

Earths History: Geological Time, Rocks, Fossils



Geological Time Scale

- Timeline that organizes the events in Earth's history.
- Earth is about 4.7 billion years old.
- More complex organisms such as land plants and fish evolved only within the last 500 million years.

EON	ERA	PERIOD	MILLIONS OF YEARS AGO
Phanerozoic	Cenozoic	Quaternary	1.6
		Tertiary	66
	Mesozoic	Cretaceous	138
		Jurassic	205
		Triassic	240
	Paleozoic	Permian	290
		Pennsylvanian	330
		Mississippian	360
		Devonian	410
		Silurian	435
		Ordovician	500
		Cambrian	570
		Proterozoic	Late Proterozoic Middle Proterozoic Early Proterozoic
Archean	Late Archean Middle Archean Early Archean	3800?	
Pre-Archean			

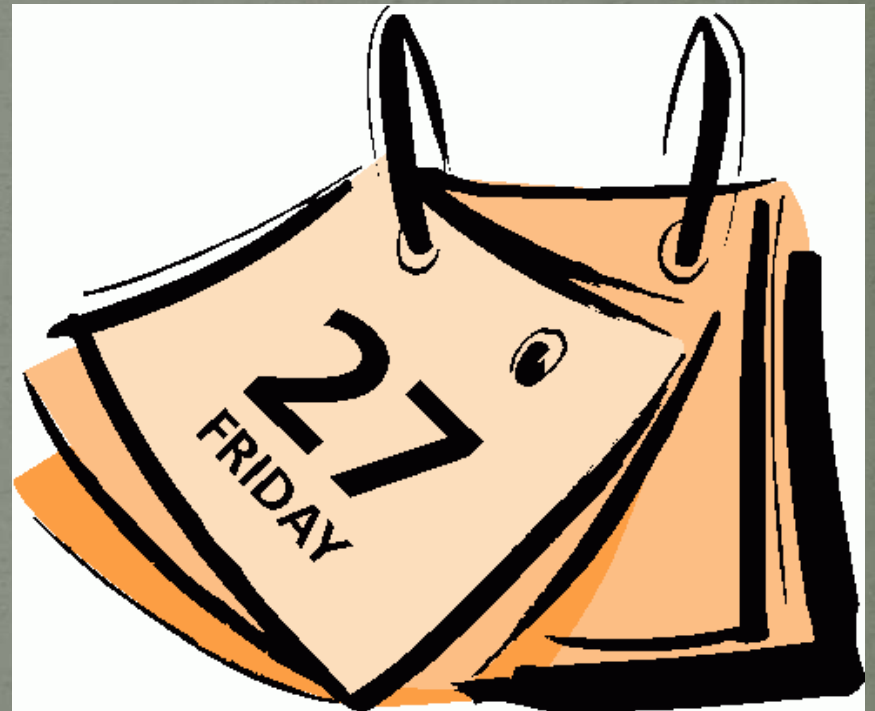
Humans

- Humans evolved only about 110, 000 years ago
- If humans were squeezed into a single day, humans would not evolve until the last few seconds.



Calendar of Earth

- The geological time scale is like a calendar extending from earth's formation to the present.
- The scale is divided into eons, eras, periods, and epochs.



Eon

- The largest group: divided by the Cambrian boundary (about 550 million years ago) when the variety of life forms explodes: billions of years long

Era

- Mass extinctions mark the boundaries between the eras
- hundreds of millions of years long

Period

- Blocks of time when a unique rock series was laid down
- tens of millions of years long

