

Finch Beaks

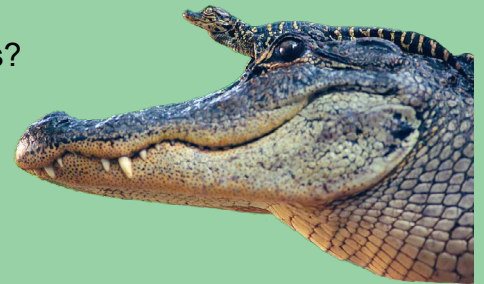


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**Do you need an idea for a scientific study?
Try out one of our ideas or make one of your own.**

Evolution explains how populations change over time based on changes in several factors. Take the following brief quiz to see how much you already know about evolution. See the bottom of page 4 to check your answers.

1. Temperature can affect whether an alligator egg becomes a male or female alligator.
 - a. True
 - b. False
2. About what percentage of the human body is actual human cells?
 - a. 10%
 - b. 40%
 - c. 75%
 - d. 95%
3. About how many years ago in the evolutionary path from a common ancestor did humans diverge from chimpanzees?
 - a. 100,000 years ago
 - b. 1,000,000 years ago
 - c. 3,000,000 years ago
 - d. 6,000,000 years ago
4. The appendix in the human body is now considered a “leftover” trait of earlier ancestors since it has no known specific purpose.
 - a. True
 - b. False
5. Human embryos have a distinct tail during their early development in the womb.
 - a. True
 - b. False



Draw a Tree

The phylogenetic tree provides a visualization of how different organisms are related by a common ancestor. In this activity, you'll create a phylogenetic tree based only on the habitat and eating habits of various organisms. The back page of this brochure provides instructions for creating a tree. Make sure to read that page before beginning this activity.

Materials Required

None

Procedure

1. Read the following information about each of the organisms.
2. In the space below or on your own paper, draw a phylogenetic tree that relates all the organisms based on their eating habits and on their habitats.

Organism	Habitat	Feeding
Harp seal	aquatic and terrestrial	carnivore
Black bear	terrestrial	omnivore
Sea otter	aquatic	carnivore
King penguin	aquatic and terrestrial	carnivore
Hippopotamus	aquatic and terrestrial	herbivore
Harbor porpoise	aquatic	carnivore
Blue whale	aquatic	herbivore
African elephant	terrestrial	herbivore
Killer whale	aquatic	carnivore
American alligator	aquatic and terrestrial	carnivore
Baleen whale	aquatic	carnivore

Phylogenetic Tree

Questions

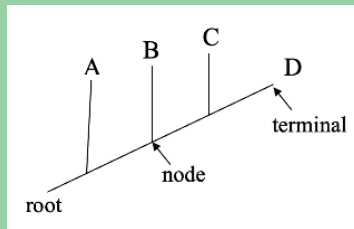
1. What other information could be used or collect to create a better phylogenetic tree of the listed organisms.

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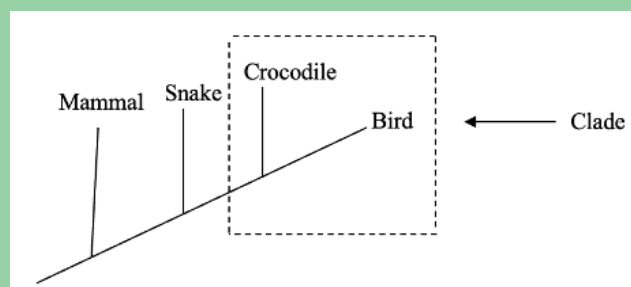
The Phylogenetic Tree

One of the tools used by researchers to determine how different organisms are related is the phylogenetic tree. The tree shows the point where different organisms diverge from common ancestors. The closer the divergent point, the more closely related the organisms. Lineages split during evolution often due to migration of individuals to a new region that is isolated from the initial area. As these two lineages become more different responding to the environment and to genetic mutations, the two groups evolve and become two distinct populations.

Usually, researchers create phylogenetic trees to indicate events that are relevant to living species. For instance, the tree in figure 1 shows four different species that arose from a common ancestor. The starting point of the tree is called the root and indicates the oldest ancestor. The attachment points of each side line to the main line from the common ancestor is called a node. The node represents the common ancestor between the two lines that emerge from the node. The end point of each side line is called the terminal.



If two terminal organisms or populations can be separated from the root with a single cut, this group is called a monophyletic group or clade. If two or more cuts along the root are required, these groups are called non-monophyletic groups. Figure 2 shows that birds and crocodiles belong to the same clade. However, crocodiles and snakes are a non-monophyletic group since this would require two cuts along the root line.



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Answers: Page 2 Answers: 1) a, 2) b, 3) d, 4) a, 5) a. Page 3 Answers: *** 1) Answers will vary. Might include genetic relationships and other factors.

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