



TEACHERS AND RESEARCHERS EXPLORING AND COLLABORATING

PolarTREC STEM Experience Report

Kate Steeper

Shrubs Snow and Nitrogen in the Arctic 2019



PolarTREC Expedition Page

<https://www.polartrec.com/expeditions/shrubs-snow-and-nitrogen-in-the-arctic-2019>



This program is supported by the National Science Foundation under award 1918637. Any opinions, findings, and conclusions or recommendations expressed by this program are those of the PIs and coordinating team and do not necessarily reflect the views of the National Science Foundation.

Janet Warburton and Judy Fahnestock
Education Project Managers
Arctic Research Consortium of the US (ARCUS)
3535 College Rd. Suite 101
Fairbanks, AK 99709
(907) 474-1600
info@polartrec.com
www.polartrec.com

Bringing the Science Back to my Classroom

It's sometimes a common and depressing comment to hear from your students, "I'll never use this in my life! Teach me something practical like how to pay my taxes!" As teachers, we strive to make learning relevant to student's lives, but for a multitude of reasons sometimes your lessons just don't have that inspiring impact that you were hoping. Comments like these are understandable coming from high school students. Anxious to start their lives, they grasp to understand how being forced to learn content that they didn't choose will support their future goals. Our jobs as educators are to make learning relevant and enjoyable.



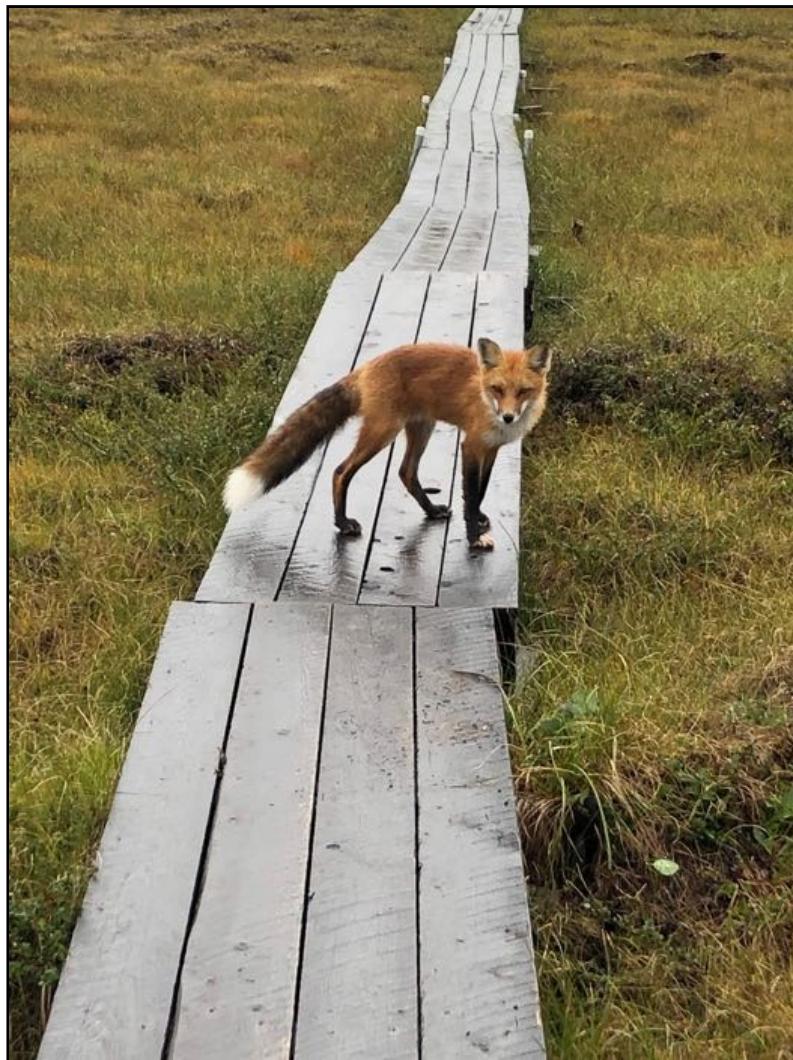
Researchers hike equipment out to field location from road

