

## Teaching Philosophy and Practices—Dina Leech

**General Philosophy-** I believe that my job as an educator is to *uncover* facts, not cover them. Unquestionably, my students must understand basic biological and environmental principles by graduation. However, the path to this foundational understanding does not have to involve strict lecture and memorization. Rather, I empower my students to seek and critically assess scientific knowledge.

**Science Literacy-** I believe this ability to find and process scientific information is imperative to being a ‘good’ citizen and steward of the environment, science major or not. Our current society is built on technology and the science needed to sustain it. We live in a world with an ever-growing population, yet limited resources. Decisions we make every day have broad reaching consequences for our health and that of the environment. Thus, we have an ethical and societal responsibility to maintain a current understanding of science and technology and share this information with our broader community. I often start my classes with ‘Science in the News’, and I find it encouraging that my present and former students send me emails with reactions to news articles they’ve come across. I hope they continue to be life-long learners and strive to be citizen leaders.

**Communication Skills-** Information sharing requires skills in written and oral communication, both of which require practice, practice, practice. I therefore give my students opportunities to write and speak often in all my courses. Assignments range from informal class discussions or journal reflections to formal student research presentations and laboratory reports. I work hard to provide students with constructive criticism and feedback on all these assignments, such that their communication skills continue to develop and mature. For example, students in my writing intensive Ecology course are required to submit two drafts of their lab reports, the second being a response to my comments on their initial submission.

**Interdisciplinary Connections-** Both biology and environmental science are extremely broad disciplines, spanning molecules to ecosystems, natural sciences to social sciences. To the young scientist, sub-disciplines within each field may seem unrelated, such as ecology and cell biology or biodiversity and economics. However, the reality is that they are often mutually dependent. I therefore make a concerted effort to integrate interdisciplinary skills and concepts into my courses. For example, when discussing Industrialized Agriculture in my introductory environmental science course, my students are required to integrate knowledge of genetic engineering, plant reproduction, economics, and environmental/social ethics. This is facilitated through a case study of Monsanto, Inc. and their patented genetically modified seeds.

**Critical Thinking-** Effectively making these interdisciplinary connections requires critical thinking, which also requires practice, practice, practice. One way I encourage the development of critical thinking in my classes is to dive into the primary literature early and often. This allows students to see how scientists test concepts covered in class and present their results to the scientific community. Reading the primary literature promotes conceptualizing, applying, analyzing, synthesizing, and/or evaluating information. My students

are often required to write 2-3 page reflections on papers we've read from the primary literature. These reflections not only require them to briefly summarize the main points, but also think about the implications and applications of the article to the scientific community and the general public.

**Quantitative Skills-** Quantitative reasoning skills are also essential, especially in the biological and environmental sciences. To teach data visualization and statistical analysis, I emphasize the use of comprehensive, online datasets to investigate ecological and environmental issues. In my Environmental Applications course, students analyze data collected by federal organizations like NASA, EPA, USGS as well as the UN Food and Agricultural Organization (FAO), to answer questions regarding climate change, freshwater scarcity, and pollution. I'm always saying to my students "show me the data!".

**Student-Directed Research-** To me, teaching and scholarship are inseparable. I am committed to incorporating research into my teaching endeavors. Upon entering the lab or field, the look of amazement on my students' faces as they realize what they learn in the classroom is actually applicable to basic and applied research is priceless! While gaining hands on training, self-directed research forces students to think more critically and learn what interests them. All my lab courses include independent research projects. Working in small groups, students identify, design, and execute a 4 to 5 weeklong research project with guidance from myself. Once their data are collected, the students are required to plot and analyze their results. The final product is presented as an oral presentation on the last day of lab at our in-class research symposium. I love seeing them take ownership of their projects in front of the classroom.

**Classroom Environment-** I see learning as a two-way street. Ideally, my courses are a series of intellectually stimulating conversations between my students and I. In order to create this atmosphere, respect and approachability are essential. I establish these in part through my high energy and enthusiasm for the subject matter. Lectures include questions throughout to keep students engaged and challenged, and I include both in and out-of-class activities that encourage students to teach each other. In doing so, I try to accommodate different learning styles: reading, listening, seeing and doing. Objectives for the course as well as for each class period are clearly laid out so there are no surprises along the way.

**Achievement and Diversity-** It has been my experience that my students perform better and can be challenged to think more critically because they recognize that I genuinely want them to succeed. For me, mentoring students from a diversity of backgrounds has been one of the most rewarding aspects of academic life. I am excited to provide all students with the skills necessary to achieve their goals. However, I have noticed a disturbing trend that my minority students often struggle more than others. I take these discrepancies seriously and particularly reach out to these students to instill confidence that they can do better. It is my belief that all students can succeed if they are willing to put forth the effort.