

## **Molecular Methods Problem Set**

Due 11/10/11

1. Identify five problems associated with using molecular methods for diversity studies of environmental samples. (20 points)
2. Why are deoxynucleotides included in the PCR mix? How many units of Taq went into the PCR mix? What happens to the strands of DNA at each temperature of the PCR program? (15 points)
3. Include a print of the agarose gel showing the presence or absence of bands using different primers. Label each lane according to the group/function you were trying to amplify. Note the column from which your DNA came, the conditions of that sample (what was the column amended with, fresh or salt water, light or dark?). Comment on what the molecular results tell you about the ecology of your column (25 points).
4. What are ribosomes? Why is ribosomal RNA critical to understanding microbial diversity. What is the difference between rRNA and mRNA? Describe the ecological relevance of both (15 points).
5. Design an ecological experiment using tools from molecular biology. Clearly state your hypotheses and what tools you would use to test your hypotheses. Why are the tools that you chose appropriate for the questions that you posed (25 points)?