

CH 17 THE HISTORY OF LIFE

17-1 The fossil Record

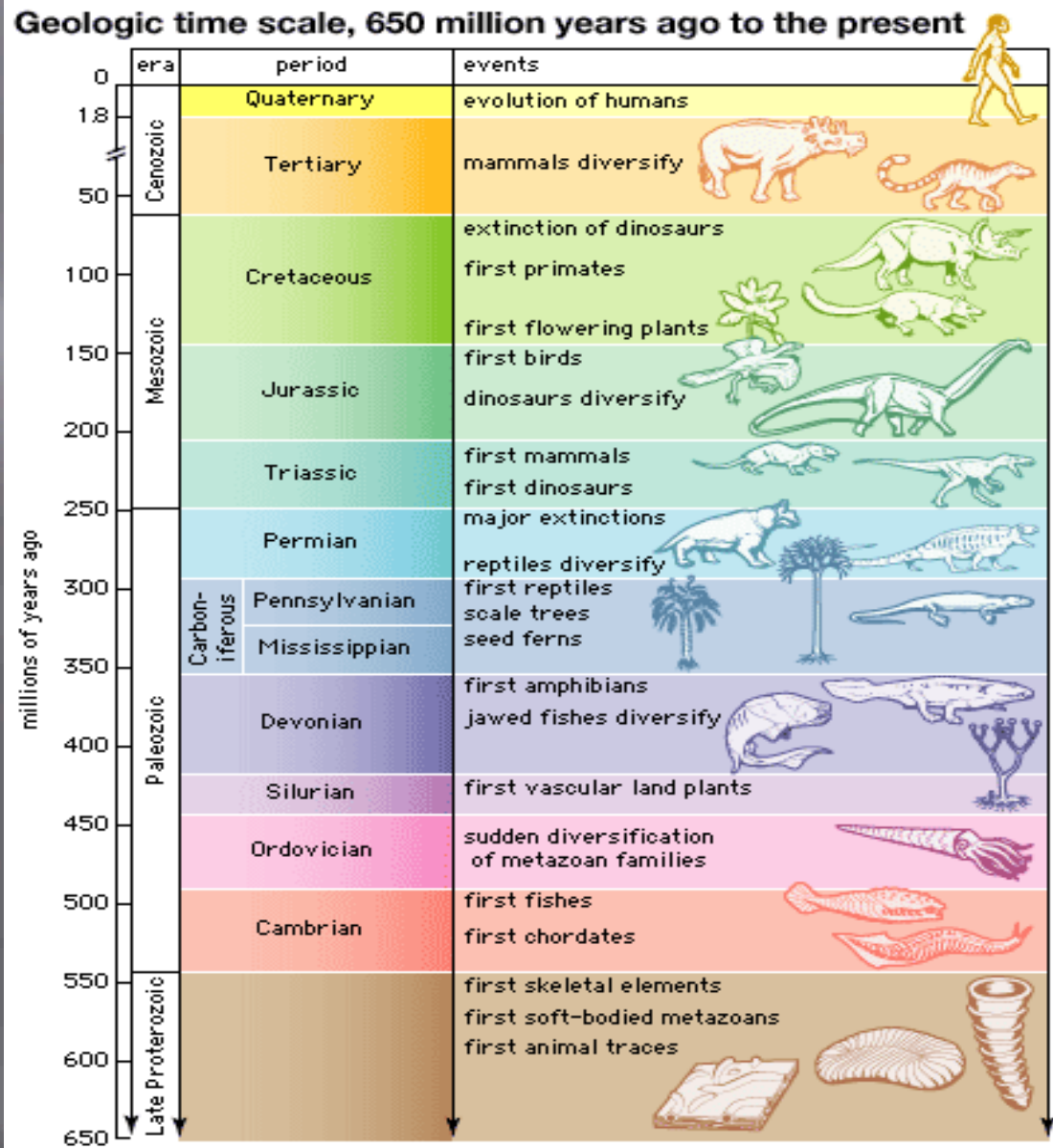
17-2 Earth's Early History

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

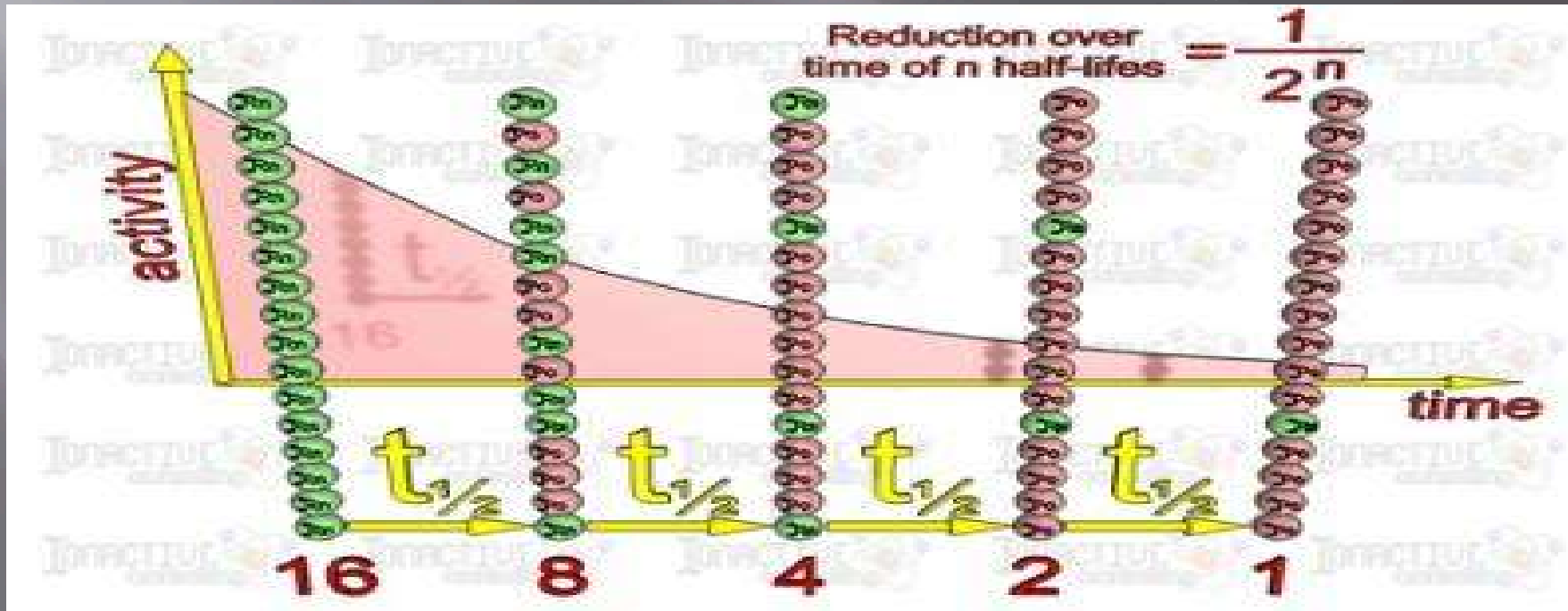


17-1 The fossil Record

- ▣ 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

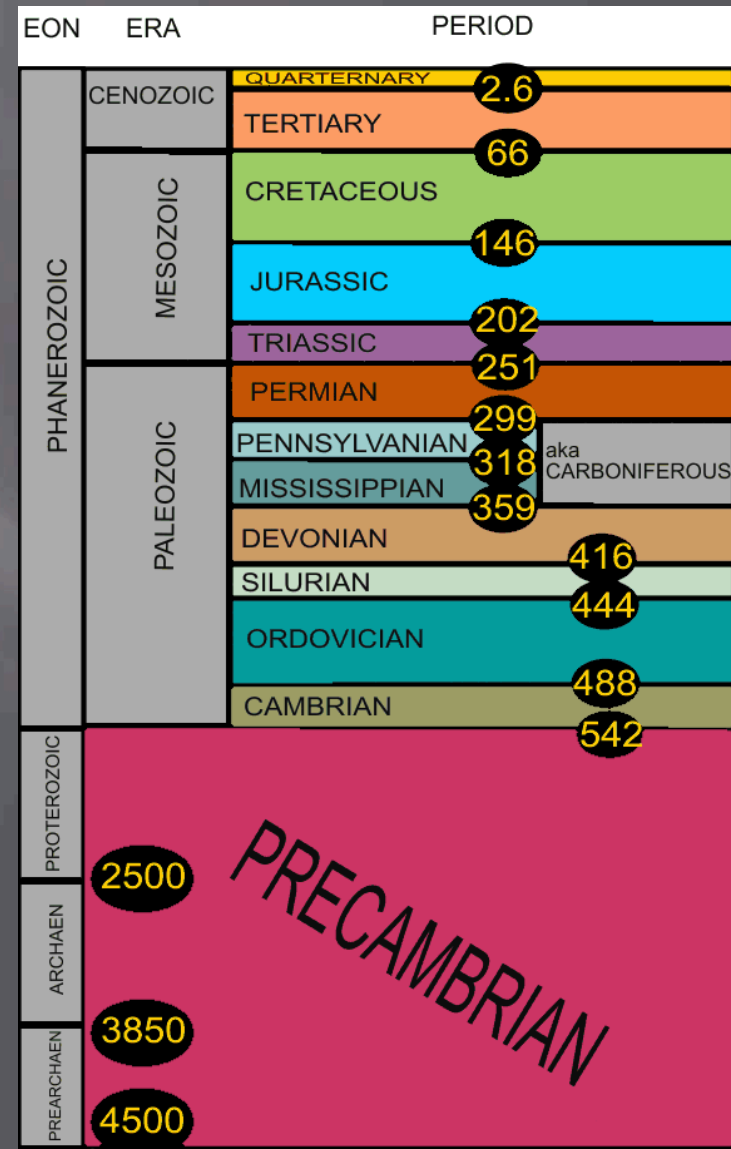
17-1 The fossil Record

- ▣ 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





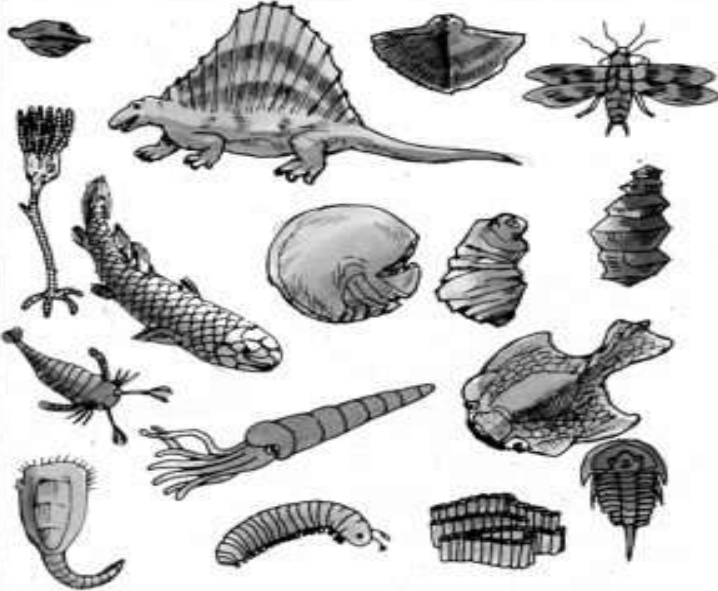
17-1 The fossil Record

- 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

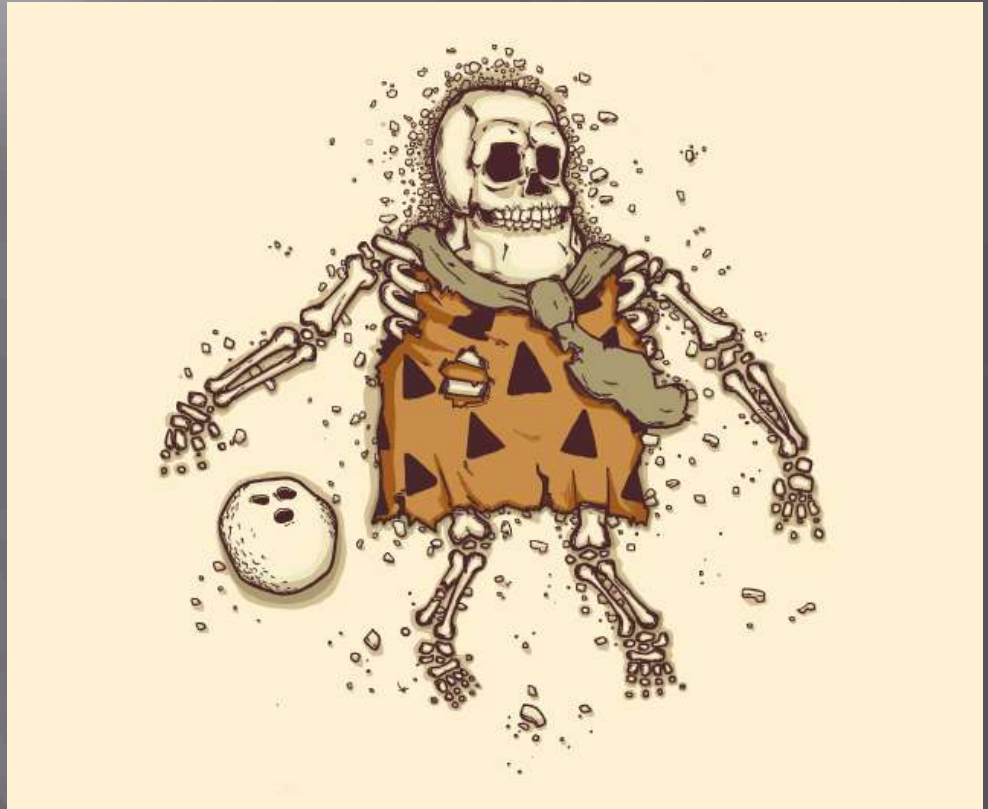


17-1 The fossil Record

- ▣ 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

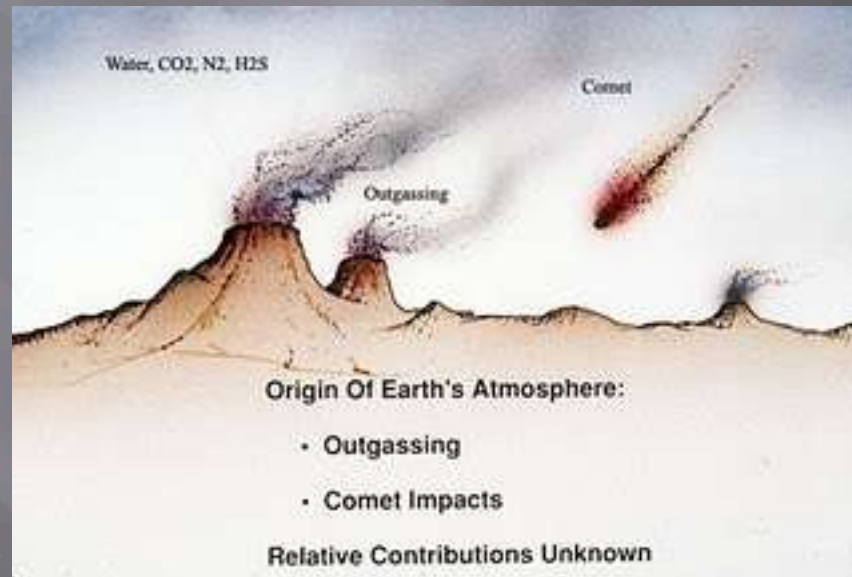
GEOLOGIC TIME SCALE			
ERA	PERIOD	EPOCH	SUCCESION OF LIFE
CENOZOIC <i>recent life</i>	QUATERNARY 0-1 Million Years Rise of Man	Recent Pleistocene	
	TERTIARY 62 Million Years Rise of Mammals	Pliocene Miocene Oligocene Eocene	
MESOZOIC <i>middle life</i>	CRETACEOUS 72 Million Years Modern seed bearing plants, Dinosaurs		
	JURASSIC 46 Million Years First birds		
	TRIASSIC 49 Million Years Cycads, first dinosaurs		
PALEOZOIC <i>ancient life</i>	PERMIAN 50 Million Years First reptiles		
	<i>Carboniferous</i> PENNSYLVANIAN 30 Million Years First insects		
	MISSISSIPPIAN 35 Million Years Many crinoids		
	DEVONIAN 60 Million Years First seed plants, cartilage fish		
	SILURIAN 20 Million Years Earliest land animals		
	ORDOVICIAN 75 Million Years Early bony fish		
	CAMBRIAN 100 Million Years Invertebrate animals, Brachiopods, Trilobites		
	PRECAMBRIAN Very few fossils present (bacteria-algae-pollen?)		

▣ Pg 422 (1-6)