Epoch

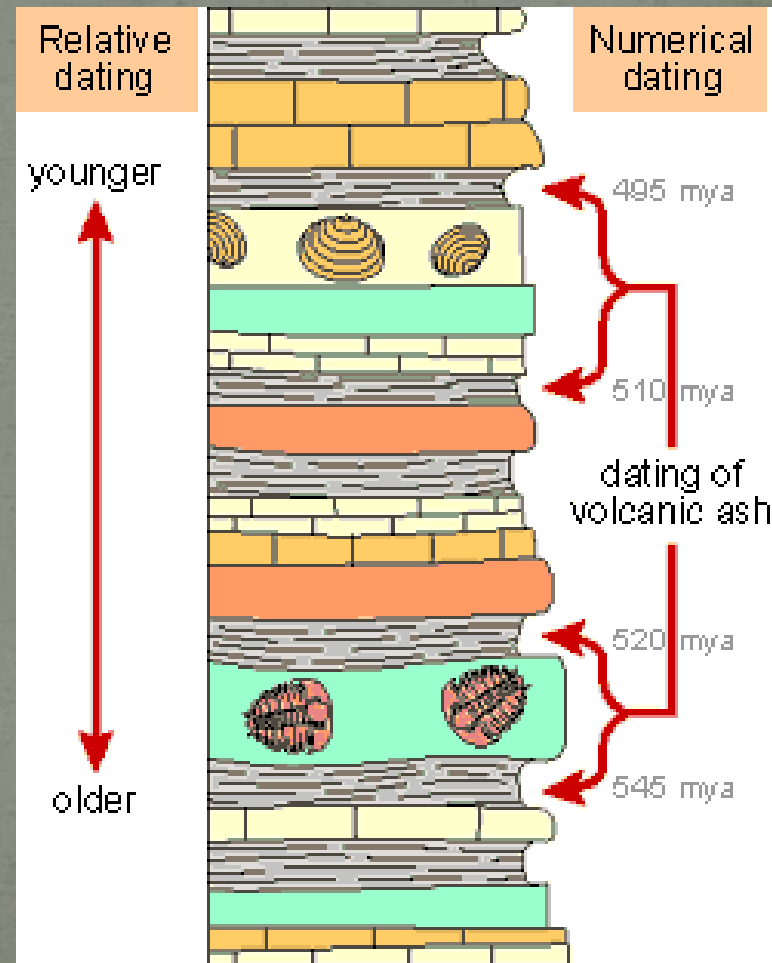
- Divisions of the most recent periods
- Several millions years long

Determining the Age of Rocks

- Scientists use rocks and fossils to try to date events, or determine when in history events took place on earth.
- Scientists use 3 techniques of dating:
 - Absolute age
 - Radioactive dating
 - Relative age

