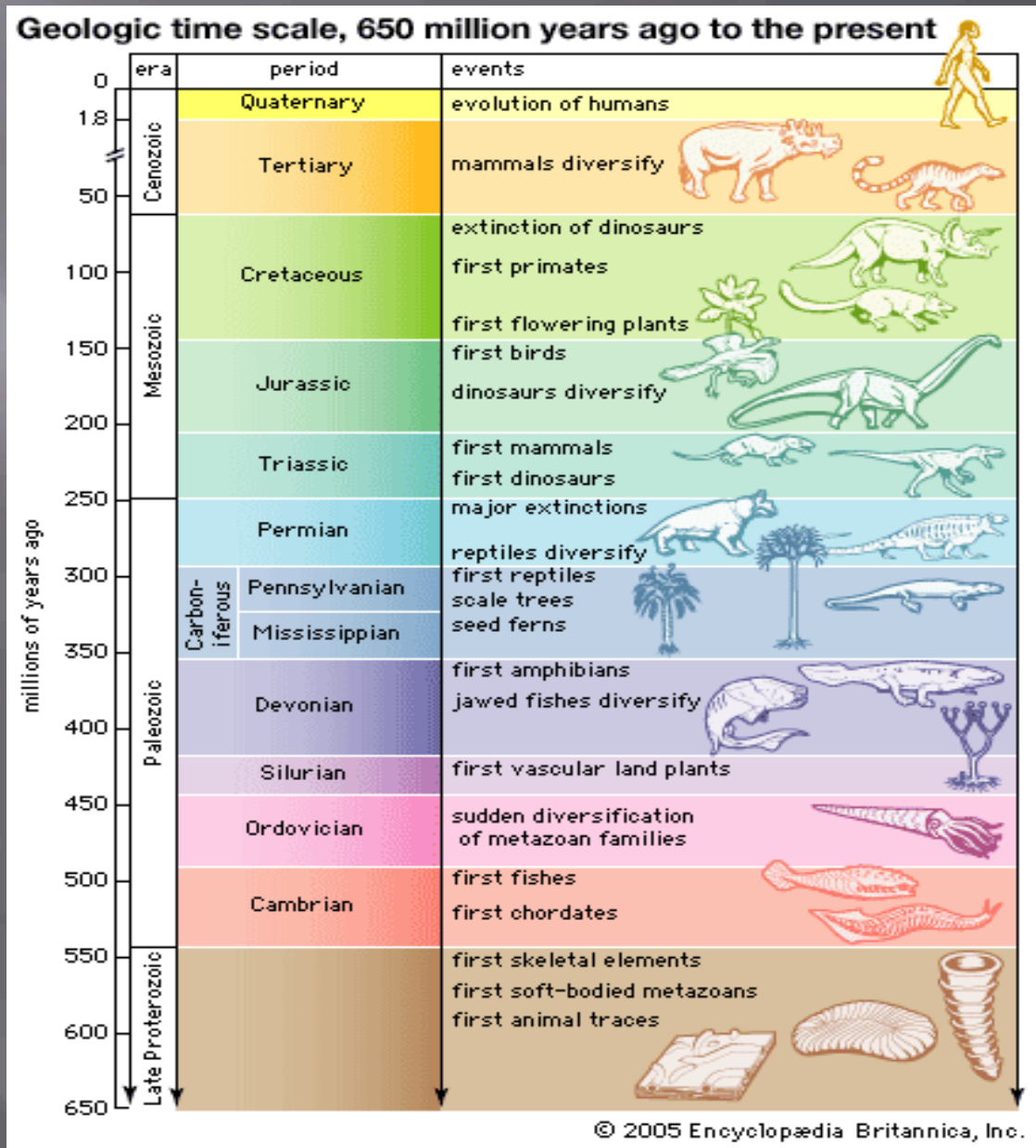
CH 17 THE HISTORY OF LIFE

17-1 The fossil Record
17-2 Earth's Early History
17-3 Evolution of Multicellular life
17-4 Patterns of Evolution

17-1 The fossil Record

- Paleontologists are scientists who study Fossils
- The fossil record provides evidence about the history of life on Earth.
  - It also shows how different groups of organisms, including species, have changed over time



17-1 The fossil Record

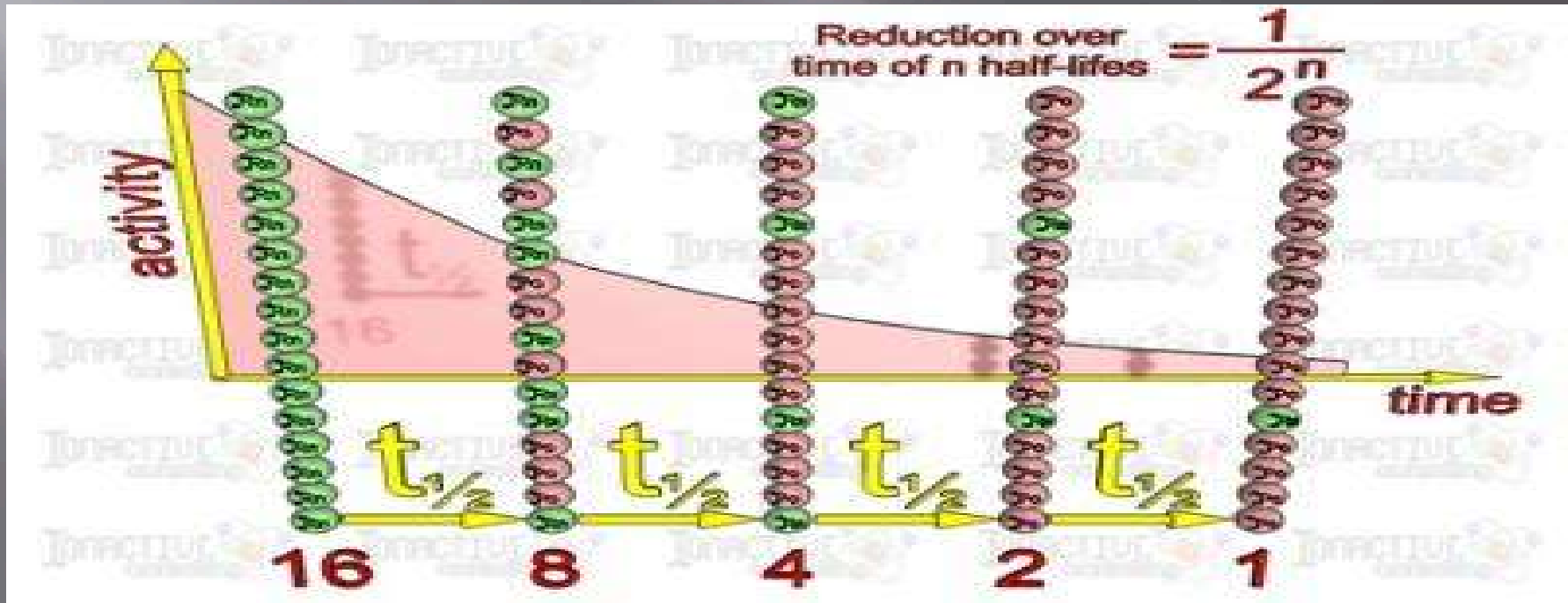
- More than 99% of all species that have ever lived on Earth have become Extinct, or the species have died out