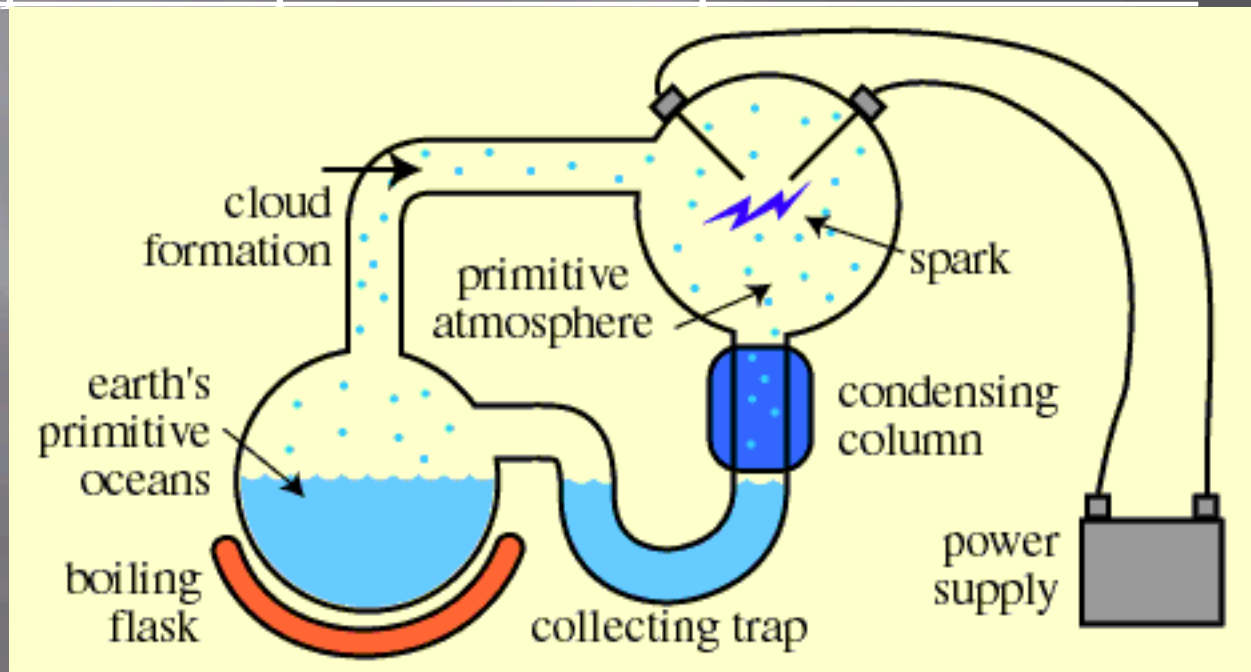
17-2 Earth's Early History

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



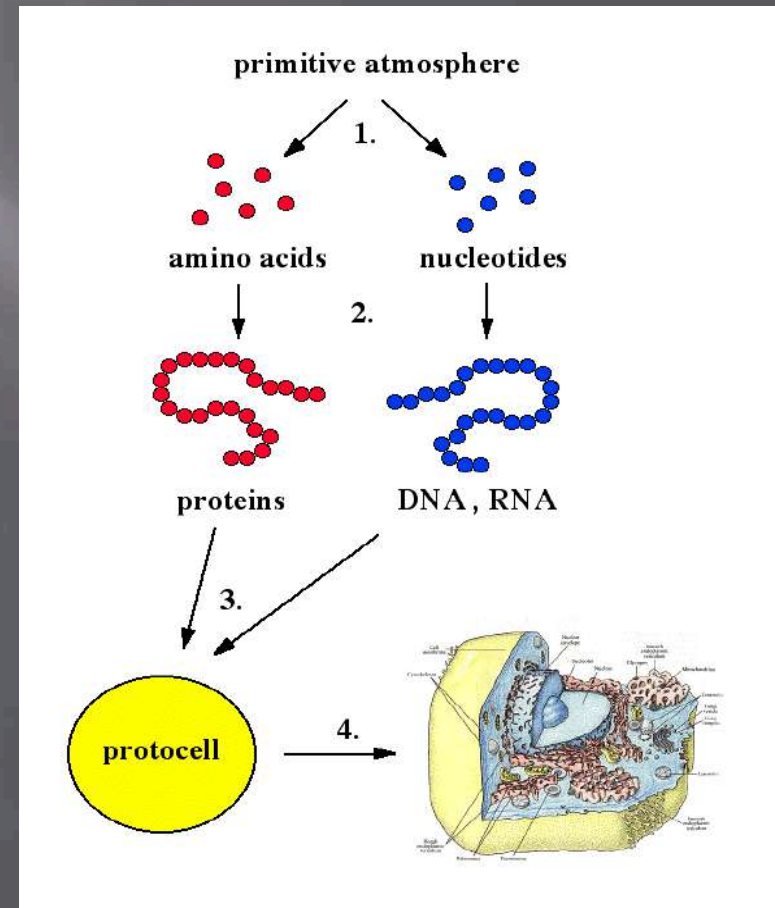
17-2 Earth's Early History

- 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 proteinoid microspheres



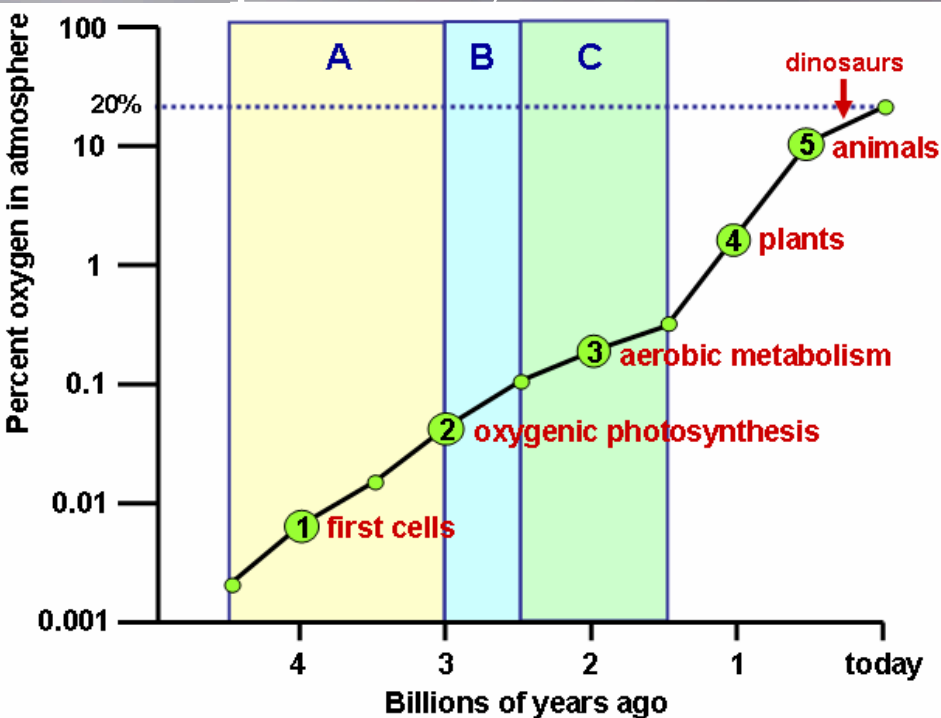