I applied to PolarTREC as a chemistry teacher at an urban charter school in South Los Angeles and my students come from socioeconomically disadvantaged backgrounds. They and their families are my inspiration. Every day they struggle with challenges that many in the United States could never imagine. The fact that my students never allow their setbacks to dissuade them from their goals to make their families' lives better is what gets me out of bed early every day. However, despite my best efforts, my students were still struggling to see how learning about chemistry or even science would really further their goals of lifting their families out of poverty. I routinely would receive feedback from previous students like, "I miss your class, but I don't miss chemistry." I was almost there. I almost had that full student buy-in, but I was still just missing the mark.



A view of the Tundra and the Brooks Range from Toolik Field Station

At the same time, I was attempting to expose my students to more earth and environmental science and wrap it into my chemistry curriculum. With climate change being in the news on a daily basis I wanted my students to be at a minimum, informed, but I also hoped to inspire them to act and to seek out careers that would be resilient in an unpredictable, warming world.



Juvenile fox at Toolik Field Station

However, my students live in South Los Angeles in economically depressed neighborhoods. Many don't even have a yard to grow a few plants let alone the awe-inspiring experiences of camping in the wilderness or swimming with tropical fish on family vacations that I was lucky enough to have in my childhood. I could appreciate how my actions could shape the environment because I had been provided that opportunity. Therefore, linking climate change and environmental impacts on my student's everyday life was challenging. I can't walk my students across the street to a field or stream to discuss carbon cycling so I questioned, "How can I give my students these experiences to show them how learning about science and scientific practices are arguably more relevant to their futures than learning how to pay taxes?" It was my attempt to answer this question that I discovered PolarTREC.



Dr. Syndonia Bret-Harte and undergraduate student Emily Reast preparing to harvest above and below ground samples

The Importance of Educator/Researcher Collaboration

My PolarTREC expedition was an exceptional experience and being paired with a researcher and seeing field research in action gave me a wealth of new ideas for how to incorporate scientific thinking into my lessons and make the science relevant to my students in engaging ways. Since my return, my students have asked me numerous questions about my experience, indicating that the program has already succeeded in engaging student interest. I have been able to immediately incorporate anecdotes into my lessons and will continue to develop lessons illustrating how polar science and research are important and relevant to student's lives.



Making Progress on the Pluck

The experience has even helped me discover new student misconceptions about research. For example, in the classroom, we usually conduct experiments where a distinct conclusion can be met within an hour-long lab. Upon my return, I received questions from students asking if we were able to answer our research question in the three weeks I was there. Unbeknownst to me, my students were under the impression that all scientific research reaches a conclusion just as quickly as they do in their hour-long labs.



Summertime at Toolik Field Station

While I understood that scientific cumulatively builds upon itself and that the research I participated in would take years to fully flesh out, my students had not. I immediately set a goal to bring in year-long student research projects. This experience in itself illustrates how important it is for teachers to have experiences such as PolarTREC expeditions. I can share with my students my experiences, showcase scientific practices, and be a model for taking risks, having adventures, and enjoying learning along the way. I am able to build my experiences into my lesson for the remainder of my career and use it as a lens to teach my content. My researcher and I have also discussed and plan on collaborating in the future. I hope that I can build lessons in which she can interact with the students, both in-person and through webconferences. Thus, students are exposed to potential STEM career paths, learning about environmental science, all while engaging in scientific practices.



Atigun gorge waterfall

Continued Outreach

I know that being selected as a PolarTREC educator will be one of the most profound and fruitful experiences of my career. Upon my return, I immediately set about recommending the experience to every teacher I knew. I hope that in the future I can further support PolarTREC and my researcher in an effort to give back as much as I have received from the experience.