17-1 The fossil Record

- In Relative Dating, the age of a fossil is determined by comparing its placement with that of fossils in other layers of rock
- Scientists also use Index Fossils to compare the relative ages of fossil
  - To be an index fossil a species must have existed for a short time, but had a large geographic range
- Relative dating allows paleontologists to estimate a fossil's age compared with that of other fossils

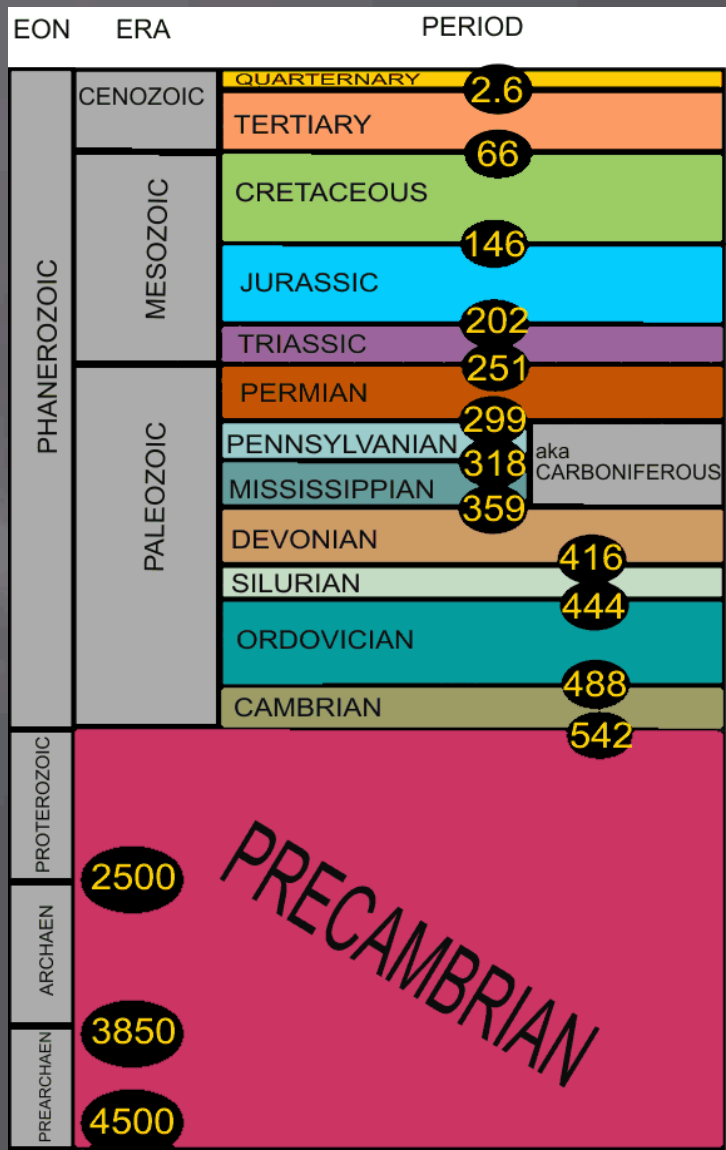
17-1 The fossil Record

- Scientists use radioactive decay to assign absolute age to rocks called Radioactive Dating
  - Radioactive elements decay into nonradioactive elements at a constant rate
- A Half-life is the length of time required for half of the radioactive atoms in a sample to decay



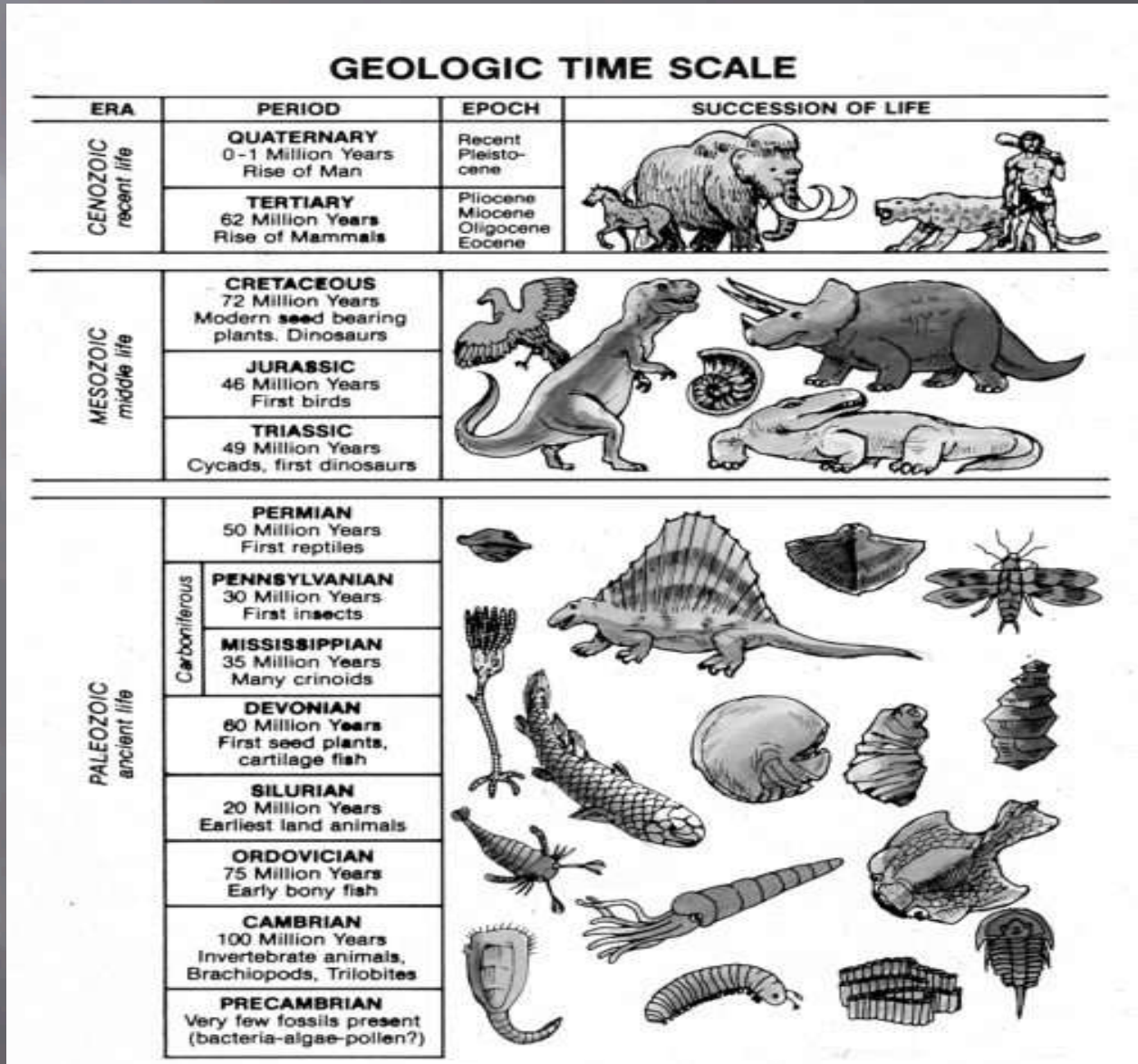
17-1 The fossil Record

- Paleontologists use divisions of the Geologic Time Scale to represent evolutionary time
- After Precambrian Time, the basic divisions of the geologic time scale are eras and periods

