

A photograph of Earth from space, showing the Western Hemisphere. North and South America are visible, surrounded by swirling white clouds. The blue of the oceans is prominent. The image is a circular view of the planet.



Are you Geo-Experienced Quiz



Fields of Geology

- Engineering
- Environmental
- Geochemistry
- Geomorphology
- Hydrogeology
- Geophysics
- Paleontology
- Volcanology
- Glaciology
- Sedimentology
- Petrology
- Biogeochemistry
- Petroleum geology
- Seismology
- Oceanography
- Limnology
- Speleology
- Geoarchaeology
- Geochronology
- GIS
- Park Ranger/Interpreter



Why study geology?

Natural Disasters

FLOODING

Drinking water

Natural Resources

Energy

Climate Change

Environmental Sustainability

Human civilization

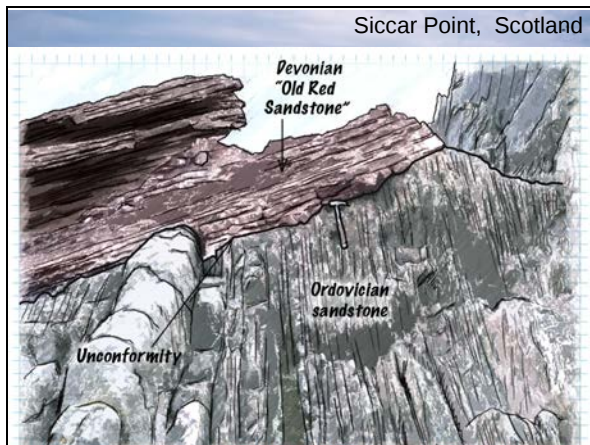
Big Idea

- Earth Scientists use repeatable observations and testable ideas to understand and explain our planet.



Pioneers of Geologic Time







Nicolas Steno

A. Deep time

B. Mineralogy



BIG IDEA

The Earth is 4.6 billion years old



Clair Patterson
Mitchellville, Iowa

Some consider him the most influential geologist of the century!

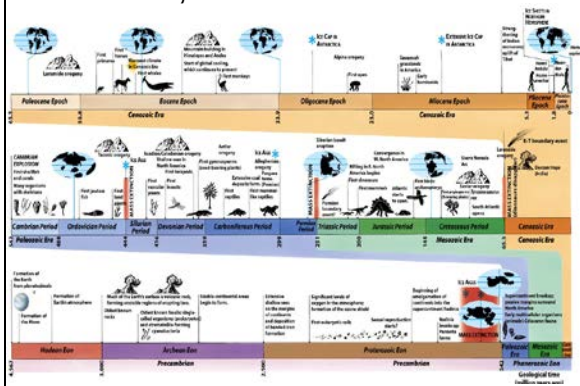


TABLE 12.1 Isotopes Used in the Radiometric Dating of Rocks

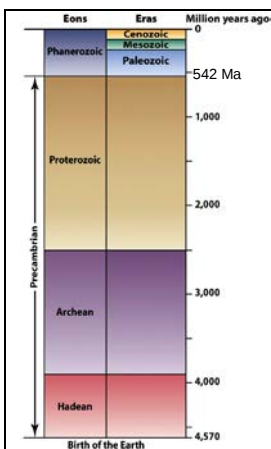
Parent → Daughter	Half-Life (years)	Minerals in which the Isotopes Occur
$^{147}\text{Sm} \rightarrow ^{143}\text{Nd}$	106 billion	Garnets, micas
$^{87}\text{Rb} \rightarrow ^{87}\text{Sr}$	48.8 billion	Potassium-bearing minerals (mica, feldspar, hornblende)
$^{238}\text{U} \rightarrow ^{206}\text{Pb}$	4.5 billion	Uranium-bearing minerals (zircon, apatite, uraninite)
$^{40}\text{K} \rightarrow ^{40}\text{Ar}$	1.3 billion	Potassium-bearing minerals (mica, feldspar, hornblende)
$^{235}\text{U} \rightarrow ^{207}\text{Pb}$	713 million	Uranium-bearing minerals (zircon, uraninite, apatite)

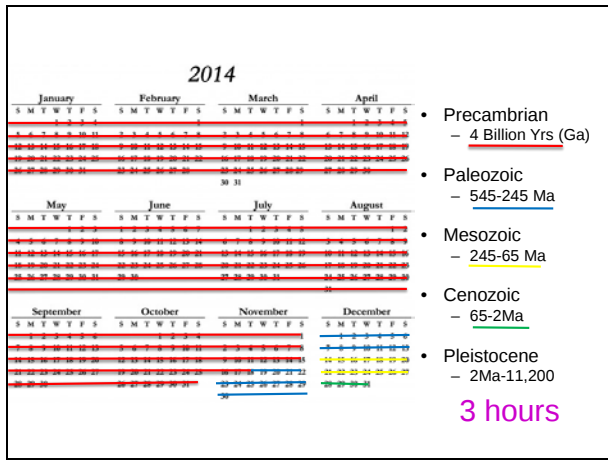
Sm = samarium, Nd = neodymium, Rb = rubidium, Sr = strontium, U = uranium, Pb = lead, K = potassium, Ar = argon

