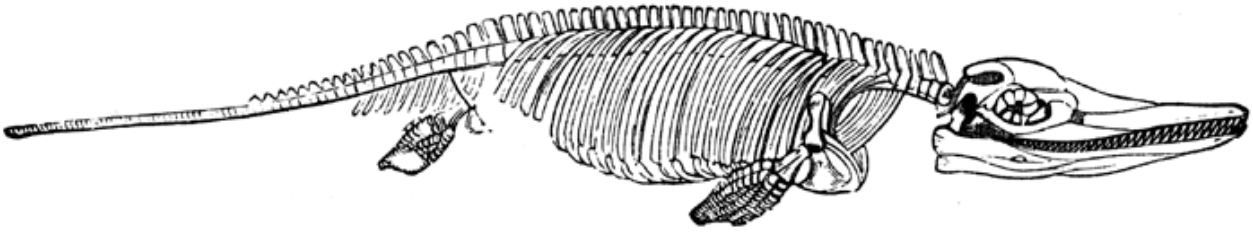
Adaptations for Survival



Natural History Museum and Planetarium

OBJECTIVE: Students will learn about animals and their adaptations to changing environments through geologic time. using the resources in the Natural History Museum.

Science GPS: S3E2; S4L2; S7L4; S7L5

DIRECTIONS:

Materials: print out of pages four through six of this activity for each student or group, poster board, rulers, pencils, markers, or crayons.

Pre-field trip: Students should learn what about adaptations. For reference study these animals and their adaptations: anteaters, armadillos, dolphins, beavers, shrews, penguins, bats, and birds (birds are particularly informative because of their different beaks).

Field Trip: Students will work solely, in pairs or in groups. Students will find the organism in the Natural History Museum and fill in the information required. This activity will require critical thinking.

Post-field trip: The animal sheets and posters or handouts will be returned to the students or groups with all the research they were able to do in the museum. Teachers may want to allow additional research after the field trip. Branching diagrams (cladograms) and how they are constructed will be discussed in the classroom. The specific organisms, adaptations, and relationships will be hypothesized and a branching diagram (cladogram)of individual organisms will be constructed.

Vocabulary:

Adaptation: an inherited change in organisms that makes them better suited to survive and reproduce in a particular environment.

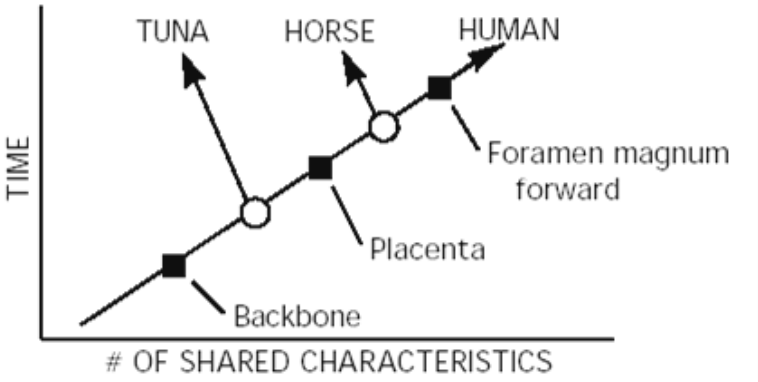
Evolution: The change in genetic composition of a population over successive generations, which may be caused by natural selection, inbreeding, hybridization, or mutation.

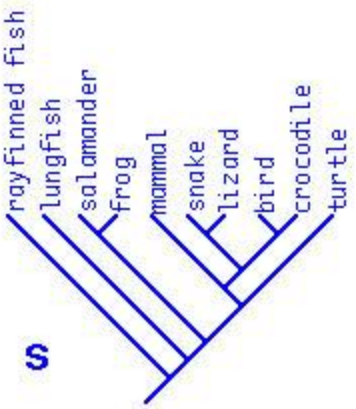
Convergent evolution: A kind of evolution where organisms evolve structures that have similar appearance or functions in spite of their recent ancestors being unrelated.

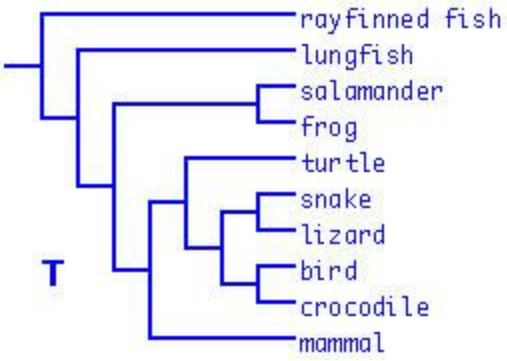
Divergent evolution: The process by which a species diverges into two or more descendant species, resulting in related species to become more and more different.