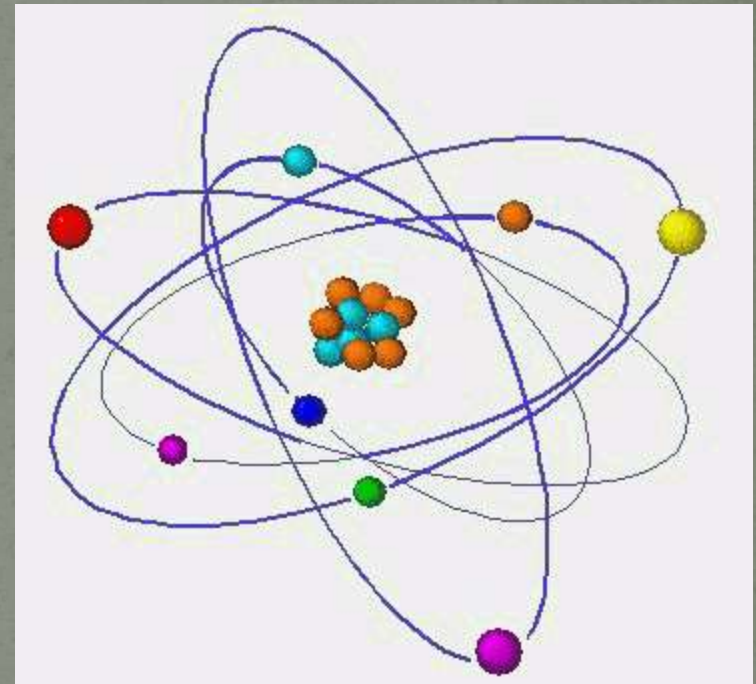
Absolute Age

- Tells the actual age of rock or fossil or how long ago an event occurred



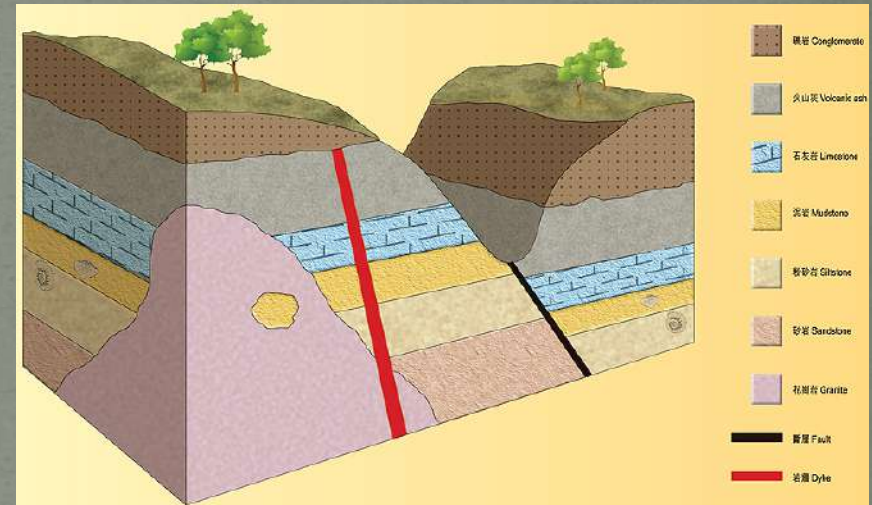
Radioactive Dating

- Is means of measuring the age of a material by comparing the amount of radioactive form of an element in a rock or fossil with the amount of its decay product.



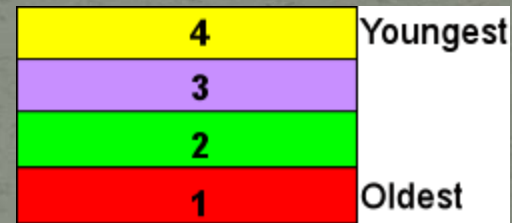
Relative Age

- When absolute age is not possible scientists use relative age.
- Relative age describes the age of an object or event in comparison to another object or event.
- It determines which events occurred earlier or later than others without giving a definite date.



