Jessica A Rick | Teaching Statement | Fall 2016

Curiosity and critical thinking drew me to a career in biology, and I strive to foster these two important abilities in my students by focusing on a growth mindset. I believe that the important parts of science education come in learning how to analyze and think critically, as well as to communicate the results of these processes. These skills are relevant in daily life both as a scientist and as a citizen of the world, and therefore of the utmost importance in all biology classrooms.

Just as science is an ongoing process, I use the idea of a growth mindset to encourage my students to similarly focus more on process than on product. Growth mindsets are fostered through rewarding hard work rather than simply the right answers, which encourages students to embrace challenges and see failure as a foundation for growth rather than evidence for their lack of intelligence. As an instructor, I can foster growth mindsets by encouraging students to immerse themselves in the process and to derive satisfaction from working hard rather than simply getting the right answer. I believe that an instructor's role is to foster this mindset inside and outside of the classroom, as it is the foundation for lifelong learning and satisfaction, no matter what career a student pursues afterward.

I believe an important component of teaching involves engaging with students' curiosity about the world. The most fascinating thing about biology for me is the actual process of asking questions and figuring out how to then answer those questions, and this sort of curiosity can lead students toward a focus on process rather than results. This connection to students' curiosity often requires looking beyond the ideas presented in textbooks, through lab exercises, introducing students to scientific literature, or a combination of the two. Connecting textbook concepts to "real" research additionally engages students with the process of science, which is something that I believe most students do not get enough exposure to throughout their undergraduate careers.

In my experience as a teaching assistant in laboratory-based classes, I have seen firsthand the importance of hands-on learning and how much more easily students remember concepts connected to laboratory exercises than those simply learned in lecture. Though it is not possible to conduct laboratory exercises in every course, I believe that it is important to engage students in active learning in non-laboratory classrooms as well. Active learning, in the sense of using activities to engage students in the process of learning, encourages students to play with the information being taught and examine it from different angles. This is one more way to move students beyond simple memorization and into engaging with topics in a more in-depth manner, which is important in fostering growth mindsets.

In my time as a teaching assistant for Genetics and Ecology courses, I designed one lab for each class related to my master's research. These "DNA Sequencing" and "Molecular Ecology" labs tied my thesis research into the concepts the students were learning in their lab classes and resulted in animated and engaged discussions related to local wildlife in northern Minnesota. I found that these lab exercises were some of the students' favorites, because they felt that they were contributing something other than just completing the cookie-cutter exercises typical in lab courses—and in doing so, were challenged to focus on the process rather than just getting the expected answer at the end of the class period.

An important part of the scientific process—almost as important as actually doing the science—is being able to communicate effectively, and I believe that this is an important skill for students to learn throughout their undergraduate education. Communication involves reading, writing, and discussing science, and I work to incorporate elements of each of these into courses that I teach. In my experience with early undergraduate courses, this means working through a scientific paper as a class to dissect the ideas, questions, methods, and results. In a more senior class, this involves asking students to seek out literature on their own, about a topic they are interested in, and empowering them to read, interpret, and synthesize these papers independently. I like to also take a step beyond engaging students in reading scientific literature and have students learn the art of professional scientific writing by writing scientific papers themselves. As a master's student, I collaborated with several professors at the University of

Minnesota-Duluth (UMD) to create a senior-level undergraduate writing class aimed at teaching students the scientific publication process through producing the *Duluth Undergraduate Journal of Biology*, a journal for which the students served as authors, reviewers, and editors, under the professors' guidance. In this course, students spent the semester writing a research or review paper, getting feedback from the instructors on that manuscript, and peer reviewing one another's manuscripts. I hope to incorporate elements of this course, such as scaffolding writing assignments, into all future courses that I teach, not only at the senior undergraduate level.

Biology is the study of the world around us, and I use this idea to guide my work both inside and outside of the classroom. I believe that the knowledge and skills provided to students inside the classroom should translate both to the laboratory setting and to non-science pursuits as well. I also strive to foster a growth mindset in my students through a focus on curiosity, critical thinking, and communication. Throughout the course of my graduate career, I have sought opportunities to improve as an educator. Each teaching experience that I have had has helped to shape the views I have as a teacher, and I look forward to continuing to revise and shape my vision as I gain more experience in the future.

Thesis/thread to tie everything together: *curiosity and critical thinking, taking in and analyzing the world around you*

AIM TO PROVIDE STUDENTS:

- Analytical skills
- Critical thinking skills
    - Curiosity as a way of thinking critically about the world around us
    - Both in interpreting others and crafting own logical arguments
- Learning skills (wording?) – how to be good learners
- Communication skills
    - Writing, speaking, listening
    - Small group skills, how to work with one another
- Growth mindset
- Skills relevant to daily life, as well as scientific pursuits

Science is more interesting to students when they find it relevant. Luckily, biology surrounds all of us every day, and thus biology can easily be made interesting and applicable for students. Likewise, connecting ideas taught in a lesson with "real" research—whether it is research currently underway at the students' institution or across the globe—is another way of making classroom ideas more interesting to students.

I believe that communication is an incredibly important skill for students, and teaching effective science writing has become an important component of my teaching.

Important things to me:

- Biology/science as a framework for interpreting and understanding the world, rather than as a set of facts to memorize
    - Fostering a sense of curiosity, and an emphasis on science as exploration
- Developing students as learners and critical thinkers, and giving them tools to develop these skills
- Developing communication skills (writing and speaking)
- Developing small group skills through student-student interaction in the classroom
- Science as a creative process—and working to foster this creativity
- Student choice

Examples of things that I've done/experiences I've had:

- ~~Creating a "DNA Sequencing" lab for genetics lab and "Molecular Ecology" lab for ecology lab → based on my own research, and working to make these exercises relevant to the students in the class and get them involved with "real" research~~
- Helping to create the DJUB class to work on upper level undergrads' writing skills → teaching them skills actually relevant to science/grad school
    - Many students come out of undergrad only familiar with writing prescribed "lab reports," and have little understanding of what scientific writing *actually* looks like
- Evolution: experience with working to incorporate more active learning/group work, etc. in a lecture-style class (it works!)
    - Much different than my experience as an undergrad
- Ecology: the importance of hands-on learning, and striving to bring this experience into classrooms (even if it isn't traditional "hands-on" learning)