17-2 Earth's Early History

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

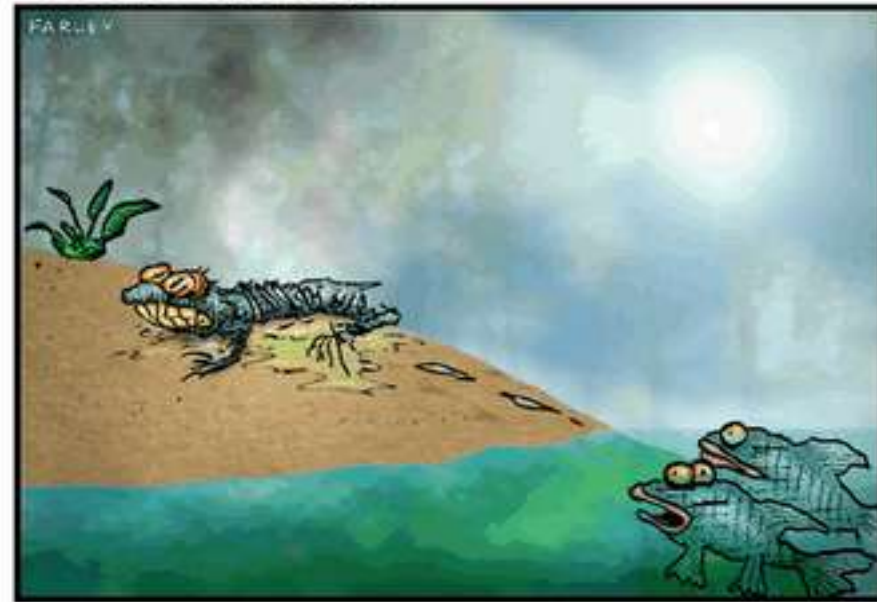


17-2 Earth's Early History

- 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



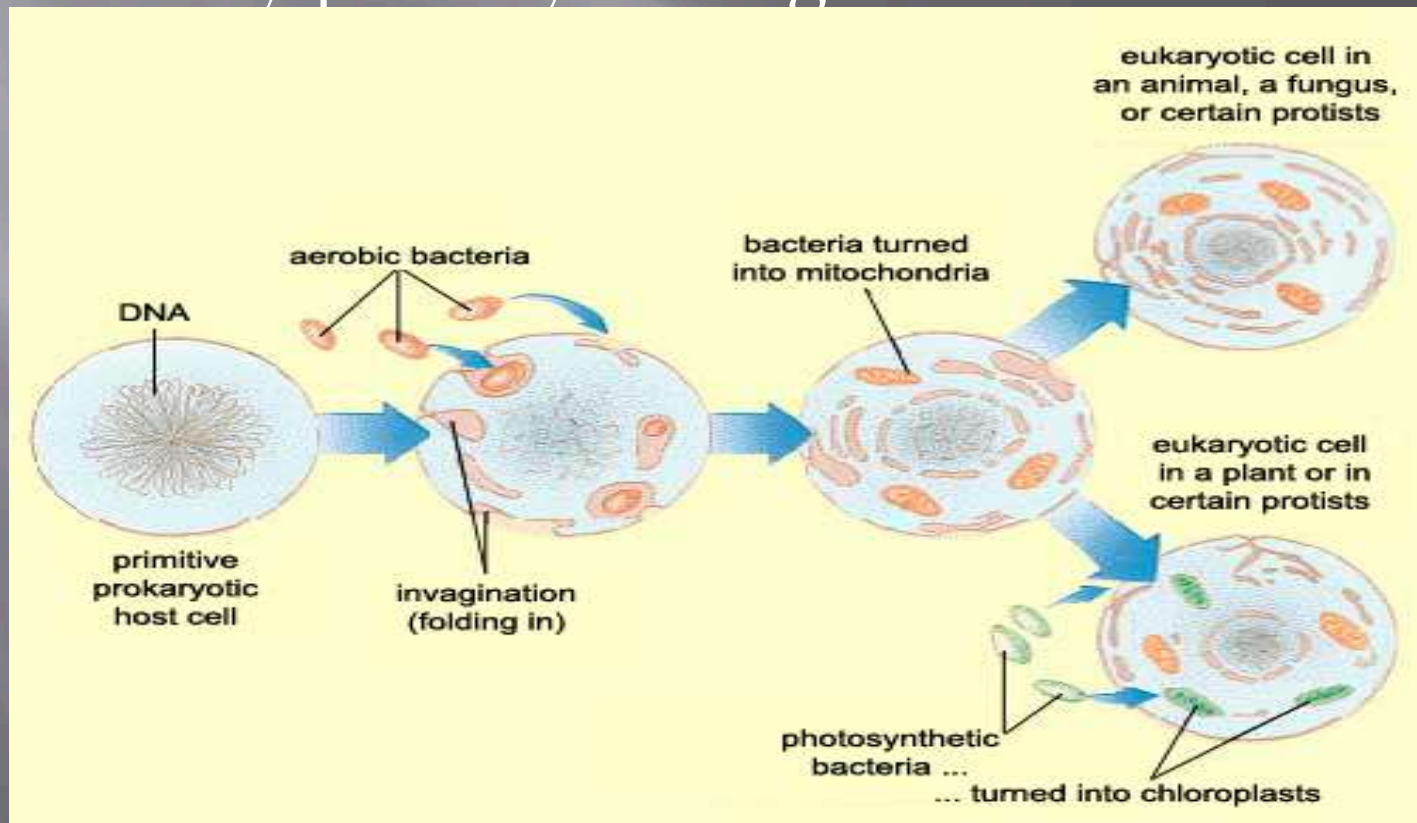
DOCTOR FUN



"Well, well, well ... check out 'Mister Evolution'."