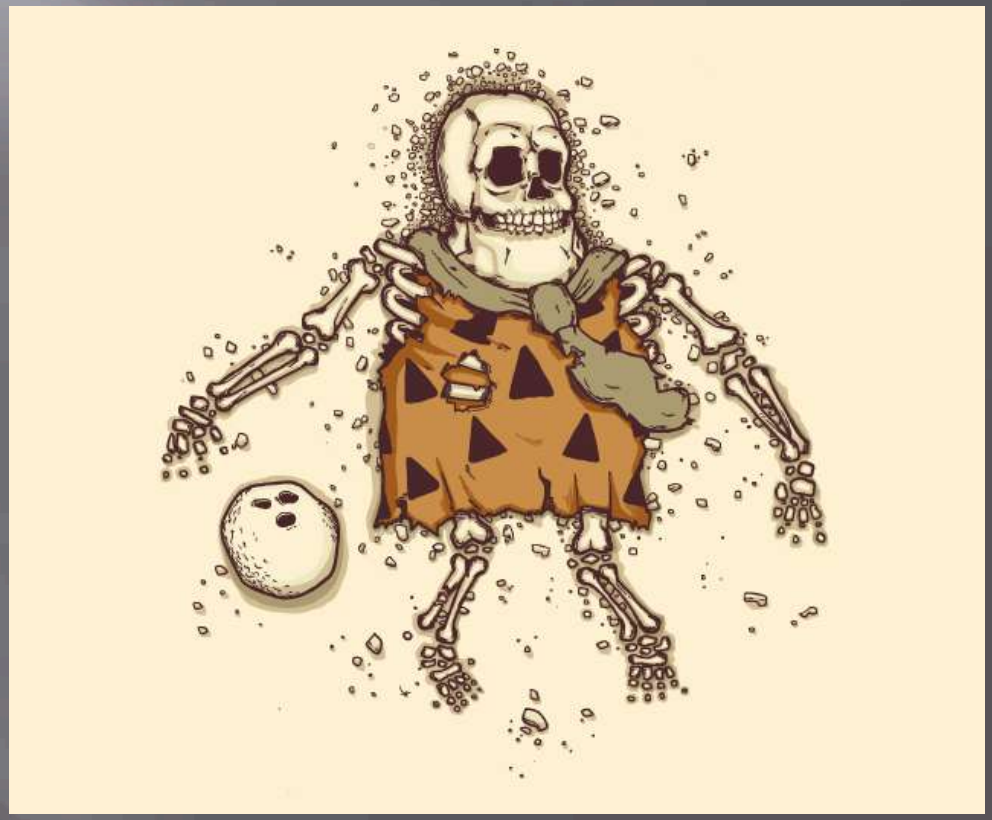


17-1 The fossil Record

- Geologists divide the time between the Precambrian and the present into three Eras
- Eras are subdivided into Periods, which range in length from tens of millions of years to less than 2 million years

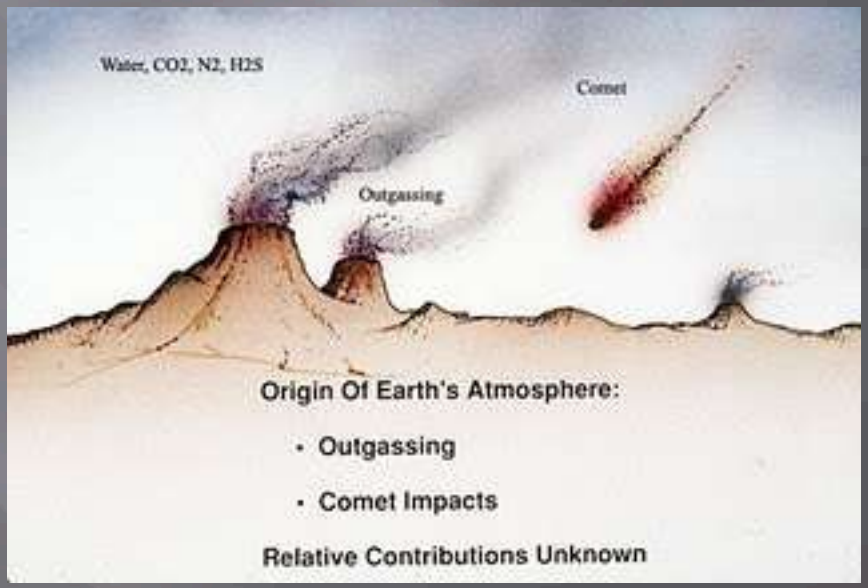


- Pg 422 (1-6)



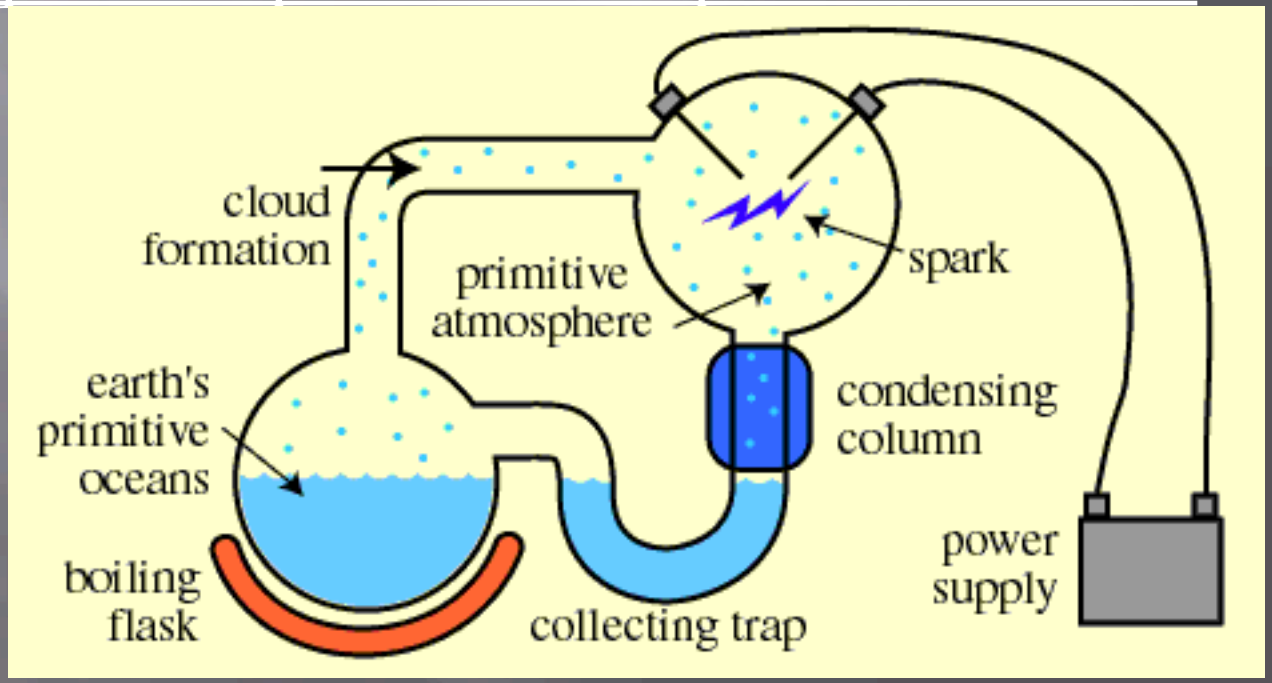
17-2 Earth's Early History

- Earth's early atmosphere probably contained hydrogen cyanide, carbon dioxide, carbon monoxide, nitrogen, hydrogen sulfide, and water



