

Chapter 5 Changes Over Time



There are some things evolution can not explain...

Watch it brother!



Your shell is smooth

Section 1 Darwin's Voyage

Charles Darwin

-1831 was the naturalist on board the HMS Beagle for a 5 year voyage around the world

-Developed the theory of evolution by natural selection

-Saw many different kinds of animals and fossils

-One stop on voyage was the Galapagos Islands off South America



Species = a group of similar organisms that can mate with one another to produce fertile offspring

-Many species looked similar on the Galapagos to the mainland animals but were also very different

-Ex. Iguanas, birds, plants, etc

-Somehow each species had come from the mainland and adapted to the new environment

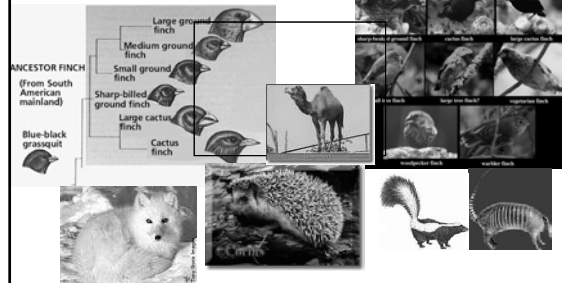


We'll watch a video on Friday about the Galapagos.



Adaptations = a trait that helps an organism survive and reproduce

Ex. Finches and their beaks



-Darwin reasoned that plants and animals that arrived on each island faced different conditions than on the mainland

-Species were forced to adapt

-He thought the species gradually changed over many generations changing over time to become better adapted to the new conditions

-Gradual change over time = evolution

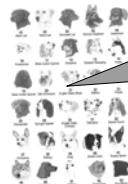
Play the elephant clip Dorchak!



-Darwin knew selective breeding gave organisms selected traits

-He thought evolution was a process similar but the traits were chosen by the environment

-Natural Selection = process which individuals better adapted for an environment are more likely to survive and reproduce to pass on these same traits (genes)



Woof, woof. Play the natural selection clip



THEORY OF NATURAL SELECTION

- 1) In nature there is a tendency toward overproduction
- 2) Not all the offspring that are produced will survive
- 3) variations exist in a population
- 4) variations are inherited
- 5) The individuals with variations that are best will live longer and pass on their variation to more offspring over time
- 6) the resulting population as a whole will change as it becomes better adapted to the environment

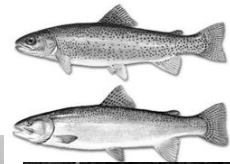
Natural selection is amazing coach...



Yep

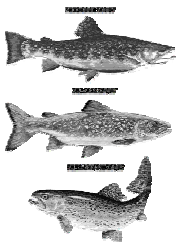
-Variations from mutations in genes or from shuffling of alleles during meiosis

-Genes pass from parents to offspring



-New species form when a group of individuals remains separated from the rest of its species long enough to evolve different traits

-Longer the species isolated more likely it will evolve into a different species



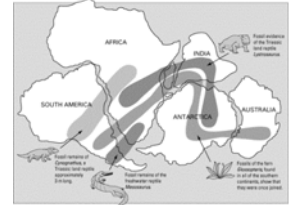
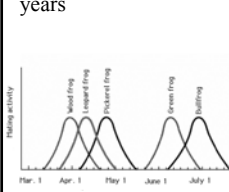
Continental Drift

-at one time all the continents were connected = Pangaea

-Organism could walk all over

-Continents broke apart and isolated organisms

-Been isolated in different environments for millions of years



Section 2 The Fossil Record

- most organisms remains decay when they die and nothing is left

- fossil = any trace left behind that an organism had lived (bones, a mold, anything petrified, something stuck in resin, or frozen in ice)

- fossil record = layers of rock trap the remains of the past in layers on earth's surface

- further down = older (usually)



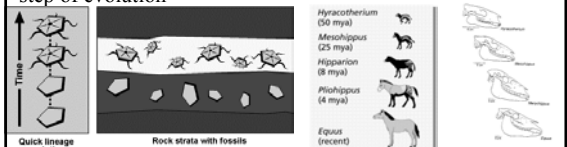
-fossil record incomplete because fossils are rare

-Knowledge of extinct species based on fossil record

-extinct species= no species now exist – most fossils are of extinct organisms

-Fossil record provides clues about how and when organisms evolved

- fossil record will never be complete enough to show every step of evolution

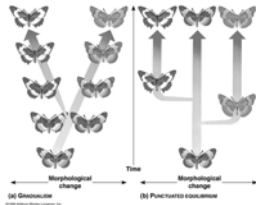


Two thoughts on how evolution occurs:

#1 = Gradualism = slowly but steadily – tiny changes add up to major changes over time

- fossil record should show but doesn't

* (don't write this) remember fossils are difficult to form and are hard to find

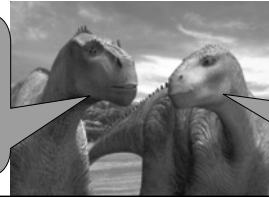


#2 = Punctuated Equilibria = evolution occurs in rapid short periods of time followed by little or no change

- short amount of time means difficult for fossils to form

- can occur when species is isolated or during major environment changes

How we went extinct is a good example of punctuated equilibria.



Dorchak should show a clip of that.

Section 3 Other Evidence for Evolution

Body Structure = organisms basic body plan

ex. Bones, skeleton, muscles, organs, etc.

-Structures change because of needs of different environments

-As organisms evolve their inherited structures modify

-Homologues = similar in structure, in function, or both; the more homologous structures shared by different kinds of organisms, the closer their relationship



Smallpox Symptoms (Black-pox)



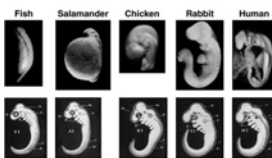
Evidence from Embryology and Biochemistry

-embryos are used to study the early steps of developing plants and animals

-Comparing the embryos shows a number of relationships not obvious in the fully grown organisms

-Ex) pig and human embryo

Embryo resemblances



Similarities in DNA

-Scientists studied the sequences of DNA for different animals with the same traits and found similar DNA sequencing

-Remember DNA codes for specific proteins (structures)

-DNA sequencing in Chimpanzees and Humans is 99% identical

-Between humans and other mammals is 80%

-We have common ancestors

We don't want to hear, see, or smell that we have anything in common with Mr. Dorchak!



Branching Tree = a diagram that shows how scientist think different groups of organisms are related – use all the evidence available to make a tree (Body structure, Embryology, DNA, Fossil Record Etc.)