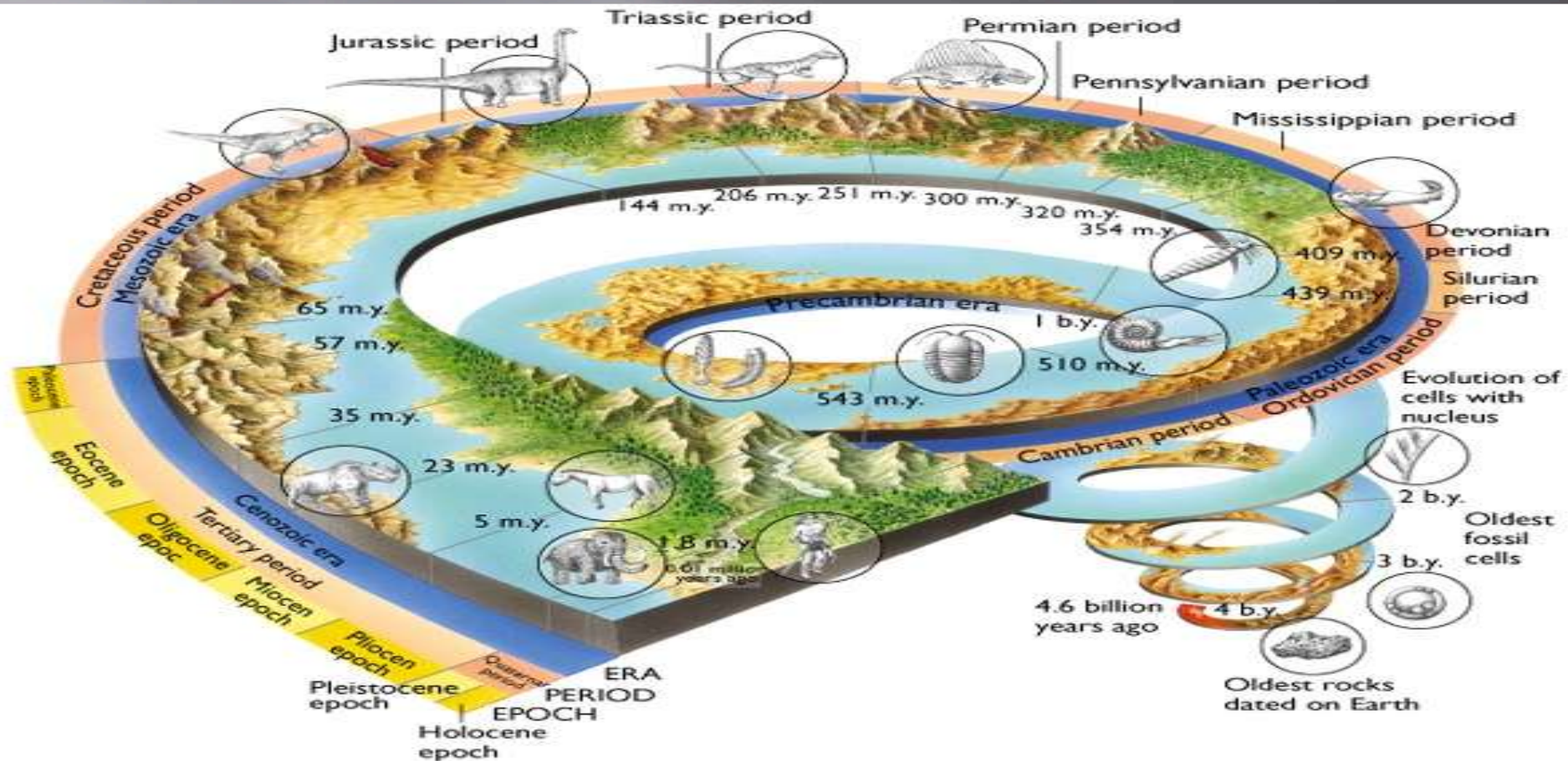
17-2 Earth's Early History

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



Thursday Questions

▣ Pg 428 (1-5)