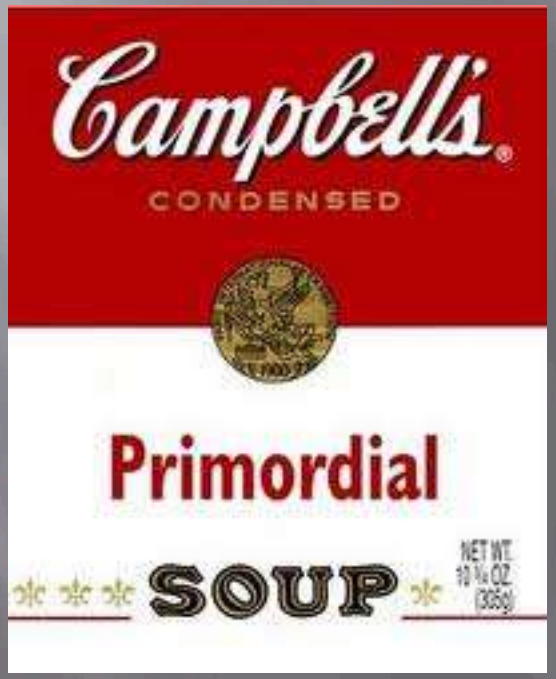
17-2 Earth's Early History

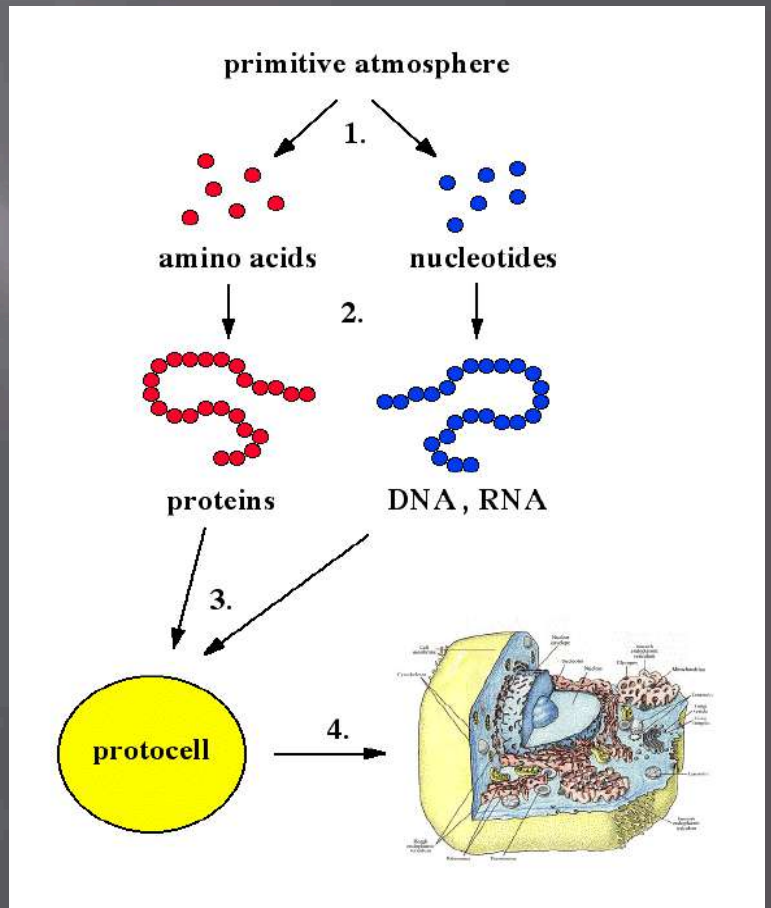
- Miller and Urey's experiment suggested how mixtures of the organic compounds necessary for life could have arisen from simpler compounds present on a primitive Earth



17-2 Earth's Early History

- Under certain conditions, large organic molecules can form tiny bubbles called <u>proteinoid microspheres</u>



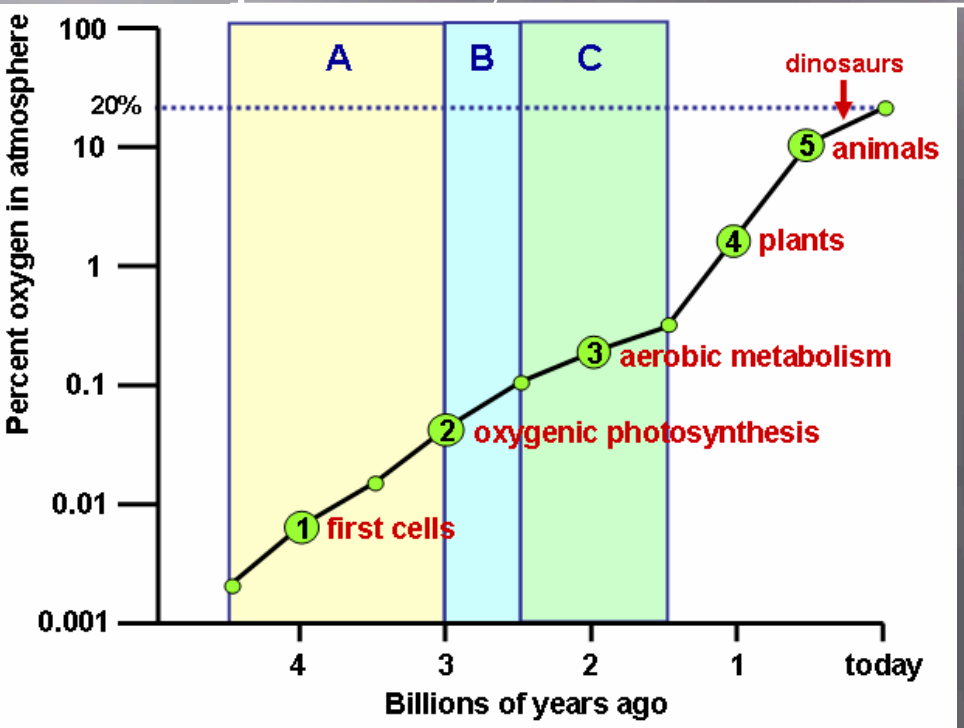


17-2 Earth's Early History

- Microscopic fossils, or Microfossils, of unicellular prokaryotic organisms that resemble modern bacteria have been found in rocks more than 3.5 billion years old

