BioG 1103 Name _____

Lab Day & Time _____ Lab Instructor _____

PHYLOGENY WORKSHEET

Chloroplast DNA was sequenced from a golden alga, a red alga, a green alga and from a flowering plant. DNA was also sequenced from a cyanobacterium similar to the one involved in the endosymbiosis from which chloroplasts first originated. DNA coding sequences for ribosomal RNA (rRNA) from these five species were aligned. A very small portion of the more than 2000-base sequence is shown below for all five species.

1 2 3 4 5 6 7 8 9 10 11

AGCGATCCTGC	*Synechococcus sp.*, a cyanobacteria
AGTAATCCTGC	*Heterostigma akashiwo*, a golden alga
AGTGATCCTGC	*Porphyra yezoensis*, a red alga (nori)
AGCGTTCTTGC	*Chlamydomonas reinhardtii*, a green alga
AGCGCTCTTGC	*Spinacia oleracea*, a flowering plant (spinach)

1. Draw below the most parsimonious tree based on the above data. At the tree's base, write out your hypothesized ancestral sequence (assume the outgroup's sequence is the same as the ancestral sequence). At the branch tips, indicate the taxa. Indicate nucleotide changes with a line across the branch where you think the change occurred. Next to the line, indicate the number of the nucleotide in the sequence and the direction of the change (e.g. #3,C⇒T).

2. Why is the tree you drew above the most parsimonious tree (given your data)?