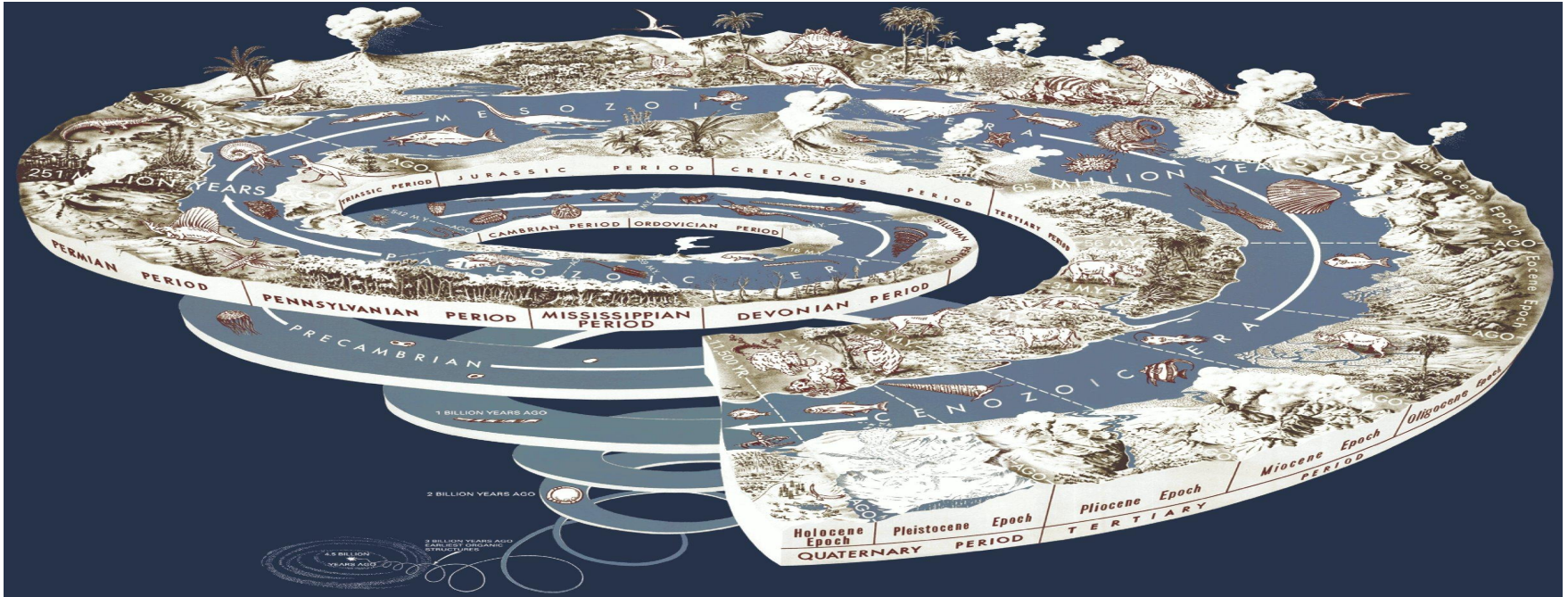


CHAPTER 17.4: PATTERNS OF EVOLUTION



Macroevolution: large scale evolutionary patterns and processes that occur over LONG periods of time.

Extinction

More than 99% of all species that have ever lived are now extinct.



Mass extinctions: wipe out entire ecosystems, food webs collapse causing many species to become extinct

The 5 major mass extinctions:

1. End Ordovician, 439 mya

60% of marine invertebrate genera go extinct.

2. Late Devonian, 367 mya

57% of marine invertebrate genera go extinct.

3. End Permian, 245 mya

82% of marine invertebrate genera go extinct.

