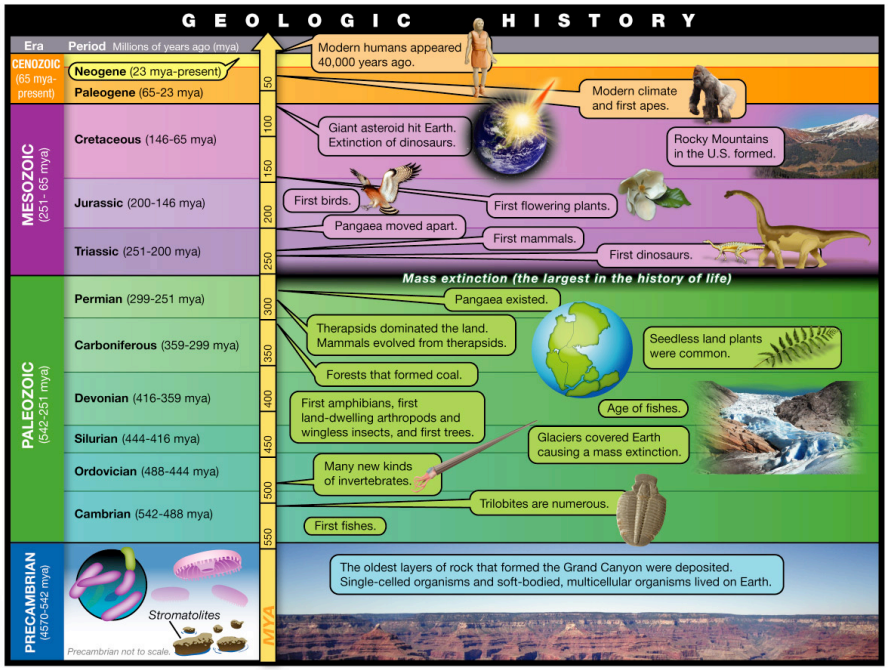


18.1 Cenozoic era



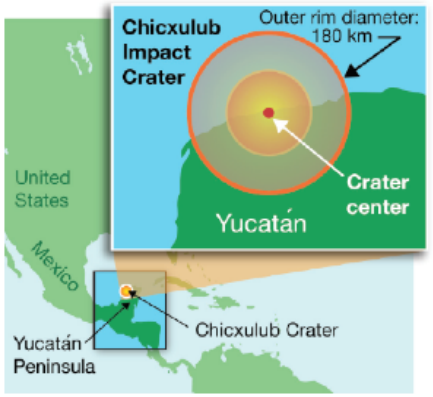
- Mammals diversified into a variety of species including land mammals, sea mammals, and flying mammals.
- Cenozoic means "recent life."

Earth's Geologic History



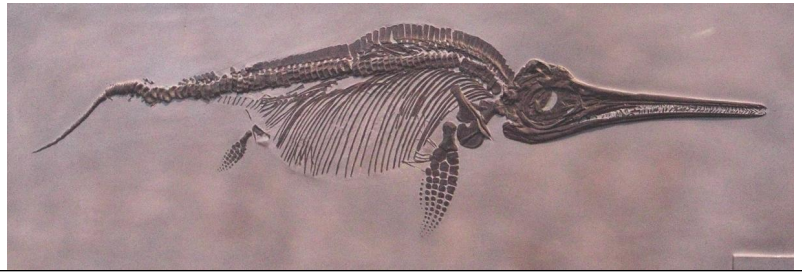
18.1 Mass extinction

- Scientists have evidence that a large asteroid crashed near Mexico's Yucatan peninsula about 65 mya.
- The resulting climate change may have caused the extinction of Mesozoic Era reptiles, including most dinosaurs.



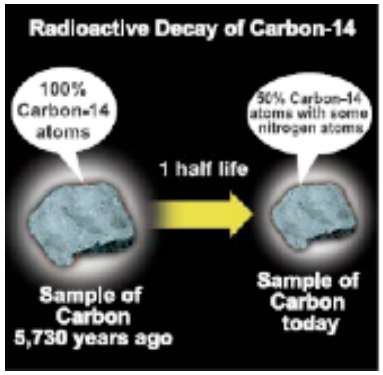
18.1 Absolute Dating

- **Absolute dating is a method of measuring the age of an object such as a rock or fossil in years.**
- **Scientists use both absolute and relative dating to develop the geologic time scale.**



18.1 Absolute Dating

- Radioactive decay refers to how unstable atoms lose energy and matter over time.
- As a result of radioactive decay, an element turns into another element over a period of time.



Carbon turns in to nitrogen over time.

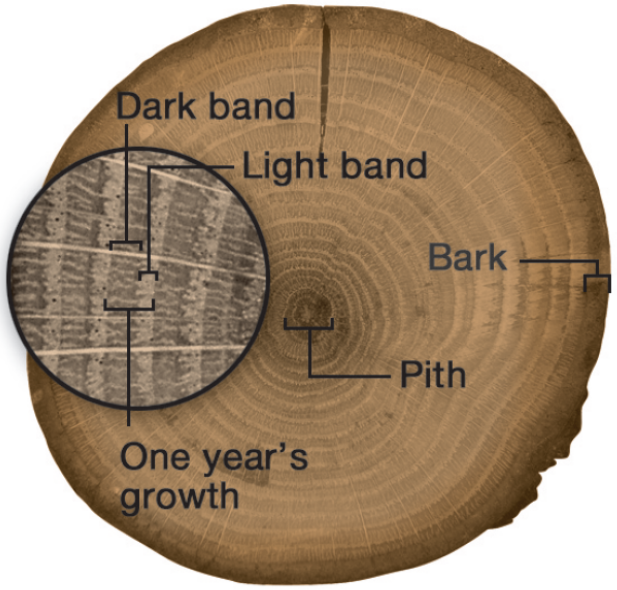
18.1 The half life of uranium

- Scientists know that it takes 4.5 billion years for one half of the uranium atoms in a specimen to turn into lead.
- We say that 4.5 billion years is the half-life for the radioactive decay of uranium.

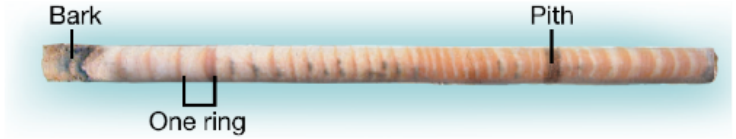
18.1 Trees and absolute dating

- A tree grows one tree ring for every year that it is alive.
- Andrew Douglass (1867–1962) was an astronomer who discovered the significance of tree rings.
- In the early 1900s, Douglass hypothesized that trees might record

A Cross-Section of a Tree



18.1 Trees and absolute dating

- 

- Each tree ring is a record of what the environment was like that year.
- Wide tree rings indicated a very wet year and narrow rings indicated a dry year.
- Douglass named this new field of science dendrochronology.

18.1 Trees and absolute dating

- The oldest tree on record is a bristlecone pine called “Methuselah.”
- It is 4,765 years old.
- These trees grow in the mountains of California.

Bristlecone pine trees grow very slowly.