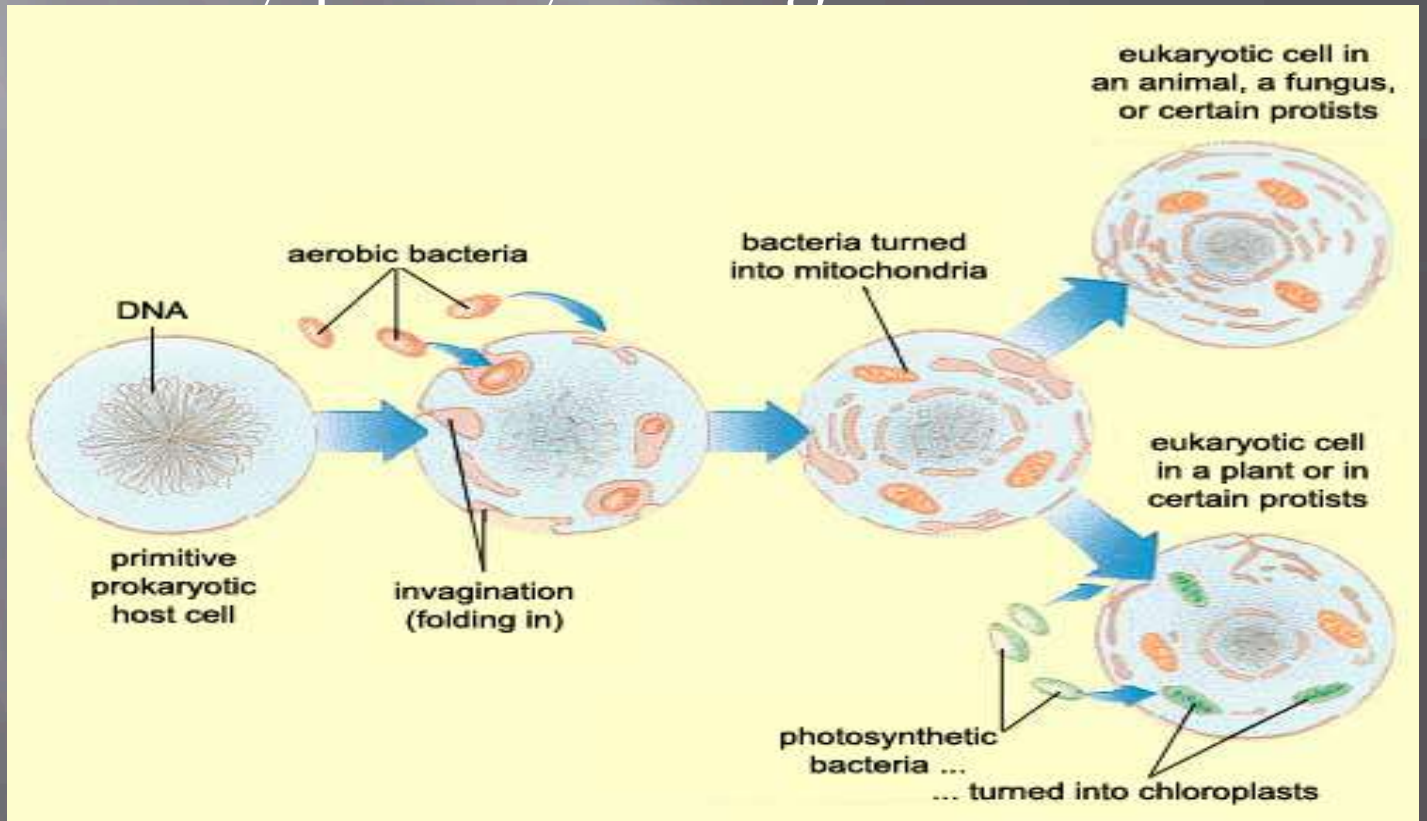
17-2 Earth's Early History

- The rise of oxygen in the atmosphere drove some life-forms to extinction, while other life-forms evolve new, more efficient metabolic pathways that used oxygen for respiration



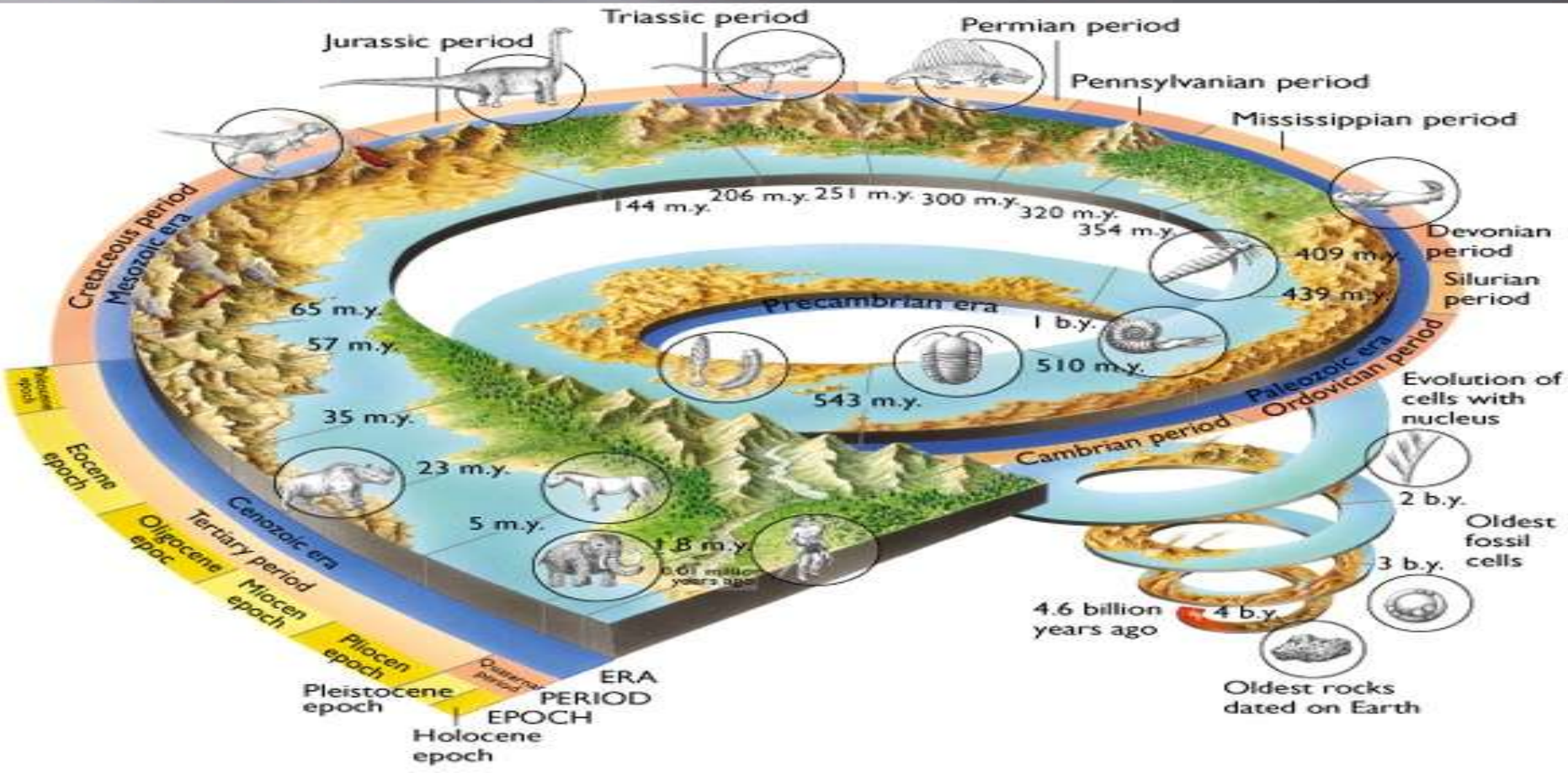
17-2 Earth's Early History

- The Endosymbiotic theory proposes that eukaryotic cells arose from living communities formed by prokaryotic organisms