4. End Triassic, 208 mya

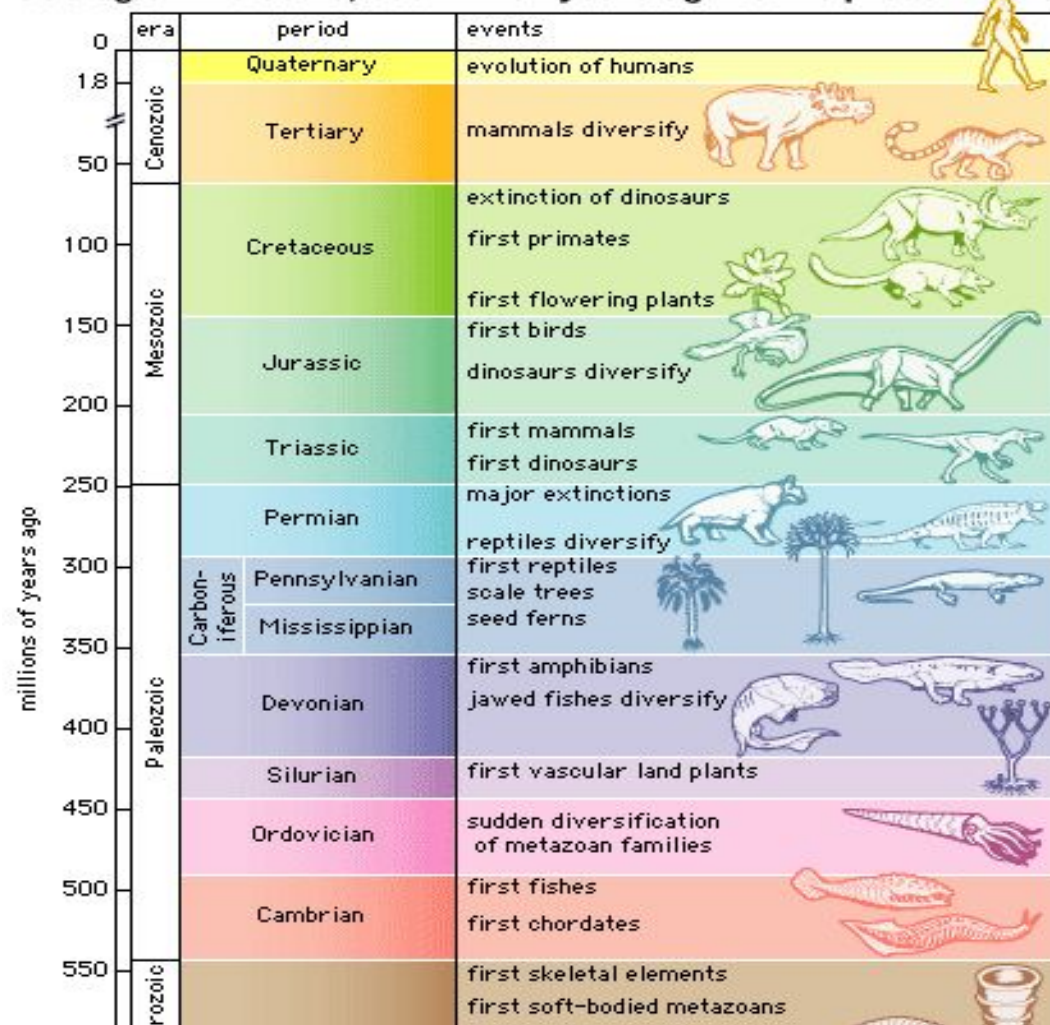
53% of marine invertebrate genera go extinct.

