Chapter 19-1
"The Fossil Record"
p 538-545
Biology 10

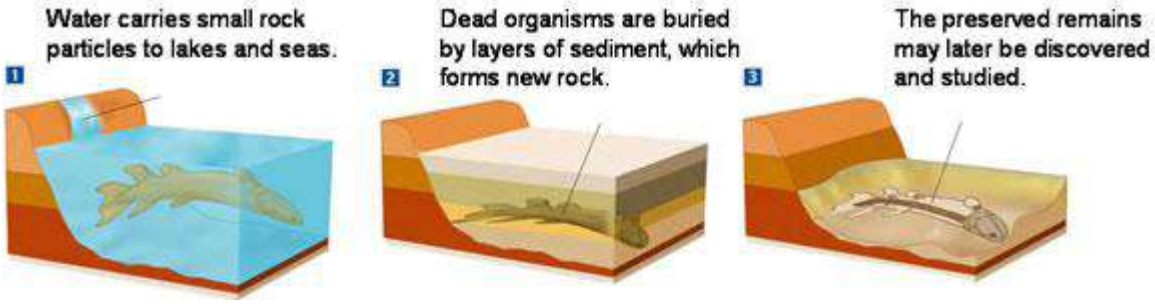
Objectives

- Describe how fossils reveal information about ancient life.
- Describe how we date events in Earth's history.
- Explain what the geologic time scale is, and be able to list its major divisions.
- Analyze how Earth's environment and it's organisms affect each other.

Fossil Evidence

- Provides much of evolutionists evidence
- Most fossils formed when organism is _____ _____, which prevents bacteria from decomposing
- Hard parts (bones, teeth, shells, etc) most common
- Other fossils- frozen mammoths, insects trapped in amber, minerals leaching into organism

Fossil Formation Images



Dating Earth's History

- Two types of dating

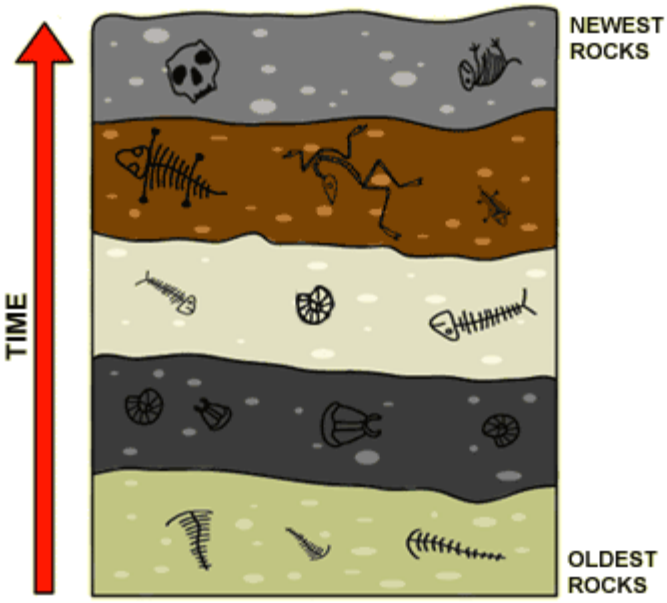
- **<u>relative dating</u>**

- **<u>radiometric (absolute) dating</u>**

Relative Dating

- Places rock layers and their fossils in a _____
- _____ on the bottom, _____ fossils on top.
- Scientists must use **<u>index fossils</u>** to determine how old other fossils are
  - index fossils- _____ _____ (ex: trilobites)
- Relative dating just tells you how old a fossil is RELATIVE to other fossils, it _____ of a fossil in years!

Relative Dating Example



Radiometric Dating

- Uses _____ to determine a fossils age in years
- Radioactive isotopes _____ as they decay to form stable isotopes
- The rate of decay is constant for a radioisotope

- By measuring the _____ _____, we can estimate how old a fossil is

Half-Life

- **half-life**: _____ _____
  - ie: **For every half-life that passes, the amount of radioisotope remaining is cut in half!**
- Each type of radioisotope decays at a different rate
- ex: carbon 14 has a half life of _____ years, can be used to measure objects that are less than 60,000 years old
- ex 2: potassium-40 has a half life of _____, so can be used to determine ages of much older things

Quick Lab:

- Find a partner
- Take a sheet of paper, cut out 100 1-cm squares.
- Place an X on each square.
- Put the squares in a cup.
- Mix squares in the cup and dump out.
- Remove all the squares that show an X, and record how many squares are left in the data table below.
- Return the unmarked squares to the cup.
- Repeat steps 5-7 until there are 5 or fewer squares left.
- Make a graph with the number of spills on the x axis, and the number of squares remaining after each spill on the y-axis

Data Table for Quick Lab

Spill Number	Number of Squares Returned

Questions

- How many spills did you need to remove half the squares? To remove ¾ of the squares?
- If each spill represents 1 year, what is the half-life of the squares?

The Geologic Time Scale

- Paleontologists developed the geologic time scale by studying _____

- Where _____ or mass extinctions occur, boundaries between different eons, eras, and periods were established
- The ages were then determined using radiometric dating

- Geologic Time Scale demonstration…

Divisions of the Geologic Time Scale

- Largest divisions are _____
- eons broken down into _____
- eras broken down into _____
- Names come from locations of rocks, or some other feature of that period
  - ex: Cambrian period named after Cambria, where rocks were first found

Changing Earth

- Earth is constantly changing
  - ex: _____ into today's continents
- Earth's features have affected organisms
  - ex: _____, which forces organisms to evolve to the change
- Organisms have also affected Earth!
  - ex: _____ changed the composition of Earth's atmosphere, which allowed organisms to move up on land
  - ex 2: humans have caused drastic changes to our planet