Thursday Questions

- Pg 428 (1-5)

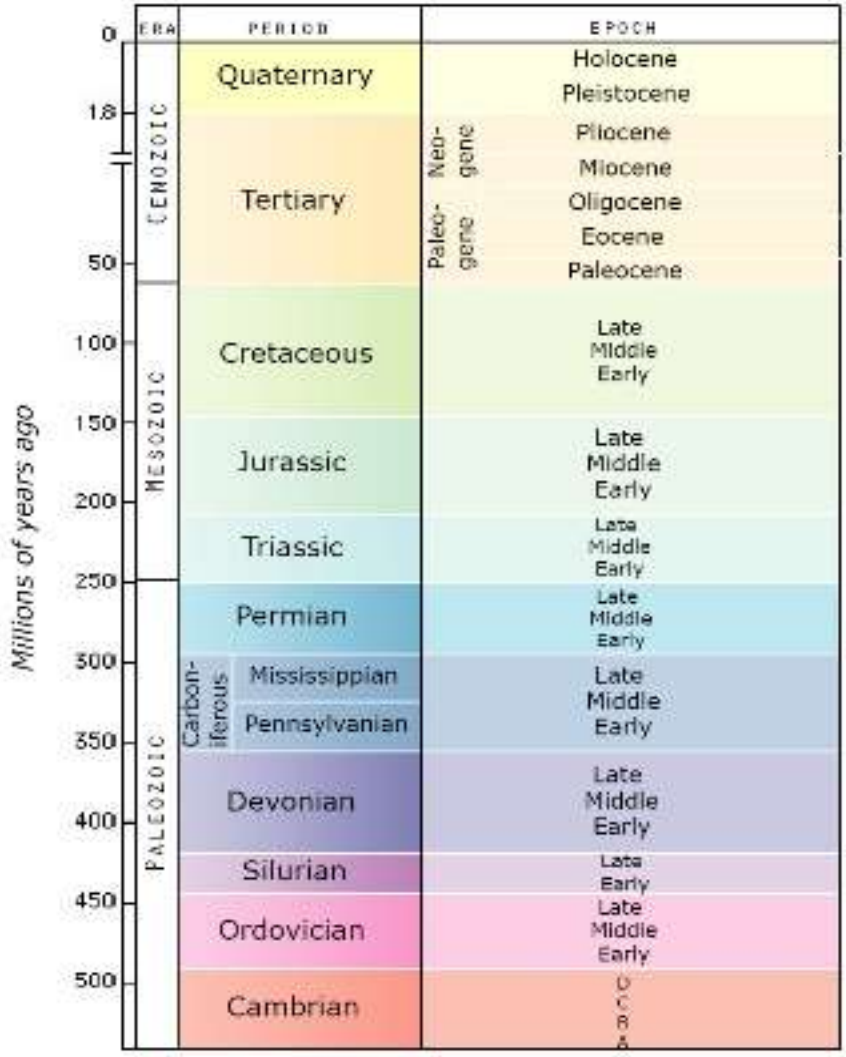


17-3 Evolution of Multicellular Life

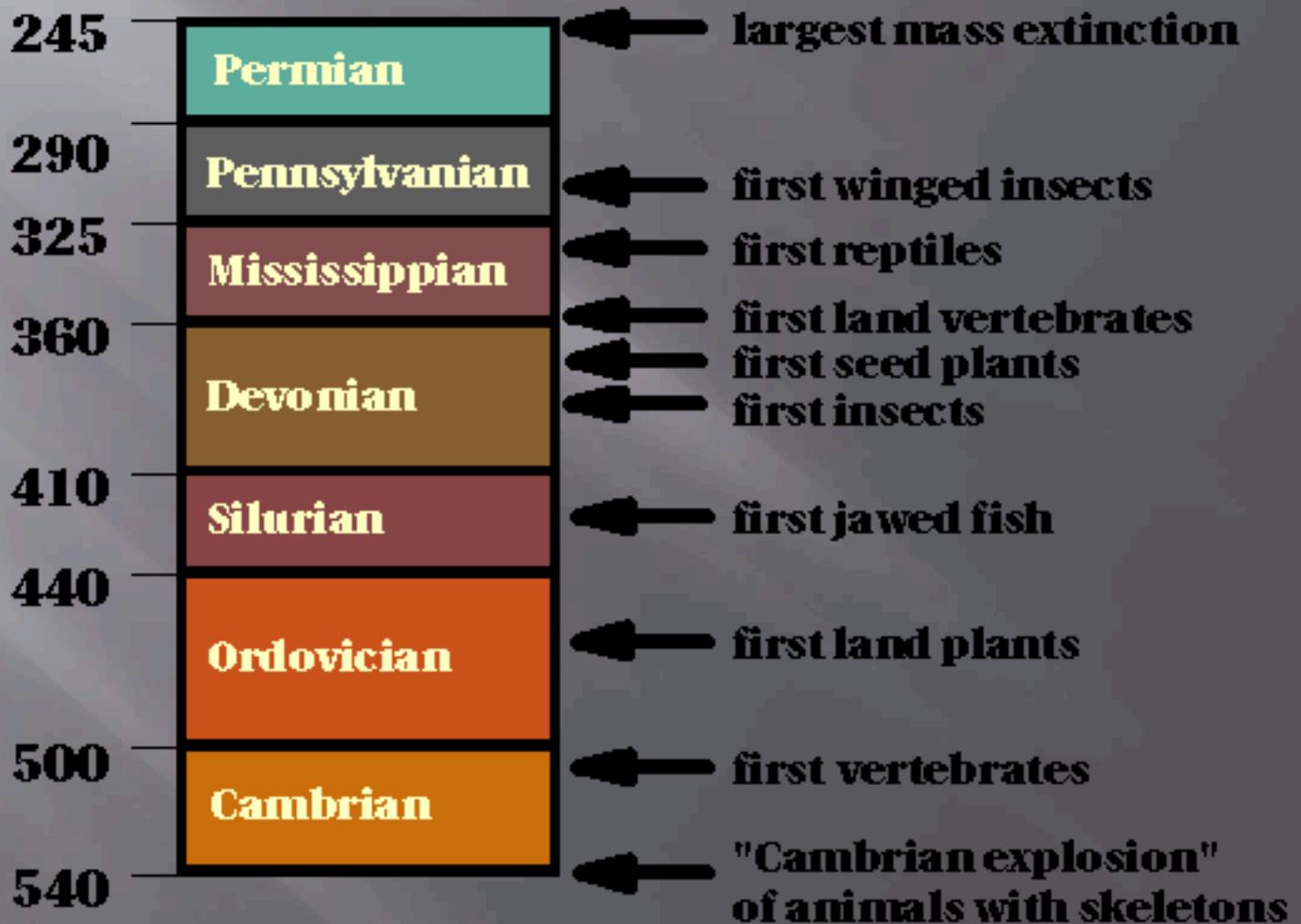
- Rich fossil evidence shows that early in the Paleozoic Era, there was a diversity of marine life

