

Molecular Biology and Phylogeny  
Plausible responses to Analysis questions  
For Teacher Use, or Student Use.

1. yes
2. humans and monkeys are more closely related than ducks and chickens.
3. yes; These show independent confirmation (when two or more independent types of evidence reveal the same pattern, confidence increases for the interpretation of relatedness).(See Background paragraph 2).
4. A) The "human-kangaroo" degree of relationship is twice as close as the "human-frog" relationship  
B) yes            C) differences between human and kangaroo: 9; between human and frog: 18; the cladogram therefore properly shows about twice the distance between human and frog as between human and kangaroo.
5. There are still many other factors which could be different, e.g. different chromosome numbers, and different DNA sequences (gene differences) sufficient to produce two different species.
6. A) much closer relationship; B) The two birds are more closely related (had a common ancestor very recently), while the two fungi would have to trace their common ancestry much farther back in time (much more distantly related). Another way of looking at this is that the two birds are in the same class (Aves), so their members are, by definition, much more like each other (and therefore more closely related) than they are to some other member of the animal kingdom (e.g. a clam). The two fungi are in the same kingdom, so they could be very similar, but they could also be very different (as they are).
7. Cladograms reveal probable relationships and degrees of relationships between groups of organisms, along with the relative times when different lines branched off (speciation occurred), showing common ancestry.