







What Scientists Think

- Believe the Earth is over **4.6 Billion** years old.
- Believe early Earth was hot, water vapor, little oxygen, carbon dioxide and nitrogen gases.
- Use fossils for clues to the past
- A **fossil** is any preserved evidence of an organism.
- Most organisms DO NOT become fossils.

Fossil Formation

- Nearly all fossils are formed in sedimentary rock. (fossils do not form in igneous or metamorphic rock)
- The organism will leave either an impression (outline) in the rock, or minerals will fill in the empty pores and leave hard bone or tissue.
- This happens as the organism decays after it dies.



Categories of Fossil Types						
Category	Trace fossil	Molds and casts	Replacement	Petrified or permineralized	Amber	Original material
Example						
Formation	A trace fossil is any indirect evidence left by an organism. Footprints, burrows, and fossilized feces are trace fossils.	A mold is an impression of an organism. A cast is a mold filled with sediment.	The original material of an organism is replaced with mineral crystals that can leave detailed replicas of hard or soft parts.	Empty pore spaces are filled in by minerals, such as in petrified wood.	Preserved tree sap traps an entire organism. The sap hardens into amber and preserves the trapped organism.	Mummification or freezing preserves original organisms.

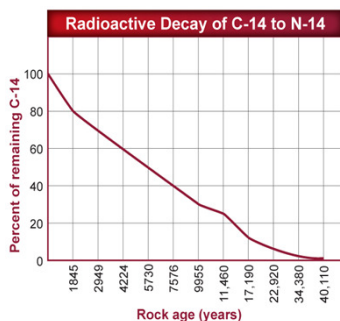
Dating fossils

- **Relative dating** is a method used to determine the age of rocks by comparing them with those in other layers.
- Younger layers are towards the top, and the older layers are towards the bottom. (law of superposition)
- Which layer shows aquatic early fossils?



Radiometric Dating

- Uses the decay rate (half-life) of radioactive substances to determine the age of the fossil.
- Radioactive substances are not found sedimentary rock, so radiometric dating will not work to date the rock.
- Carbon 14 (like on the chart) is commonly used to date organic tissues. (bones, tissues)



The Geologic Time Scale

- The **geological time scale** is a model that expresses the major geological and biological events in Earth's history.
- The time scale is divided into **FOUR** eras.
 - Precambrian, Paleozoic, Mesozoic, Cenozoic
 - Many Eras ended in mass extinctions
- Eras are divided into **PERIODS**