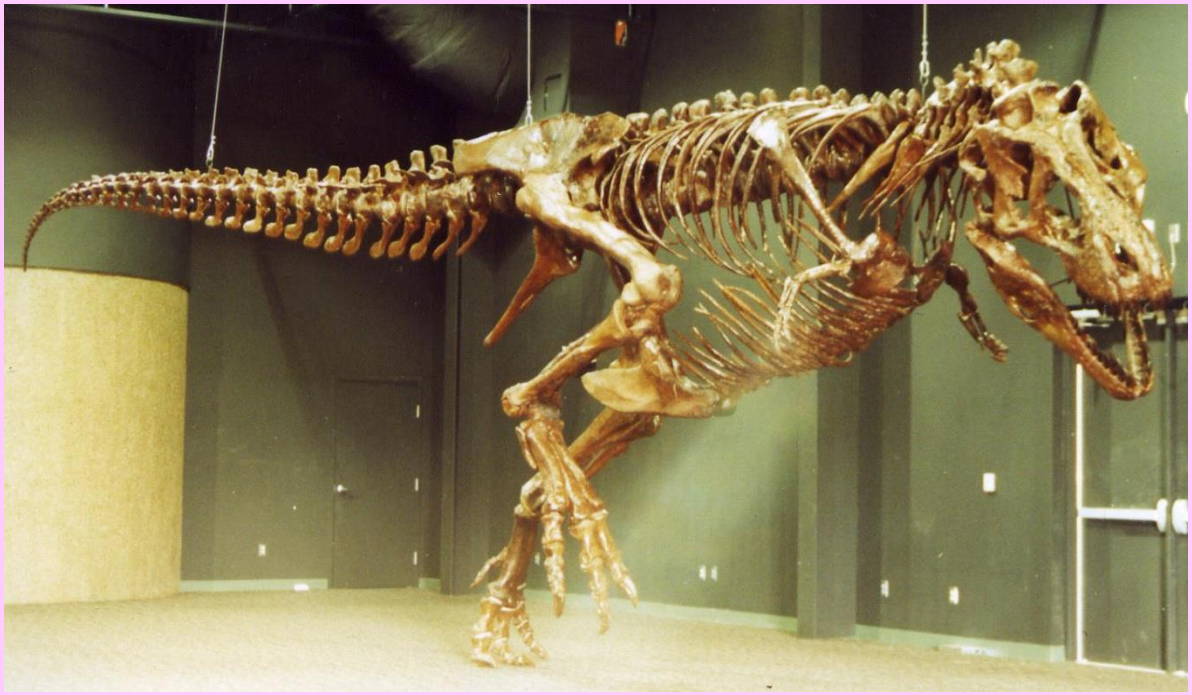
PATTERNS OF EVOLUTION



http://www.baystatereplicas.com/images/repro_dino_pecksrex3.jpg

Large scale evolutionary patterns and processes that occur over long periods of time = Macroevolution

1. **Mass extinction**
2. **Adaptive radiation (Divergent evolution)**
3. **Convergent evolution**
4. **Coevolution**
5. **Punctuated equilibrium**

Mass Extinctions

At several times in Earth's history large numbers of species became extinct at the same time

Caused by several factors:

- **erupting volcanoes**
- **Plate tectonics (continents were moving)**
- **Sea levels were changing**
- **Asteroids hitting the Earth**
- **Global climate change**

Example:

At the end of the MESOZOIC Era-

More than HALF of all plants and animals were wiped out… including the dinosaurs

http://www.changbi.com/file_img/webzine/dinosaur02_02.jpg

Effects of mass extinctions:

Opens habitats and provides opportunities for remaining species

After mass extinctions there is often a burst of evolution that produces many new species

