

STATEMENT OF TEACHING PHILOSOPHY

General interests and approach to teaching

I came to the realization that I wanted to teach biology while I was in college. The more I have learned about and experienced teaching, the more I know I want to be a teacher. I want to teach biology in particular because I want to give students an understanding and appreciation for the environment and all the living things in the world around them. More generally, I want to help students acquire knowledge and the ability to evaluate that knowledge to form their own opinions and decisions.

I prefer a learning centered approach to teaching where the emphasis is placed on the student. While understanding certain facts and concepts is fundamentally important in understanding biology, I do not want students to leave my classes with only a few facts memorized that they will soon forget. I want to give them a chance to learn the process of science by planning and carrying out experiments as well as evaluating the research of others. I want my students to learn general skills such as data analysis, critical thinking, and effective communication through writing, giving presentations, and participating in group work. I also take my role as an advisor and mentor seriously. I hope my students will gain increased self-confidence and enthusiasm for biology after interacting with me.

Teaching and learning strategies

Students will come into my classes with different learning styles and a variety of experience behind them, but I seek to accommodate their different learning styles by using a variety of techniques. I generally structure class time to include lecture, discussion (as a class and in small groups), demonstrations, and hands-on activities. To have meaningful class discussions, students need to learn a base of information through lectures and reading assignments; however, they also need to be given the opportunity to apply their knowledge and gain a better intuitive sense of concepts especially through active learning activities. In addition to time in the classroom, time spent in the lab and in the field can provide more opportunities for active learning through real world experiences. Students also need to be given the opportunity to ask questions and reflect on what they have learned in an informal setting. One way to do this is to set aside 5 minutes at the end of class where the students are given time to write down what the main points of that day's class were and include any questions that they have. The next class period, I can ask students to share what they wrote at the end of the last class as a way to summarize what was discussed previously and connect it to the next topic. Students reach a higher level of understanding when they see clear connections between concepts. Active student engagement in the material also increases understanding, and one way this can be accomplished is by talking about the connections and relevance of a topic being discussed to their everyday lives.

Using many different assessment measures to allow students to demonstrate understanding and to develop important skills is important. I try to write exams that allow students to show some mastery of specific details and concepts, but also include questions that allow them to interpret data, design experiments, and synthesize material from different parts of the course. In addition to or instead of exams, I like to include group and independent projects where students can gain experience in solving problems or even actively do self-designed research projects. Communication skills are developed and assessed through in-class discussions, oral presentations of projects, debates, and writing assignments.

Not only is writing essential for effective communication, but the process of writing also helps clarify thinking and encourages a greater depth of understanding. All courses I teach include writing assignments; some of these assignments are relatively short and informal, while others are longer assignments or revisions of previous work. I believe students learn more from getting feedback on drafts and revising a single assignment a few times than writing a lot of different assignments, so I like to give opportunities for students to revise their writing. I have also found peer review to be especially useful since students can learn from both giving and receiving criticism. To develop critical thinking, students in my classes read and discuss papers from the literature, articles from newspapers, and websites. I will never forget the first time I criticized a paper from the primary literature in a class in

college. My eyes were forever opened to the fact that just because something is published does not mean it is true or good science; I think this is crucial for students to learn.

In addition to assessing students, assessing the course and my own teaching is important. I like to use mid-course and end-of-course student evaluations to help me assess my performance. I keep a portfolio of each class I teach documenting what I did and what should be done next time. I realize that a lifetime spent teaching is also a lifetime of learning, so I try to stay current on topics in teaching and learning by reading the literature and attending conferences and workshops.

The role of a teacher as a mentor is often underappreciated, especially at large research institutions; however, I think it is a very important role. A good mentor is a good listener, is willing to spend time with students, gives advice when it is wanted and needed, gives encouragement, and pushes students to excel through constructive criticism. In my teaching experiences so far, one of the things I have enjoyed the most is working with students on research projects and helping them navigate the joys and pitfalls of doing science. I really like interacting with students, and I hope that I provide them with the support they need and can inspire them to pursue a career in science.

