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Date_____ Professor/TA_____

Activity 26.1 How are phylogenies constructed?

Construct a modified concept map to relate the concepts of phylogeny and systematics listed below to the phylogenetic tree on the next page.

- Begin by writing each term on a separate sticky note or piece of paper.
- Then indicate how the terms are associated or related to each other and to the phylogenetic tree on the next page.
- Be sure to include definitions or descriptions of all the terms as you use them to explain these relationships.

Terms

clade	monophyletic	shared derived character
cladistics	polyphyletic	outgroup
phylogenetic tree	paraphyletic	ingroup
homology	convergent evolution	taxonomy
analogy	shared primitive character	phylogeny

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Use the understanding you gained from creating the concept map to answer the questions.

1. Compare the taxonomy of a group with its phylogeny (in general terms).

	Taxonomy	Phylogeny
a. Definition or purpose		
b. Types of characters used to develop		
c. What similarities could there be between the taxonomy of a given group and its phylogeny?		
d. What are the key differences between the taxonomy of a given group and its phylogeny?		

2. On the phylogenetic tree shown earlier, are the groups that contain humans, whales, crocodiles, and birds monophyletic, polyphyletic, or paraphyletic? Explain.

3. Considering only the individual representative organisms in the phylogenetic tree (e.g., bird, whale, frog), which can be used as good examples of analogy, or convergent evolution? As good examples of homology? Explain your reasoning.

4. In recent years, DNA sequence analysis has been used in developing phylogenetic relationships among organisms.

   a. What type of DNA has been used most commonly in this analysis? Why was this type chosen over others?

   b. The phylogenies developed using DNA sequence analysis may differ from those constructed using morphology and physiology. How do scientists know which method is more correct?

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5. Based on DNA sequence analysis, three major domains of life have been proposed What are the three major domains of life? What sets of characteristics place organisms into one domain versus another?

Major domains of life	Key characteristics