EX: Cenozoic era that followed

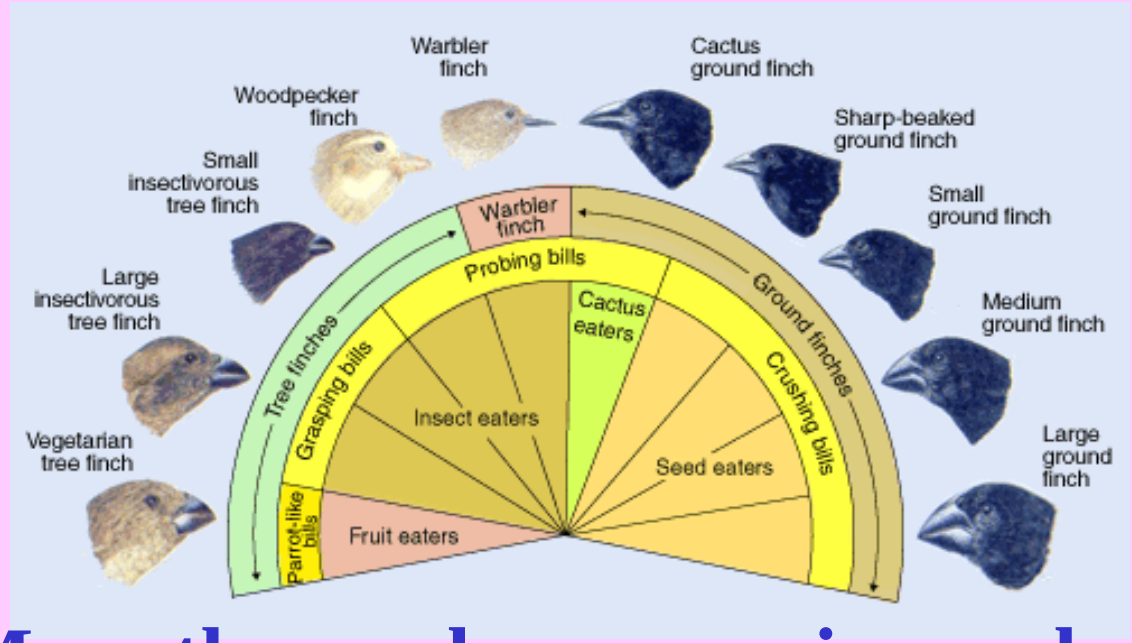
= "Age of Mammals"

Mammals species increased dramatically

Image from: BIOLOGY by Miller and Levine; Prentice Hall Publishing©2006

When a single species or small group of species has evolved through ___natural selection___ into diverse forms that live in different ways =

adaptive radiation OR divergent evolution



Ex:
Galápagos finches

More than a dozen species evolved from one species

http://www.pbs.org/wgbh/evolution/library/01/6/image_pop/l_016_02.html

Sometimes different organisms evolution in different places or at different times but in ecologically similar environments…and end up looking very similar.

Process by which unrelated organisms come to resemble each other = convergent evolution

Example:

Sharks, penguins, dolphins have all developed streamlined bodies and appendages to move through water.


Penguins

Think about biomes and common features of organisms to survive in the biome.

http://www.painetworks.com/photos/ii/ii1971.JPG

The process by which two species evolve in response to changes in each other over time

