

Mesquite Phylogenetics Lab SUBMISSION

BIOL 01104 Fall 2018

Deadline: Start of class 11/26/18 **on paper**

Instructor: Dr. Spielman

Your Name: _____

Names of Lab Group (one per line in the space below):

1. Draw your lab group's most parsimonious tree in the space below. Its treelength is: _____

2. Draw Mesquite's most parsimonious tree in the space below. Its treelength is: _____

Along the Mesquite tree for #2 above, draw the evolutionary steps for your assigned column.

Also include the character at each tip and the character which you predict is the answer, based on parsimony.

The tree length for your assigned column _____ is _____.

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Column 7

1. How many and which taxa have the sequence "T"?
2. Is the "T" a **derived** or **ancestral** character for this column?
3. Did taxa gain T due to homology (shared ancestry), homoplasy (convergent evolution), or some combination? *Be very specific.*
4. Do taxa with T form a monophyletic, paraphyletic, or polyphyletic group?

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4. Do taxa with T form a monophyletic, paraphyletic, or polyphyletic group?

Compare columns 20 and 21

1. How many different characters does each column have and what are they? Do columns 20 and 21 have the same amount of characters (out of 4) or not?
2. Which column do you think is evolving FASTER? Fast evolution is when there are more changes during some period of time, and slow evolution is when there are fewer changes during some period of time.

Column 49

1. This column has evolved to contain all 4 nucleotides in different species. It is therefore a very *variable* column in the character matrix. Determine the most parsimonious number of changes for the circumstance where the ancestor is each of the 4 nucleotides. In other words, first assume the ancestor is "A". How many changes would need to happen in the tree to produce the data we observe? Do the same for C, G, and T as the ancestor. You should use the space below to DRAW each option, i.e. draw the same tree 4 times and map changes for each one assuming a different ancestor. **Label each tree clearly and CIRCLE YOUR FINAL ANSWER. Any answer uncircled will be ignored.**

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2. Now, assume that **C** is the ancestor for this column. Draw a new tree which would make all characters at column 49 *homologous*. In other words, draw one possible tree that represents evolution with NO convergence using the data for column 49. Make sure the tree is fully bifurcating, i.e. no polytomies.