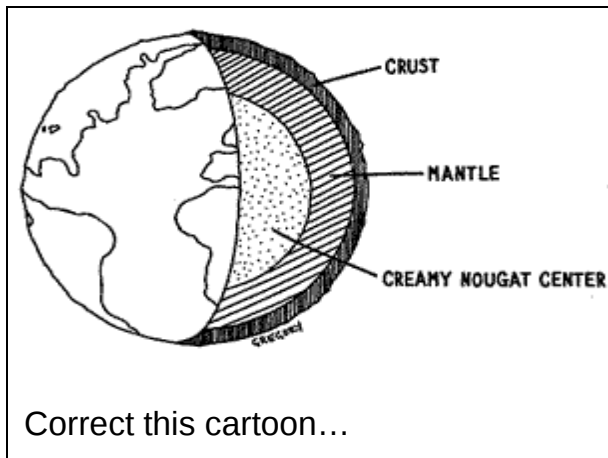
Time, it's all relative.....

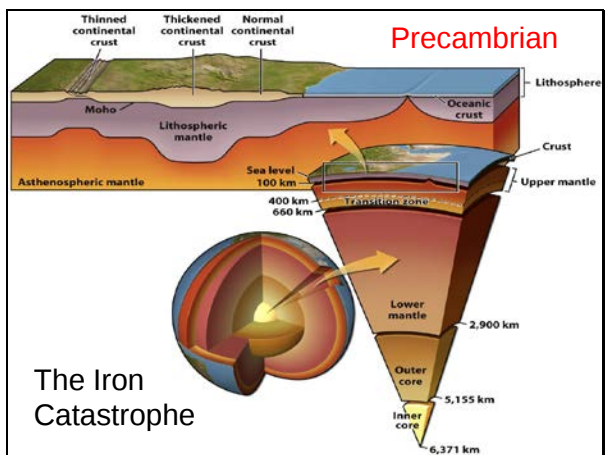


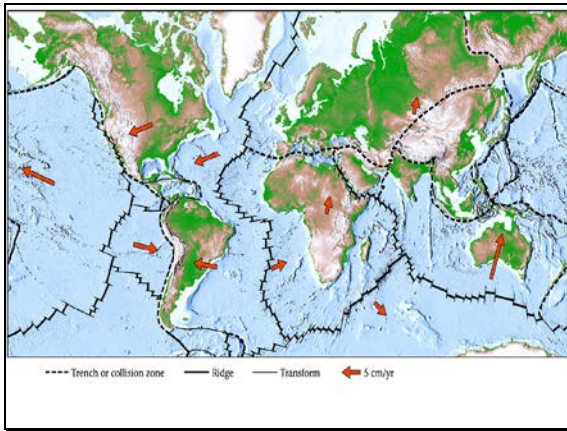
Geologic Time

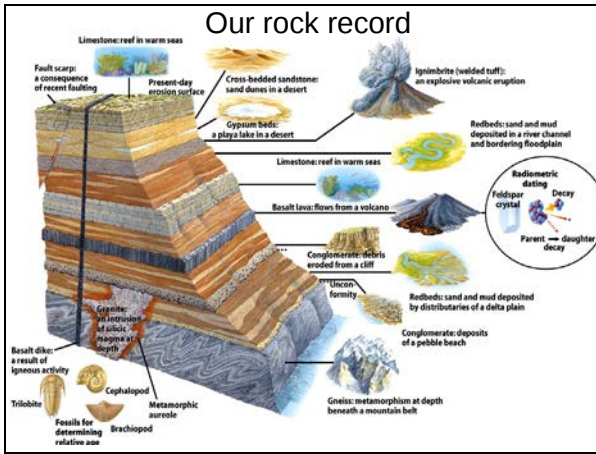


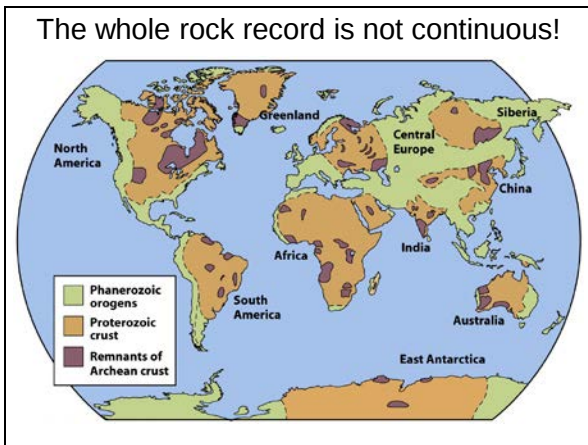