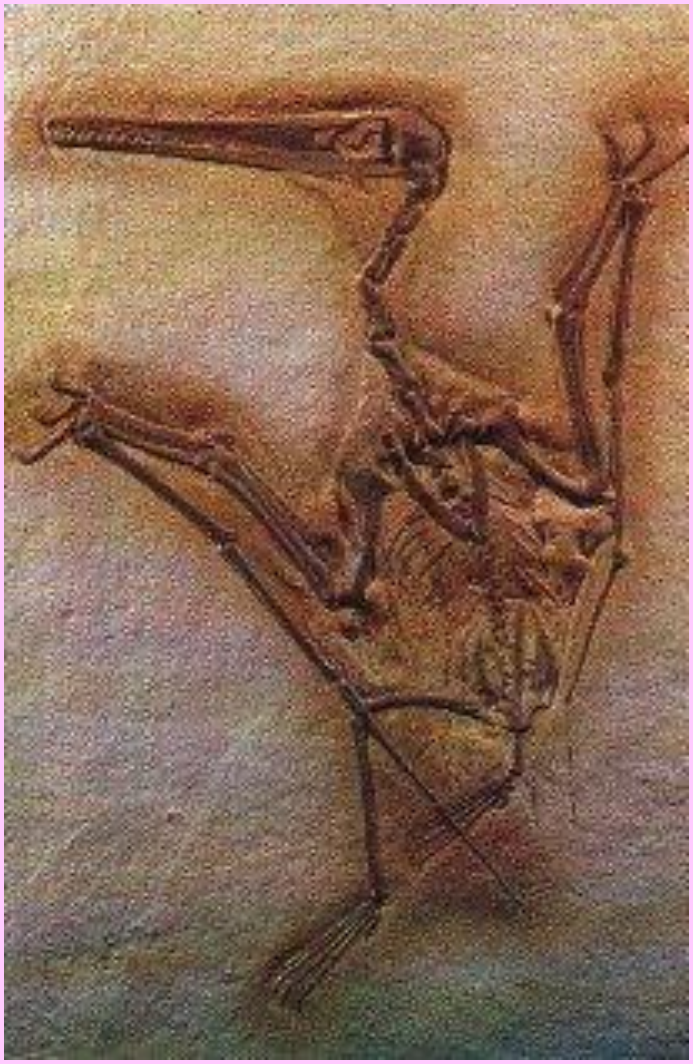
= coevolution

These species have a relationship

Predator and prey

Pollinator and flower

How fast does evolution operate?



Darwin believed evolution happened slowly over a long time

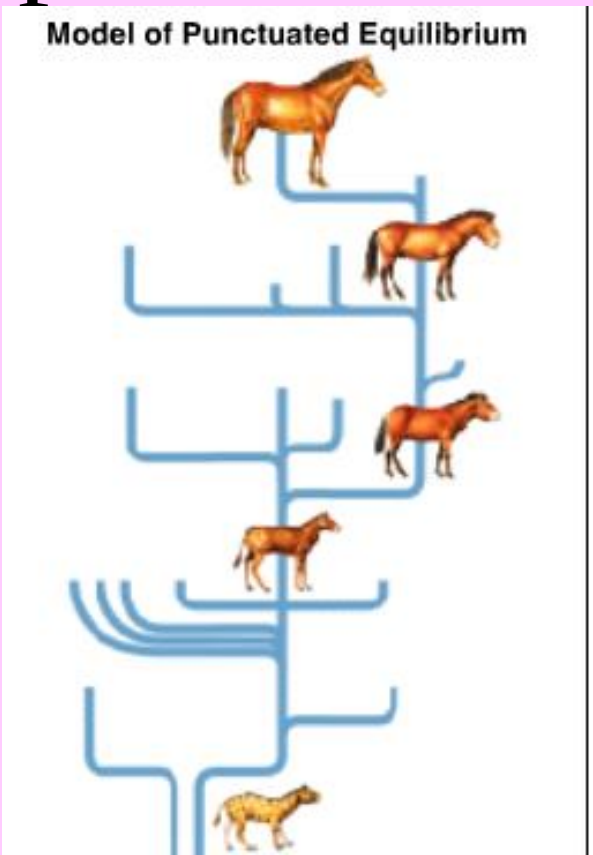
If biological change is at a slow pace, it is called _____gradualism_____.

http://animals.timduru.org/dirlist/dino/FlyingDinosaurus-Pterodon-fossil.jpg

Fossil record shows evolution happens more in bursts.