17-3 Evolution of Multicellular Life

- During the Devonian, vertebrates began to invade the land
- The Mass Extinction at the end of the Paleozoic affected both plants and animals on land and in the seas (95% of all complex life died)

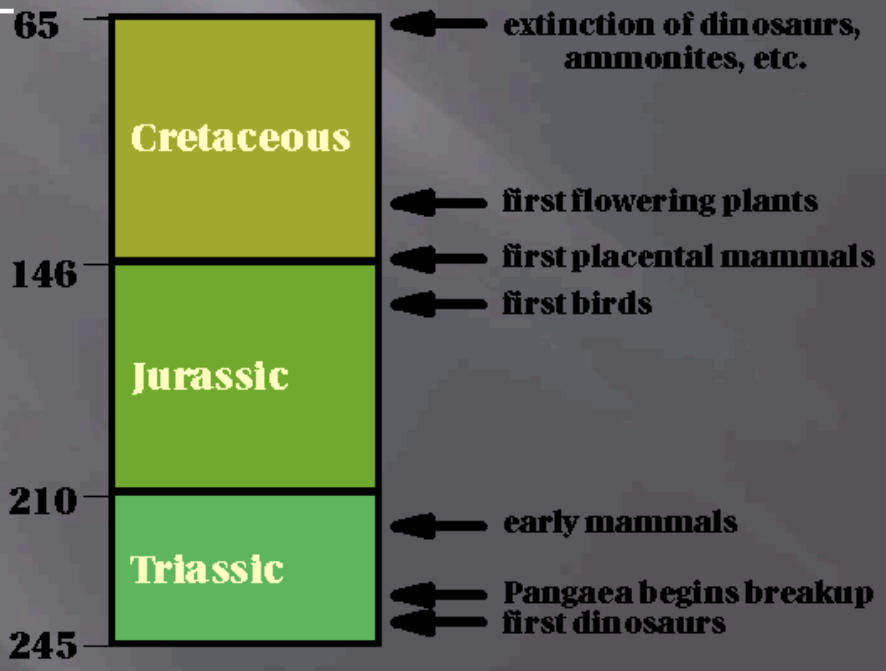


17-3 Evolution of Multicellular Life



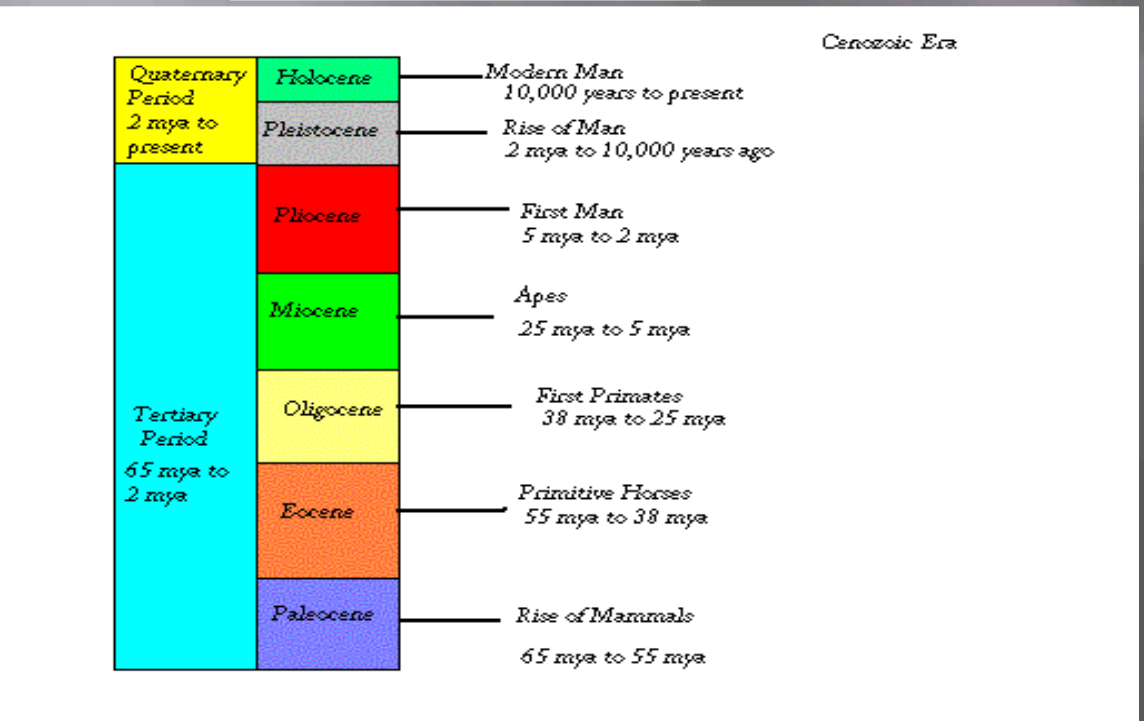
17-3 Evolution of Multicellular Life

- Events during the Mesozoic include the increasing dominance of dinosaurs. The Mesozoic is marked by the appearance of flowering plants



17-3 Evolution of Multicellular Life

- During the Cenozoic, mammals evolved adaptations that allowed them to live in various environments- on land, in water and even in the air



Pg 434 (1-4)