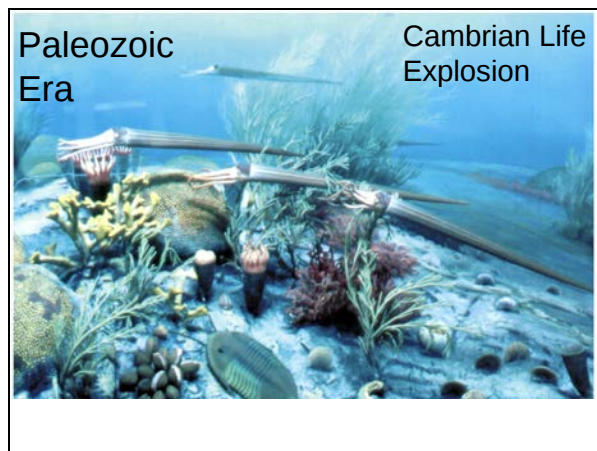
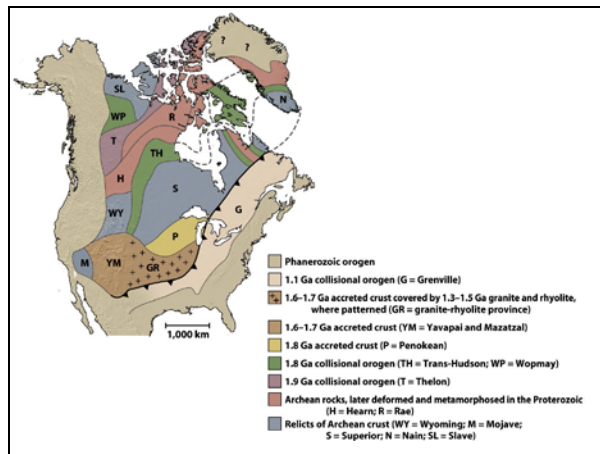




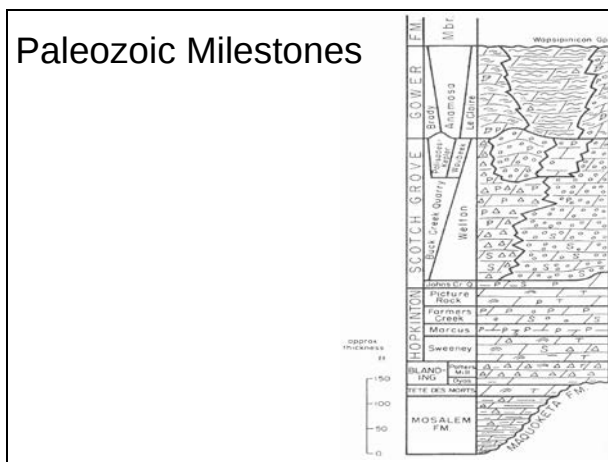
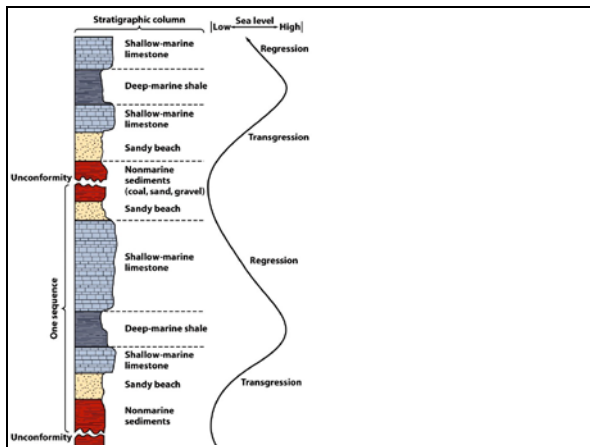
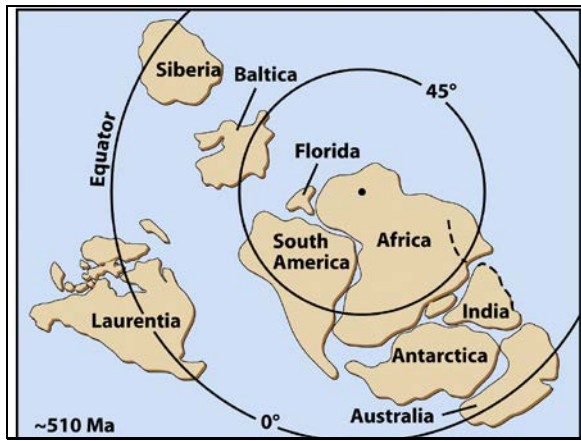