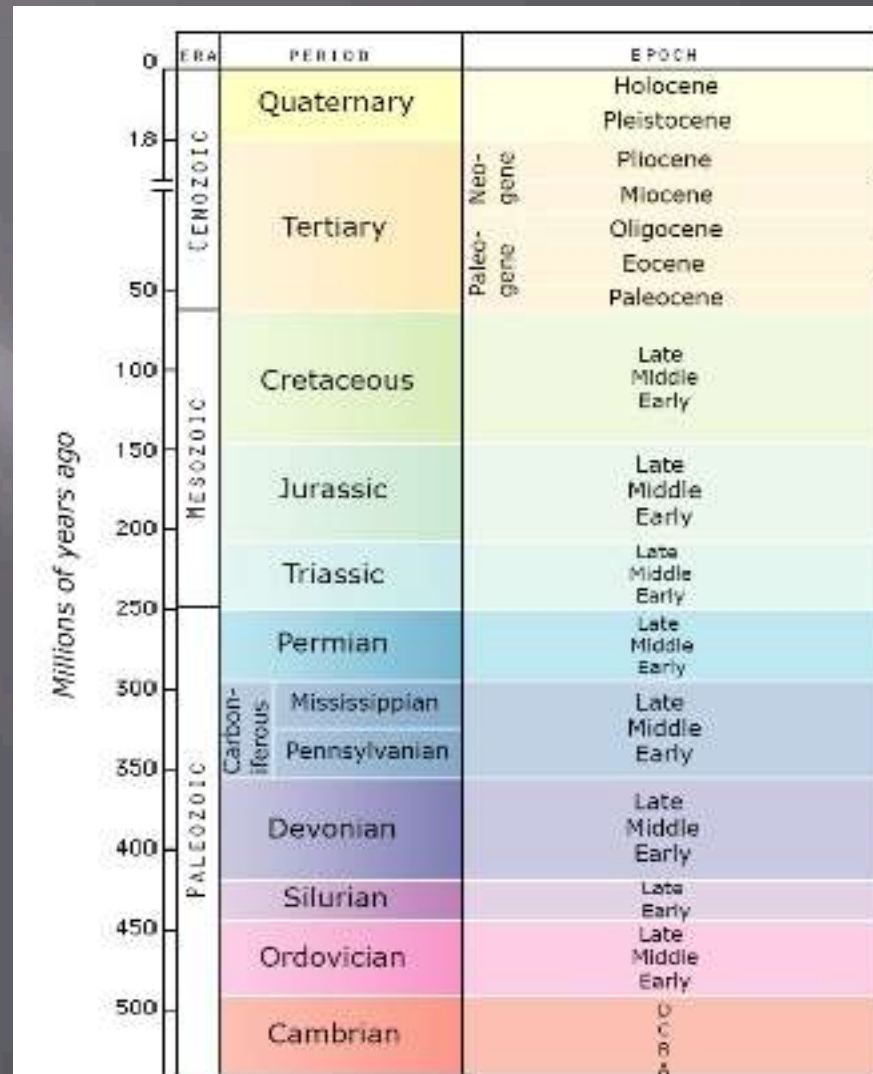
17-3 Evolution of Multicellular Life

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

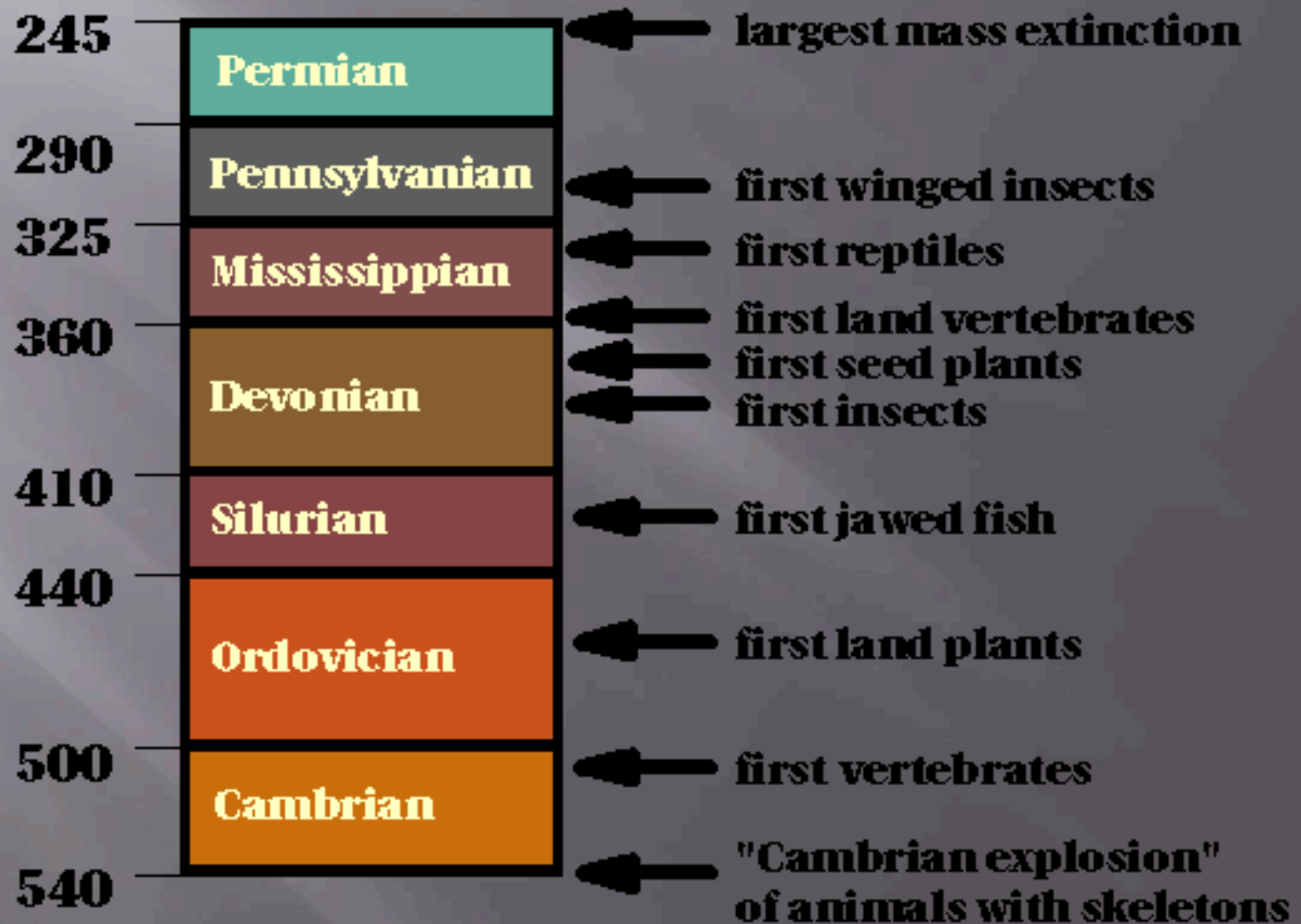


17-3 Evolution of Multicellular Life

- ▣ 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)

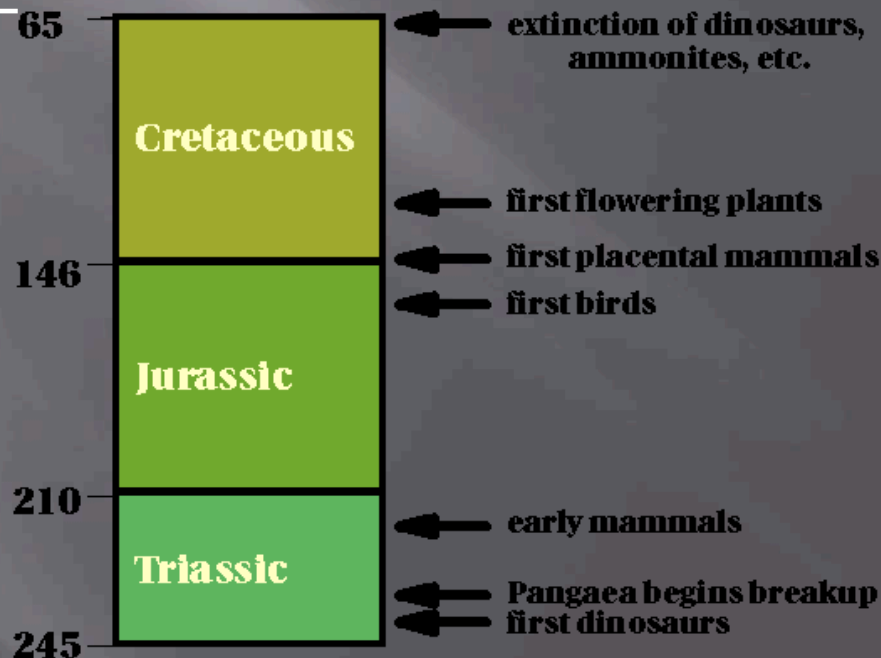


17-3 Evolution of Multicellular Life