5. End Cretaceous, 65 mya

47% of marine invertebrate genera go extinct.

mya = million years ago

Geologic time scale, 650 million years ago to the present



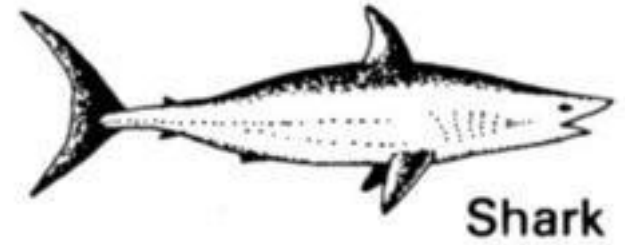
“Extinction is the rule, survival is the exception”
-Carl Sagan

Adaptive radiation:

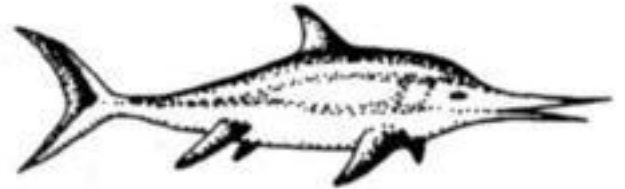
Process by which a single species or small group of species evolve in several different forms, living in different ways.



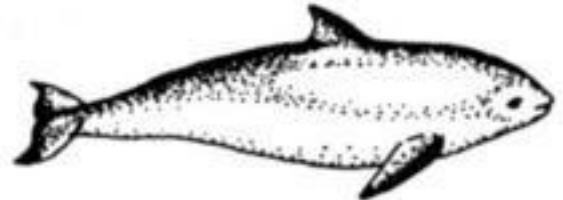
Convergent evolution: process in which unrelated organisms evolve similarities when adapting to similar environments.



Shark



Ichthyosaur



Porpoise

Coevolution: Process in which species evolve in response to changes in each other.

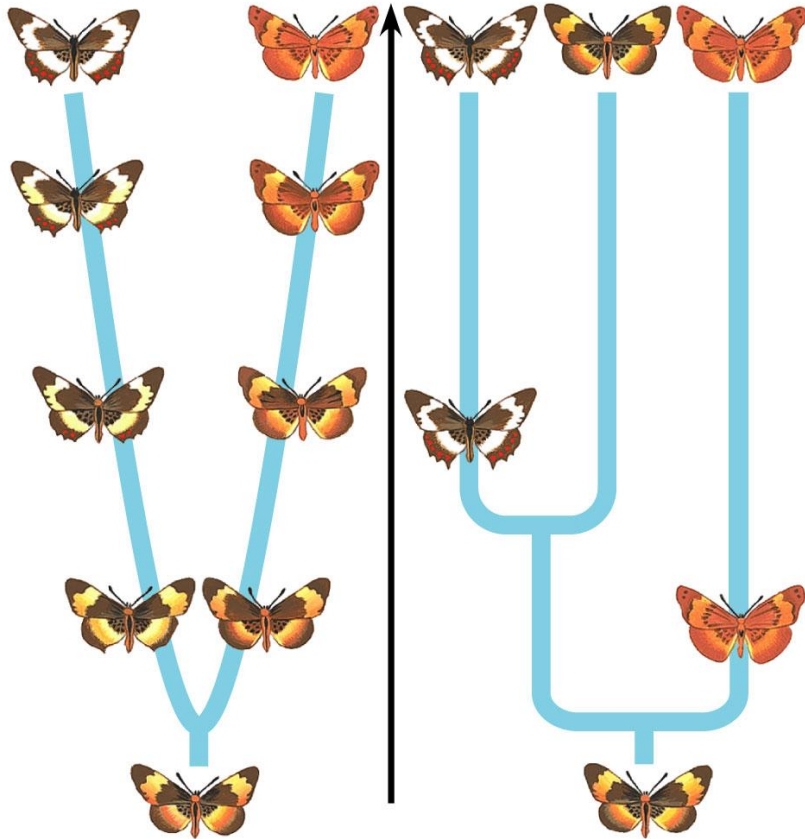


Friendly!

...Or not friendly!



Punctuated Equilibrium: pattern of evolution in which long stable periods are interrupted by brief periods of rapid change.



(a)

(b)



EVIDENCE FOR ADAPTIVE RADIATION

Hox genes: master control genes guide development in major body structure