Pattern of a long stable period interrupted by a brief period of more rapid change

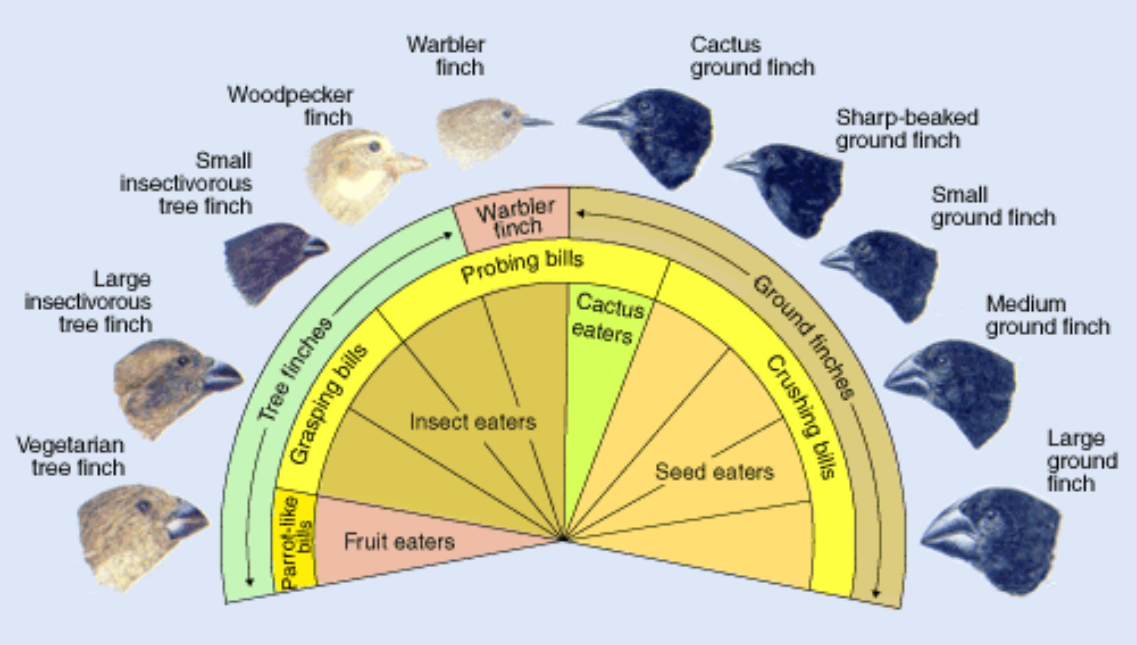
= **Punctuated Equilibrium**

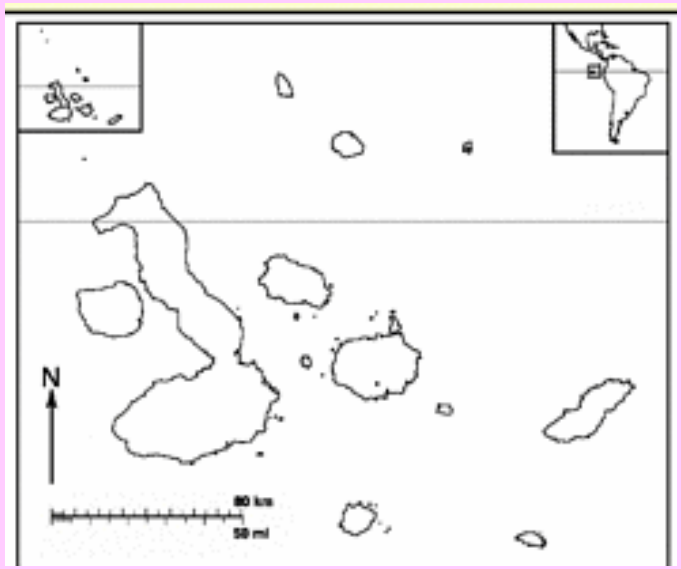


Rapid evolution after long periods of equilibrium can occur for several reasons:

1) Happens when a small population is ISOLATED from the main population OR

2) A small group MIGRATES to a new environment (like Galápagos finches)





http://www.pbs.org/wgbh/evolution/library/01/6/image_pop/l_016_02.html

http://tolweb.org/tree/ToLimages/blank_map.250a.gif