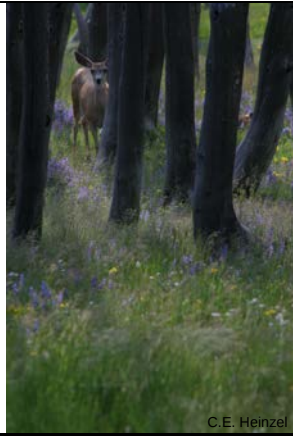


Cambrian Life Explosion



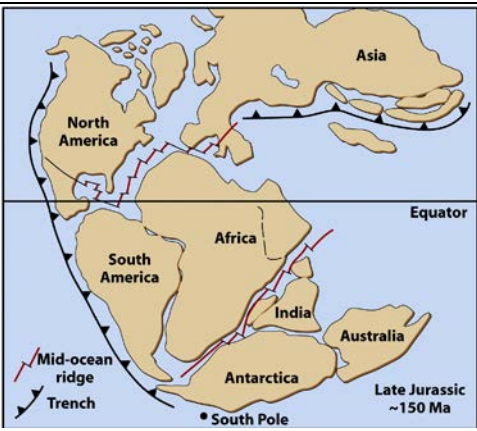
Big Idea

The Earth is a complex and **dynamic** system of interacting rock, soil, water, air, and life.



C.E. Heinzel

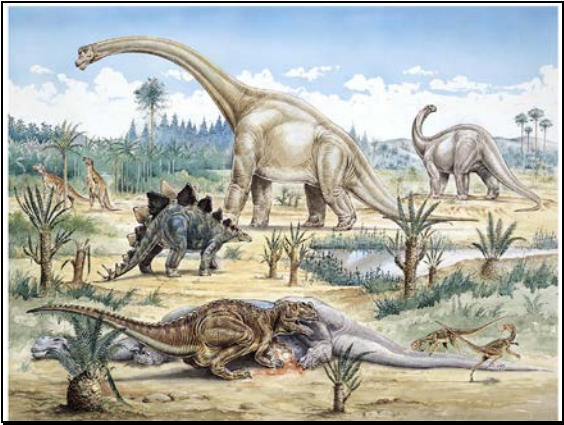
Mesozoic Era

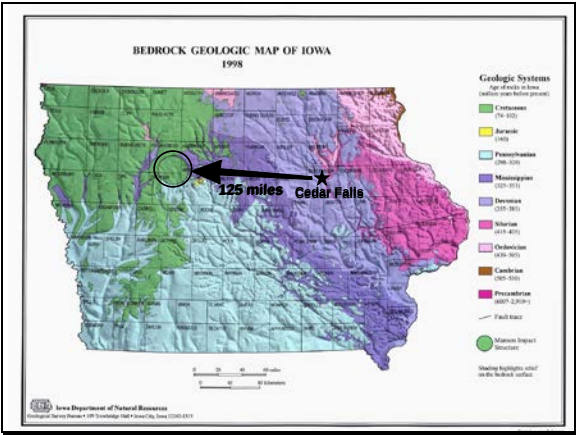


Big Idea

- The Earth is constantly changing







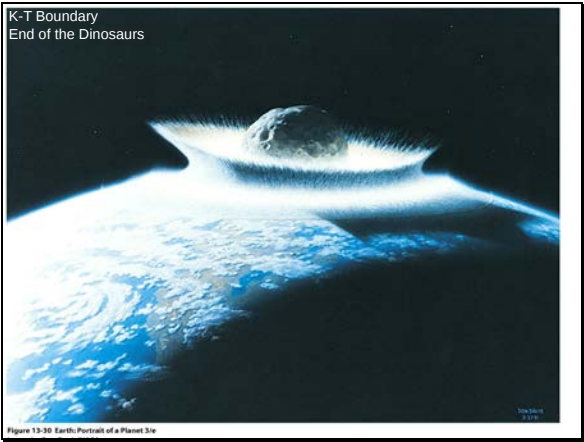
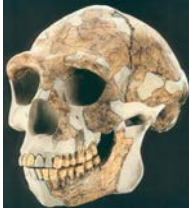


Figure 13-30 Earth: Portrait of a Planet 5e



Erectus



About 1.1 minutes

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-
-
-
-
-

- End of Ordovician (440 Ma)
- Late Devonian (375 Ma)
- End Permian (252 Ma)
- End Triassic (201 Ma)
- End Cretaceous (66 Ma)

Big idea

- Humans are capable of significantly altering the Earth.