- Timeline due at end of class

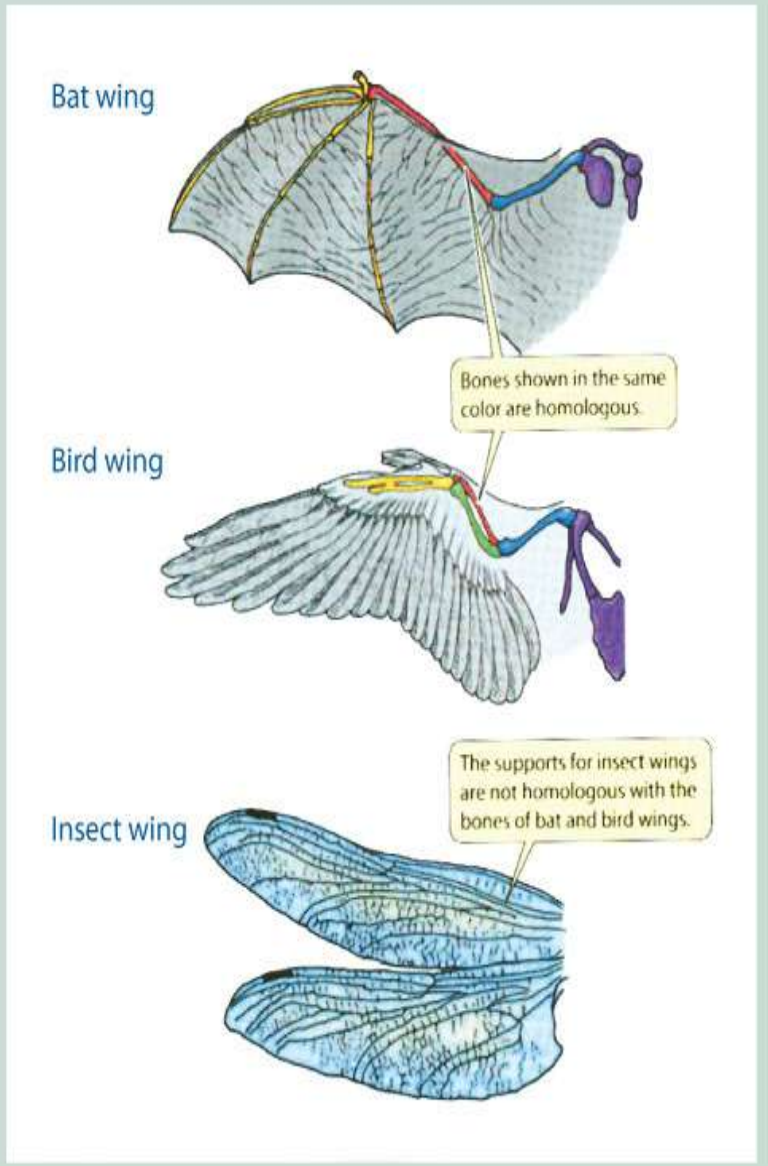
17-4 Patterns of Evolution

- nor
- Six important topics in macroevolution
- 1) Extinction- 99% of all species

A pivotal moment in the hypothesis of macroevolution

17-4 Patterns of Evolution

- 2) Adaptive Radiation is when a small population evolve into diverse forms that live in different ways (Darwins finches)
- 3) Convergent Evolution is when unrelated organisms come to resemble one another

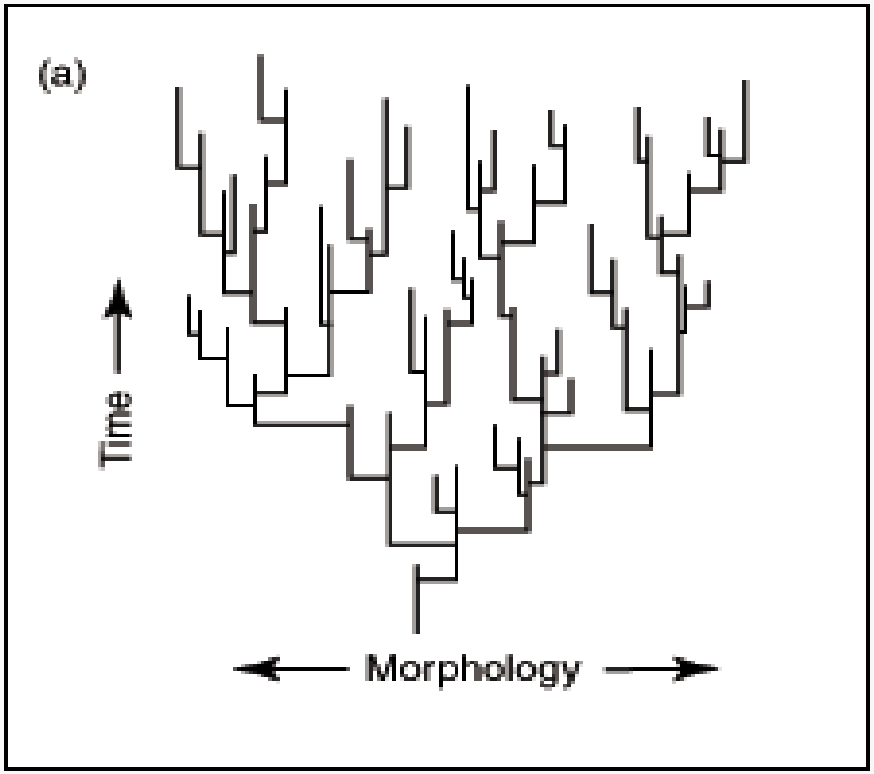


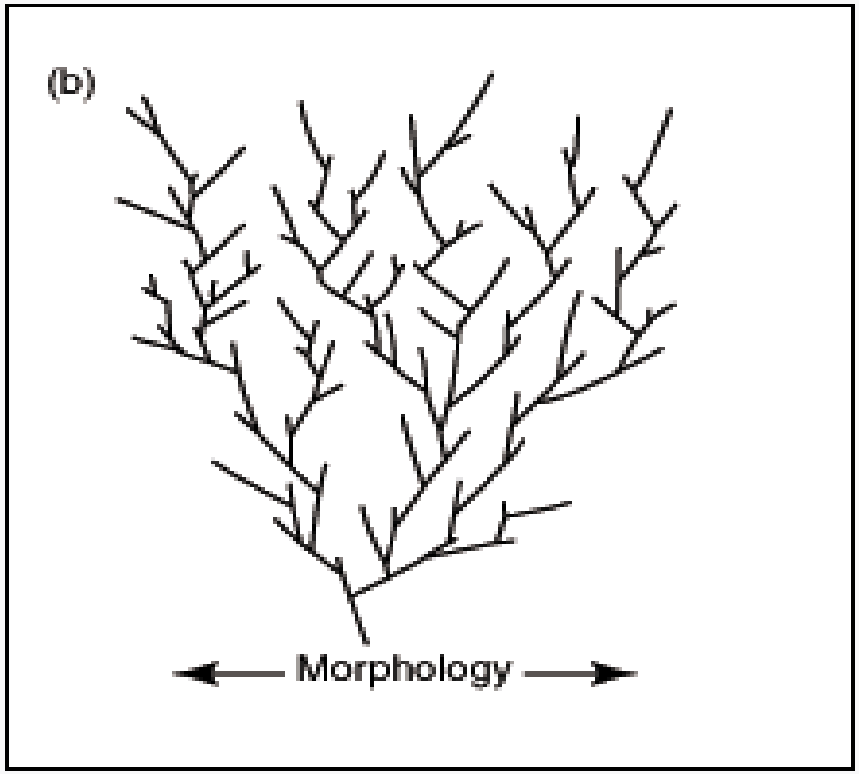
17-4 Patterns of Evolution

- 4) Coevolution is when an organism evolves and is followed by a corresponding change in another organism

17-4 Patterns of Evolution

- 5) Punctuated Equilibrium is a pattern of long, stable periods interrupted by brief periods of more rapid change





17-4 Patterns of Evolution

- 6) Changes in the expression of developmental genes may explain how these differences evolved
- Pg 440 (1-5)