Teaching experience

I have enjoyed my teaching experiences to date tremendously. My first opportunity to teach a class by myself was a general zoology course in the Continuing Education Program at Guilford College over the summer of 2003. Teaching the course was challenging since most of the students had little to no background in biology and had not been in school for many years, but I learned a lot from the experience. For example, I found non-majors become easily overwhelmed when they only take a few really large exams without something to make them keep up with the material throughout the course. In subsequent non-majors classes, I have eliminated large midterm exams and replaced them with weekly quizzes. This helps students tackle small amounts of material at a time and prevents the feeling of being overwhelmed by the amount of information they have to know and understand.

More recently, I have taught two upper-level courses at Bowdoin College, Intertidal Ecology and Marine Physiological Ecology. In Intertidal Ecology, the students spent most of their class time reading and discussing the classic and current literature to become more familiar with the field of marine ecology as well as the process of how biologists do research. In Marine Physiological Ecology, I lectured on each topic and then the students chose a relevant paper from the primary literature and lead the class in a discussion of that paper. I found it difficult to get students to evaluate and synthesize rather than simply regurgitate information, but given substantial practice they generally get better at critiquing research by the end of the class. In both upper-level classes, students designed independent research projects and reported the results both in writing and oral presentations. Most of the students seemed relatively comfortable with designing and implementing independent projects but had a relatively difficult time analyzing their data. Biology students generally have a weak background in statistical analysis and the little time I have for it in class is not enough. Someday I would like the opportunity to teach a whole class in research design and statistical analysis.

In addition to the upper-level classes I taught at Bowdoin, I have also taught at the introductory and non-science majors levels. The introductory course I taught is Bowdoin's second semester of introductory biology, which focuses on teaching research skills and the process of science rather than any specific set of facts. The biggest challenge of this course was its size, 65 students, and I didn't feel like I connected with enough of the students in the class. Teaching the non-science majors class, Coastal Marine Life, has been surprisingly rewarding. When I talk to biology majors about how we need to treat our environment better, it is like "preaching to the choir" because the vast majority of them already care about the environment. However, I feel like I really make a difference in opening the non-science majors' eyes to how important the marine environment is and that we need to be more active in protecting it. I hope I will be able to teach and work with non-scientist throughout my teaching career.

Besides my more formal college teaching experiences, I have also been involved with outreach education programs and given talks to more general audiences. I have worked with younger students

from 5th grade through high school in volunteer programs, and I find that I really enjoy getting young people interested in marine biology. In 2004-2005, I helped develop the curriculum for the Bowdoin College Coastal Science Institute for Middle School Science Educators. Bowdoin offered a week long course for middle school science teachers to help improve the teaching of marine science, and the theme in 2005 was invasive species. I have translated my research into fairly formal research talks for non-scientist audiences such as the American Association of University Women and I have also talked informally to many casual bystanders while working in the intertidal on Bailey Island in Harpswell, Maine. Because science is so full of jargon, I have found it can be challenging to translate my research into something that an average person can understand; however, I have often been told that I am good at explaining things to non-scientists. It is very rewarding when I get a non-scientist interested and excited about something foreign to them.

Training in teaching and learning pedagogy

While guidance in conducting research is typical in graduate education, it is often difficult to get training in teaching. However, because of my interest in teaching, I sought out opportunities and participated in many teacher training programs during my years as a graduate student at Duke University, including: (1) the Certificate in Teaching College Biology, (2) the Certificate in Instructional Technology, (3) teaching assistant training workshops in the Biology Department, (4) workshops and discussions on teaching and learning offered through the Center for Teaching, Learning, and Writing, and (5) a series of 6 workshops on teaching called “Pathways to the Professoriate” run by the Graduate School. I was especially active in the Teaching Certificate in College Biology as both a participant and as a member of the organizing committee that runs the program. As a participant, the course I took on Teaching in Biology and the mentorship I did with a faculty member at a local liberal arts college, Liz Wolfinger from Meredith College, were particularly valuable in helping to prepare me for faculty life. In my current position at Bowdoin College, I continue to participate in college sponsored teaching workshops and I frequently talk with other faculty members about teaching strategies.