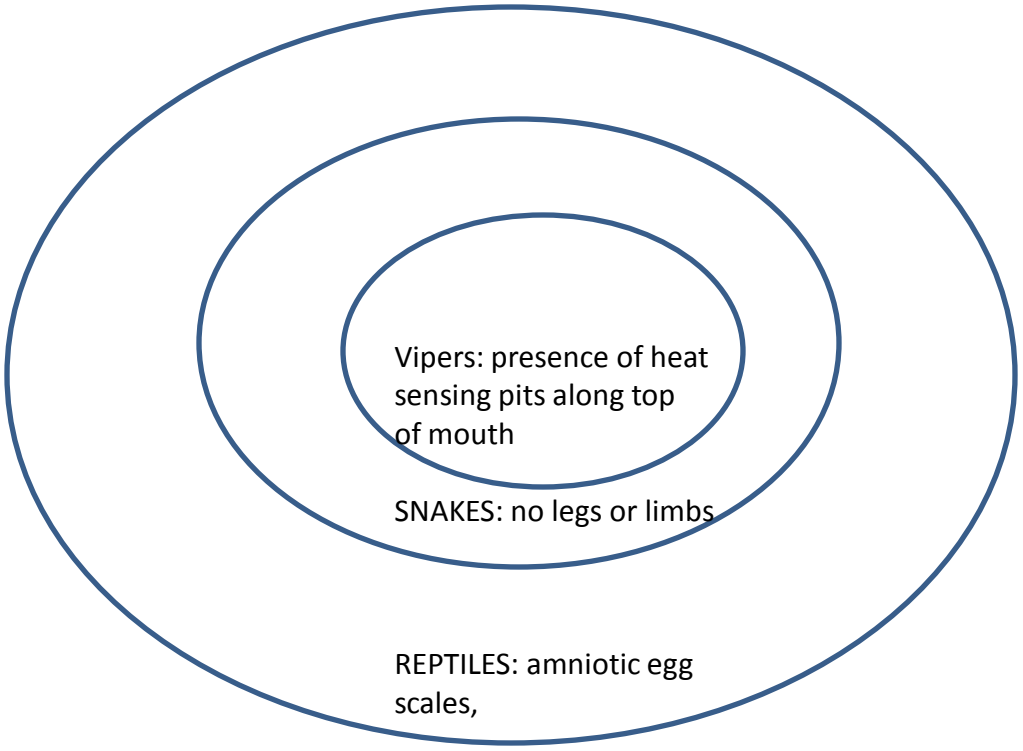
Cladogram - a branching speciation diagram depicting patterns of shared characteristics of organisms.

Simple Cladogram Examples









Directions: Find the assigned organisms in the Natural History Museum. Observe each organism or fossil. Identify a specific adaptation of that organism and answer the following questions. Next construct a cladogram for each organism using the information you have gathered.

Trilobite
Crab
Mega-toothed Shark, *Carcharocles megladon*
Goliath Frog, *Conraua goliath*
Tyrannosaurus rex
Archaeopteryx
Ichthyosaur
Turtle
Platypus, *Ornithorhynchus anatinus*
Saber-toothed Cat, *Smilodon fatalis*
Giant Bison, *Bison latifrons*
Modern Man, *Homo sapiens*
Harpy Eagle, *Harpia harpyja*
Armadillo, *Dasypus novemcinctus*
Two-toed Sloth, *Choloepus*
Giant Beaver, *Castoroides ohioensis*

Organism: (A) _____

What larger group of animals does this animal belong to? (B) _____

Identify a group of animals that this organism is the ancestor to. (C) _____

Describe an adaptation that this organism has that it's ancestor does not have.
(D) _____
_____

What does this adaptation allow this species to do? _____
_____
_____

Looking at the adaptation, what information could you hypothesize about (describe) the environment in which this organism lived? _____
_____
_____

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_____
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Construct your cladogram here.

1. Use the *larger group of animals the organism belongs to* (B) as the first group of animals on your cladogram.
2. List at least one adaptation or characteristic of that group of animals on the cladogram (E).
3. The *organism* (A) should be the second group of animals on the cladogram.
4. List the adaptation (D) you described on that species branch.
5. The group of animals that this organism may be the *ancestor of* (C) will be the final group on the cladogram.
6. List an adaptation that these animals have that the organism does not have on their branch (F).