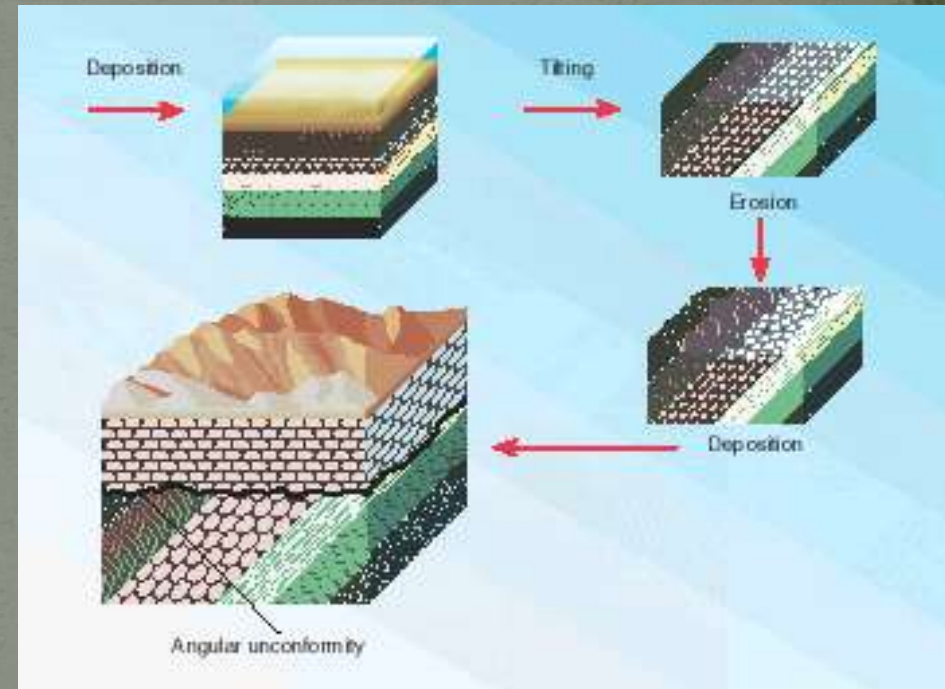
Law of Superposition

- States that in undisturbed sedimentary rock layers, older layers of rock lie beneath younger rock layers
- Older sediments must be laid down first before the younger ones pile on top.



Unconformity

- Plate movements can disturb rock layers by folding or turning them.
- Sometimes a layer can be missing one area of rock bed.
- The missing layer is called an unconformity.
- Makes it more difficult to understand how earth changed at a specific time.



Fossils Provides Clues to Earths Past

- Fossils can be used to determine the geological history, or age, of the rock that contains them
- Younger fossils may be found where the original boundary was an ocean/continent
- Older fossils are found in where plates collided, formed mountains, and now eroding.



Index Fossil

- fossil must be widely distributed
- represent a type of organism that existed only briefly.
- useful because they tell the relative ages of the rock layers in which they occur.



Extinction

- Process which species disappear
- Occur naturally over time
- Most occur following a sudden, drastic change in the environment.
- Species cannot adapt quickly enough to survive



Through Out History

- Throughout history numerous species of organism have gone extinct
- Some scientists estimate that 99.9% of all species have ever lived on earth is extinct
- Average species lives for 2 to 10 million years

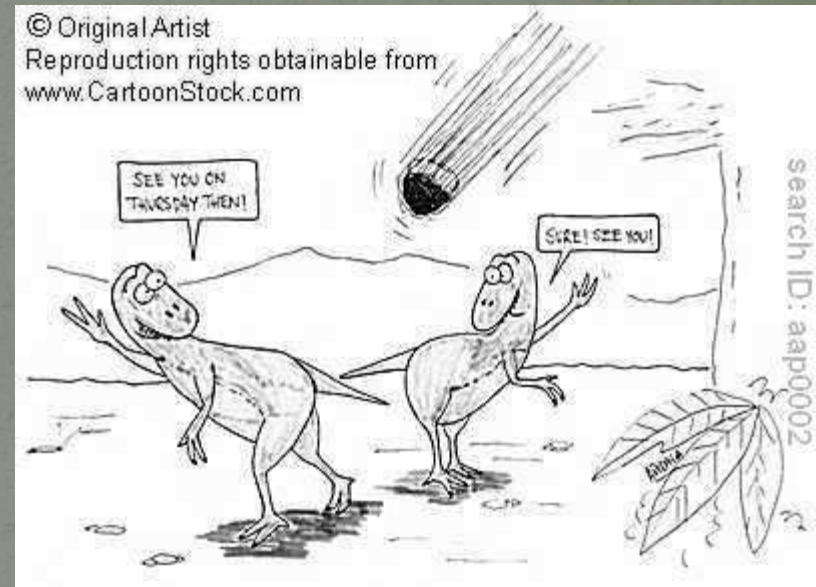


Extinction

- Increase in temp
- Increase or decrease in rainfall
- Volcanic eruption
- Flooding or drought
- Shifting land or sea
- A change in food supply
- A new predator or disease

Mass Extinctions

- Occurs when large numbers of species die out in a short amount of time.
- Mass extinctions have occurred many times in Earth's history
- Each event has wiped out more than 50% of species
- Have evidence in rock layers.
- Abundant fossils suddenly disappear.



Extinction

- Brain Pop
- <http://www.brainpop.com/science/ourfragileenvironment/extinction/>