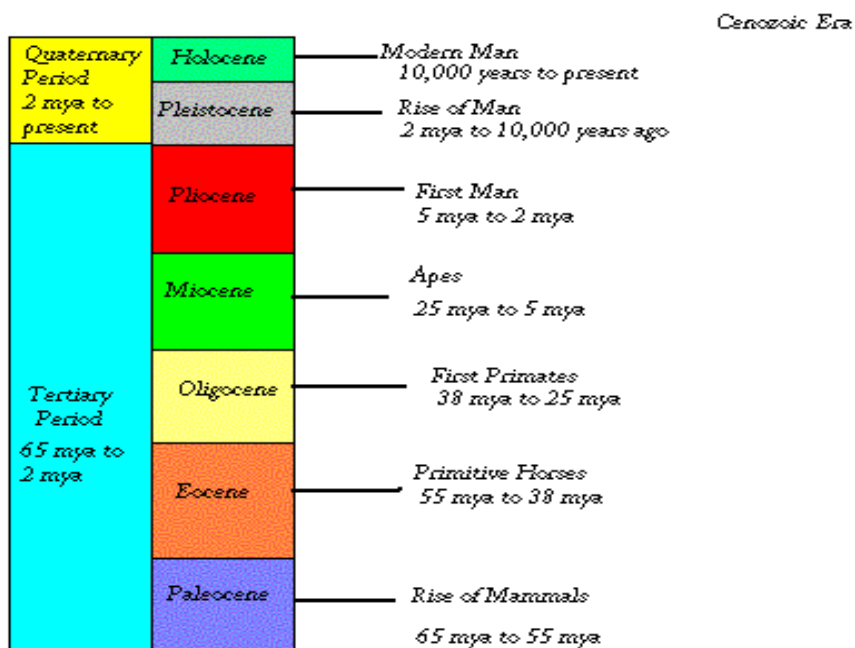
17-3 Evolution of Multicellular Life

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

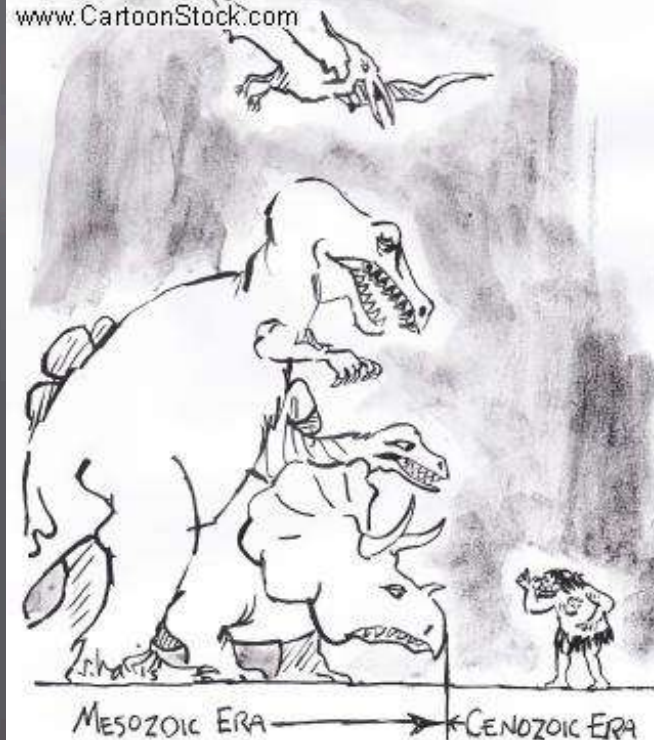


17-3 Evolution of Multicellular Life

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



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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

