

Sample teaching statement from a graduate student in Biology. She was successful in her search for a post-doctoral position that combined both research and teaching.

- *What do you believe you know about her teaching from what she has written?*
- *What questions remain for you about her teaching?*

Statement of Teaching Philosophy

I have pursued research in the field of biology because I enjoy the application of logical thinking as a tool for exploring and satisfying my curiosity about the world around me. While sometimes frustrating, this freedom to explore the living world is what is so exciting about biology. I am inspired by those people and experiences that have motivated me to pursue research, and I wish to share that with others. As a teacher I aim to provide my students with the analytical skills useful in biology, including the ability to think and express one's self logically and the capability to learn outside the traditional classroom setting. I attempt to do so by modeling these behaviors in my own research and teaching and by providing appropriate opportunities for students to practice and develop these skills. Logic and independent learning are particularly important, but not exclusive, to the study of biology, and I hope they will serve my students in whatever career path they choose.

The lecture classroom setting allows teachers to present the necessary background information of a particular discipline. Often though the concepts and facts that we relay to students in the classroom are so removed from the laboratory setting in which they were first discovered that the excitement and relevancy of the material can be lost. One way I attempt to make material more salient is to create opportunities to 'do' research at an appropriate level. While a teaching assistant for L318:Honors Evolution, I designed a molecular evolution lab to teach how selective forces are inferred from DNA sequence data. The students used a relevant computer program relied on heavily by researchers (MEGA 3.0) to investigate if and what type of selection might be acting on a gene associated with human and chimp cognitive differences (ASPM:Abnormal spindle-like Microcephaly). Students were assessed on their ability to carry out the lab and correctly interpret the results using short answer questions. Given the opportunity to design more labs associated with this class and the appropriate resources, I would choose different organisms so that the lab could be extended to include isolation and sequencing of the DNA. They would generate their own DNA sequence data with the hope that the students would gain a better understanding of the link between the organism and the sequences they worked with on the computer.

A key way I provide opportunities for students to learn and develop logical thinking habits and independent learning skills is by involving them in my own research in the lab. As a mentor, I try to create as close to an independent research environment as possible for students by carving out complete research projects for them and allowing appropriate amounts of space to learn from their mistakes. For example, a student participating in an REU 10-week summer program assessed the relative contributions of cell division and cell movement to the formation of a specific tissue, the left coelom, in a species of sea urchin. He generated sections of embryos in order to analyze the number of cells in control embryos versus experimental embryos where cell division had been inhibited. A different student working in our lab for L490 credit used PCR, sub-cloning and sequencing to generate a full length clone of the Wnt-5 gene for use in functional studies of development in sea urchins. I have found that it is important to consider the background, motivation level, and amount of time I have with the student in creating an independent research environment. Lab research also provides the opportunity to develop skills

associated with independent learning – such as, reading the literature, evaluating data and concepts, synthesizing conclusions, and logical thinking associated with troubleshooting. Part of the way I help students develop these skills is by modeling the behavior and assigning tasks as opportunities for them to practice these skills. For example, I commonly teach people how to histologically examine sea urchin larvae because this is a useful method to examine the internal morphology of sea urchins. This technique provides a powerful way to determine changes in morphology resulting from treatments that perturb development. This involves embedding the larvae in paraffin wax, making thin sections of the tissue, staining the tissue, and examining it under a microscope. On separate occasions I show the student how to do these tasks, have the student perform the tasks under my observation, and then have the student perform the task while I am available for questions, but not watching them. If students then feel comfortable with what they are doing, they start their research. Additionally, I also try to help students develop independence by introducing them to scientific literature. Scientific literature can be riddled with jargon and unexplained concepts which I think is one of the most daunting obstacles to independent learning in biology, but it can be overcome with practice in a low stress environment. I assign students a few papers germane to their project to read. To keep them from getting overwhelmed they are to read the paper only to get a feeling for what the big question is, generally how the authors investigated the question, and lastly what the researchers discovered. I also have them highlight all the words they do not understand so we can talk about them. Fruitful research collaborations with undergraduates have resulted in the students receiving fellowships, successful application to graduate school, and the generation of beautiful results, some of which will be published in peer-reviewed papers.

Just as teaching and learning extends outside the classroom to the lab, so too does it extend outside the school campus. I think it is important to engage the community in learning about biology not only to expose children to a subject which they might be interested in pursuing later, but to foster a general understanding and appreciation for the world around us. To do this I think it important to discuss relevant topics that are applicable to everyday life. For example, at a local elementary school's science night I designed a booth about the current emergence of the 17 year cicadas (Brood X) in our area. With live cicadas to handle and the opportunity to mimic a cicada's eating habit by sucking honey through a straw, younger students learned about what was going on in the environment around them. However, parents were also engaged by relaying stories of their experiences 17 years previous, when the last batch of cicadas emerged.

I enjoy the teaching because of the opportunity to connect with people and share my love of biology. Each teaching setting has challenged me to expand my definition of teacher. In the future I would like to continue to refine my teaching skills by pursuing formal training opportunities, reading pedagogical literature, continuing my relationship with teaching service office and taking advantage of local resources. For example, I currently volunteer at our local children's science and technology museum, The Wonderlab. This experience has introduced me to a variety of people interested in teaching science at all levels of education as well as provided me with opportunities to practice teaching. I'd like to integrate ideas I've learned through these experiences in coordination with student feedback to come up with innovative strategies for teaching biology at the university level.