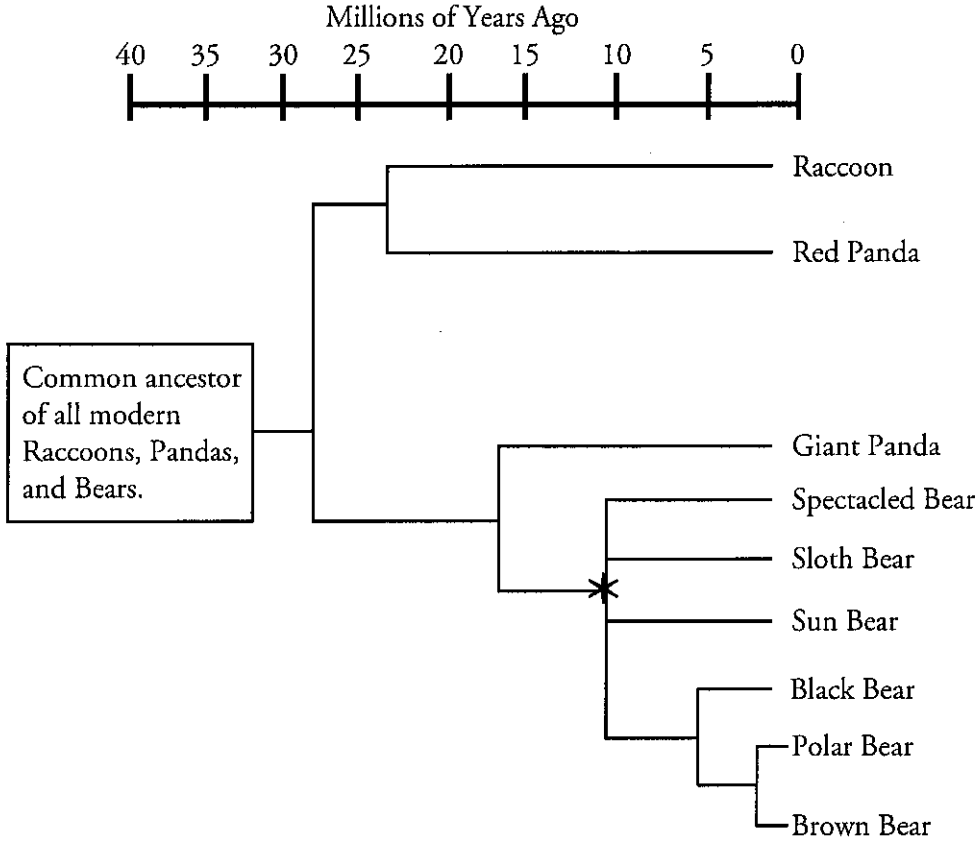
Phylogenetic Trees

How do the changes in gene sequences allow us to reconstruct the evolutionary relationships between related species?

Why?

The saying "Don't judge a book by its cover." could be applied to the topic of evolution. For example, humans share 75% of their DNA with chickens. Biologists point to this as evidence that humans and chickens once shared a common ancestor. The advent of DNA technology has given scientists the tools with which to examine how closely related certain species are. DNA analysis allows scientists to construct phylogenetic trees whose branches link together the relatedness of different organisms.

Model 1 – Phylogenetic Trees



1. Refer to Model 1.

   a. How long ago did the common ancestor of all the organisms on this phylogenetic tree exist?

   b. Which two lines diverged 30 million years ago?

   c. List all modern descendants of the organism that was alive at the point indicated by the asterisk.

2. According to Model 1, when did the Giant Panda line diverge from the line that led to modern bears?

3. According to Model 1, what animal shares the most recent common ancestor with the Brown Bear?

4. In a complete sentence, describe what the branch points and lines in a phylogenetic tree represent.

5. Which of the two branches from the common ancestor in Model 1 has the most living descendants?

6. According to the phylogenetic tree in Model 1, the Red Panda is most closely related to which animal?

7. Which are more closely related, the Giant Panda and the Red Panda or the Giant Panda and the Polar Bear? Justify your answer using grammatically correct sentences.