Phylogenetic Trees

Biology

This is an individual assignment. Answer the questions below by using the following website: http://evolution.berkeley.edu/evolibrary/article/0_0_0/evo_03. As you read, think, and document your responses, remember to concentrate on understanding a) what phylogenetic trees (phylogenies) are, b) how they can show you patterns of inheritance and genetic similarity and c) how they illustrate the diversity of life. Make sure you read all of the text, follow all of the instructions, and interact with the website where necessary. Work in Google Docs and submit your work through Showbie when you are done.

1. What are the three domains of life?

2. Are scientists sure that the phylogenetic trees we are using are 100% accurate? Why or why not?

3. Explain the conventions of a phylogenetic tree (phylogeny). What do the lines represent? When a line splits into half, what is being shown? Where are the different species located on a phylogenetic tree? What is a "clade"?

4. Scientists organize life in the form of phylogenetic trees now, but how did they organize it in the past? Why did they do this, and how is the old classification not accurate?

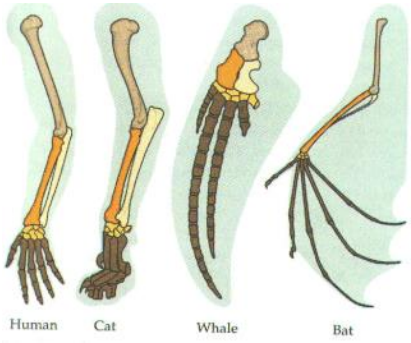
5. What are the three things the website suggests we keep in mind when reading a phylogeny? (Hint: #1 is not numbered!)

6. What information about species do scientists use to organize a phylogenetic tree? Use the appropriate scientific vocabulary in your response.

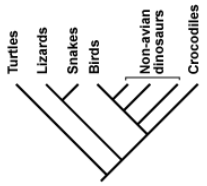
7. What is a **homologous character**? Give one example (not the one from the web page; you might need to do some additional research!).

8. What is an **analogous character**? Explain why bird wings and bat wings are analogous rather than homologous.

9. Explain convergent evolution and describe how it relates to analogous characters in organisms.



10. What is the main classification system of phylogenetic trees? How is this different from what was previously used? How has this created problems for some commonly understood groups (such as reptiles)?



11. How can time be represented on phylogenetic trees (and what problem can arise because of this convention)?

12. What are the three methods scientists use to figure out how old organisms are? Explain each in a short sentence (you will need to do a little additional research).

13. Answer the questions below using the timeline on the website:
    a. What major event happened 248 mya (million years ago)?
    b. What happened for the first time 360 mya?
    c. What evolutionary event happened 225 mya?
    d. What event happened 130 kya (thousand years ago) that is critical to all human beings?