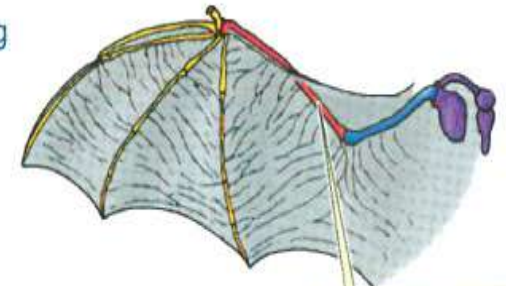


A pivotal moment in the hypothesis of macroevolution

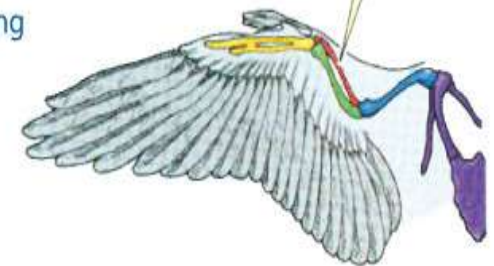
17-4 Patterns of Evolution

- ▣ 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

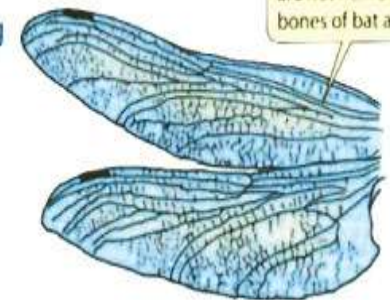
Bat wing



Bird wing



Insect wing



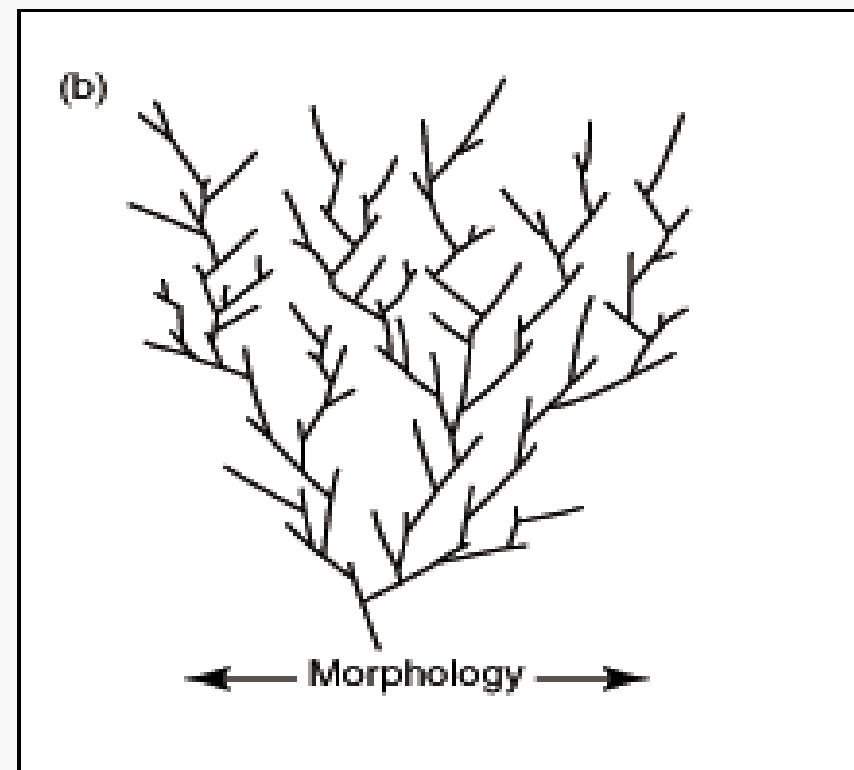
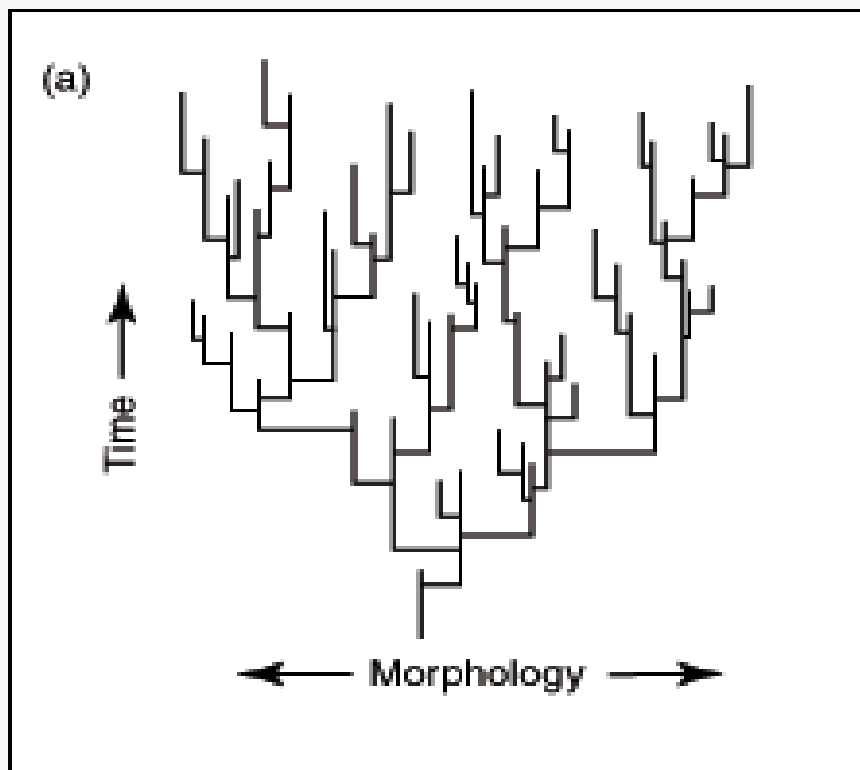
17-4 Patterns of Evolution

- ▣ 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)

