**Bruce Taterka**

**PolarTREC Needs Assessment**

**April 15, 2013**

Personal Vision for the Classroom

My personal vision for the ideal classroom is to create a place where students can become excited about the subject (usually science) and develop the desire to learn. This can and must be done through a variety of methods. My approach is to provide basic information through short, attention-grabbing, interactive lectures that emphasize photographs, short video clips, anecdotes/reports from my expanding base of teacher-research experience, and lots of questions. After providing a foundation, I try to get students to inquire, discuss, explore and make connections using activities, lab studies, outdoor class, field trips, news stories, and community events.

Obstacles

Obstacles to implementing my vision are varied. My environmental classes are externally assessed at the end of the year using either the Advanced Placement ("AP") or International Baccalaureate ("IB") test. This requires me to spend classroom time doing test preparation. It can be difficult to get students outside to study the environment, particularly during the winter. Other obstacles are typical to the public school experience - large classes, competing demands on the time of overscheduled students, senioritis, teenage angst, etc. Fortunately, I teach in a district with good resources and technology so I don't face the extraordinary challenges faced by many of my colleagues in less well-provided-for schools.

Realistic Ways to Share the Experience With Students

I have experience sharing my previous teacher-research experiences with students and will continue to build on that. I will design lab activities and outdoor classes based on my research. I have already had my students measuring soil microbe respiration with Vernier CO2 sensors and relating that to the carbon cycle. Next year I will make that seasonal, measuring the effect of temperature. I plan to gather information at Toolik to create lessons on the Arctic food web. Also, having done research in Ecuador, I plan to create lessons based on my experiences comparing Arctic ecology to tropical ecology.

I plan to design lessons for a range of grade levels and reach students in middle and elementary school as well.

Finally, I find that having research experience infuses everything I do as a teacher; it works its way into everything I do every day, not just content knowledge but also providing first-hand knowledge of the process of science, exotic locations, and the spirit of adventure.

Things I Expect to Learn

* A lot of content knowledge on Rose & George's work on aqueous chemistry, lab methods, and the carbon cycle on the tundra.
* Wide-ranging information on Arctic science in general, and the specifics of other projects going on at Toolik.
* Along with seeing the Alaska pipeline up close and personal, I hope to get up to Prudhoe Bay and see the oil infrastructure there.
* I hope to get to meet and learn from scientists about life as a scientist doing field work on remote locations year after year, and combining that with life at the University.
* I hope to get to see some cool birds and other wildlife.
* I would love to get to meet indigenous people and learn about their culture, but not sure that this is a realistic expectation.

Student Needs and Changes to my Teaching Methods

* Use more data and teach students better data analysis methods. I already have students gather real data and attempt to analyze with Excel, but this is a challenge for many students. I am developing plans to collaborate with a math teacher to have his statistics class collaborate with my environmental class to analyze real environmental data. I hope to obtain data this summer to use for this exercise. He's excited because he'll get to use real data that I can make interesting (hopefully) to his students, while I will get the benefit of his experience teaching statistics and data analysis.
* More outdoor lab activities, with more relevance. I hope to generate lab activities based on my work this summer. I'm already starting to do this with my new soil microbe lab, and I'm also tinkering with my existing UV lab to make it relevant to the Arctic or Antarctic.
* Encourage more students to participate in polar research. In the past I have succeeded in having students win Earthwatch student fellowships to go on research expeditions, and I'd like to do the same for polar experiences. It would be great to have students do Girls on Ice, research in Greenland, and other summer programs.
* Involve researchers in my class. Again, this is something I already do, but I would like to have polar scientists interact with my students by email, Skype, webinar, etc. I would love to have my students graduate from Mendham High School and work with George or Rose at Michigan or UNC.

Equity, Gender & Socioeconomic Issues

* I think I already do an excellent job with gender issues, promoting girls to do science in extracurricular activities and field work and bringing women scientists in to my class as guest speakers.
* I want to develop a program to connect my very wealthy students with less-privileged inner-city students on environmental field work. I have already begun networking with educators in Newark, NJ to do a collaborative program to study NJ's Passaic River; my school is at the headwaters of the Passaic in the "nice" part of NJ, while Newark is at the mouth in the polluted, industrial, less well off part of NJ. I envision a program where Mendham and Newark students could do a 2 or 3-day study of the river from headwaters to mouth, studying human society along the river and relating that to the chemistry and biology of the river. I am brainstorming ways to make my PolarTREC experience enable this vision.