## Personal Vision for my Classroom

The majority of students in my classes are deeply disconnected from nature and the world they live in. They have no real understanding of the value of natural systems and the role they have in maintaining the biosphere. My core vision is to use my PolarTREC experience to help broaden my students understanding of their world and have them think about how their actions have a global effect. Overall, the professional development that I undertake should be reflected in greater opportunity for student learning and understanding of the world they live in.

Through my experiences I hope that my students will:

* Increase their awareness of the variety of ecosystems on Earth;
* Understand that there is value in leaving your comfort zone to experience new things and that a certain amount of risk is OK;
* Grasp that learning is a life-long activity and not limited to time in school;
* Understand that personal growth comes through setting objectives, doing the work to learn, testing yourself against unknowns, and by assessing the outcomes of the work you do relative to the initial objectives;
* Regain or build on their excitement to learn across all subject areas.

## Classroom and School System Realities

I believe that I have two “systems” that I need to deal with on a daily basis – my high school classroom and the overall school system I work in. Each one has needs to be addressed.

### Classroom

* My students are generally bright and very capable. Socioeconomically, the majority are upper middle class. A small percentage come into my classroom who are really excited to learn; many more indifferent or unmotivated. Many of them seem to rely entirely on external motivation such as public recognition or physical rewards for good grades rather than recognizing the intrinsic value of learning and self satisfaction. I have variable levels of parental involvement in day-to-day activities, but virtually all parents have high expectations for their children and expect above average achievement in school whether the child is engaged/interested or not.
* I have adequate classroom supplies and materials. I don’t have unlimited resources, but I basically have the things I feel are important to helping my students be successful. I can count on all of my students having computers at home with good internet access.
* As noted above, many of my students are basically lazy. They’ve achieved good grades in the past with limited effort and don’t understand how to study effectively. They also seem to have “learned for the test” and not retained the deeper, long-term understanding of basic concepts of science that allow scaffolding and continued learning. As a result, I feel that I spend too much time re-teaching prior knowledge and am not able to move ahead or build depth of understanding. This is a major frustration!
* My students’ response to my PolarTREC project have been mixed. Most of them “don’t get it”. They don’t understand why I would want to do something that is physically taxing, requires a significant expenditure of personal time and energy (especially with no monetary compensation), or why I see value in the learning opportunity it provides. That’s really a bummer! On the other hand a few students really do see why I want to do this and share my enthusiasm. This is the group that makes it all worthwhile!

### My School System and Administration

I also get mixed inputs from my school administration. They are not against my participating, but like so many of my students, the administrators and most of my peer teachers “don’t get it” either. At the most basic level, the PolarTREC experience is professional development (PD). I will get continuing education credits (CEU’s) from the school system for my participation, but the reality is that it won’t have the same credibility as the classroom based PD that is arranged by my school system which I am required to attend. I know this because at the end of the year, when my annual review comes up, there is no mention of outside activities like this unless I bring it up and “remind” them of the credible value it brings to my classroom. For me personally, this is an outreach effort that needs to be undertaken so that my administration understands that in addition to pedagogy, breadth and depth of subject area knowledge are also critical to student success.

## Sharing the Experience

I have some general plans on how to share this experience with the classes I teach and with groups I have contacted through my outreach efforts. Due to the uncertainties of how the Wissard focus projects (GBASE, RAGES, and LiSSARD) are evolving, these are intentionally vague right now.

* Outreach – indentify and connect to both public and professional groups to build up a following for the project.
* Daily Updates and QA through the Virtual Base Camp (dependent on connectivity).
* PolarConnect Events – I hope to have the connectivity to schedule a couple of events during my time in the field. The deep field camp may make this challenging, and communication may be limited to satellite phone contacts with a slide show.
* Student Lessons and Activities – the focus here will be to develop data driven inquiry activities that could include:
  + Sub glacial life forms and conditions – what life forms exist, how have they adapted to this incredibly harsh environment, can you extrapolate this to other environments?
  + Remote sensing technology – how is it used in defining/delimiting sub glacial environments and change over time to those environments.
  + Life on the Ice – incorporate STEM concepts into a virtual project planning activity that helps students see the need for funding, planning and logistics along with the basics of science, math, and engineering to have a successful project outcome.
  + Basic Research – why is it important to keep funding and supporting basic research?
  + Cross Curricular – create lessons or activities that incorporate the history of polar exploration, changes in or the value of technology as a component of successful polar expeditions. This could draw in language arts and social studies as components of outreach. It could also draw together (compare/contrast) the experiences of different PolarTREC teachers to let students see how individuals respond to their own project and conditions.

## Specific Issues to Address

### Student Needs and Curricula Focus (EEn refers to NC Essential Standards for Earth Science)

* Biomes (EEn 2.7 and EEn 2.6) Utilize Antarctica as a specific example, compare to tropical and temperate biomes and levels of biodiversity.
* Climate Change (EEn 2.6) Students will identify the role of climate in defining biomes and understand how polar regions will have the greatest impacts from climate change.
* Mans Impact on Earth (EEn 2.8.3) In addition to mans impact on climate, students will understand how the slower rate of landscape recovery in polar regions translates to a more pronounced and longer lasting affect from human activity. Students should compare and contrast polar and other regions of Earth in this sense.
* Geology (EEn 2.1) Students need to understand that Antarctica is similar to other continental land masses in that it has active volcanism, plate tectonic activity, that ice is an erosional agent, and that isostasy affects the Antarctic continent as it did the Northern Hemisphere during the last ice age.
* Sub glacial lakes and streams (EEn 2.3 and EEn 2.6) Concepts of water movement beneath the ice, plus the idea that this is an isolated environment which may be affected by adaptation and evolution in relative isolation.
* Nature of Science and STEM ( no curricular item) The nature of science is not specifically identified in the current high school Earth Science curriculum, but it still exists in principle and is the basis for much cross-curricular learning as well as a point of integration with math, engineering, and technology.

## Changes in Teaching Methods

I am constantly making changes to how I present material to my students. My main targets are:

* Flipped classroom – this involves creating more on-line content for background and lecture and focusing class time on hands-on activities and practice (what used to be considered homework)
* Greater focus on inquiry and student directed activities (guided).
* Increase accountability of students for tracking their own objectives and progress towards meeting those objectives
* Enhance and increase classroom differentiation. This will provide greater opportunity for all students, not just those in the EC population.

## What I expect to learn

I expect/hope to come out of this project with:

* The ability to compare and contrast my prior knowledge in drilling and exploration operations to similar activities in extreme climates.
* Better, more functional extreme weather survival skills.
* Knowledge of the unique environment of subglacial lakes and streams; this includes their physical characteristics, methods of delineation (seismic, etc.), life forms present in them, evolutionary stages and adaptations, water flow and exchange, impacts on glacial movement, and clean sampling and drilling methods.
* Understanding what processes affect water chemistry in the sub glacial environment. Are there indications of volcanic inputs, geochemical signatures, etc.?

## Ideas or Concepts I want to teach better or more effectively

* The indicators and impacts of climate change in polar regions
* Mans impacts or ability to affect Earth both globally and locally through continued resource extraction and use and continued population growth.
* Ecosystem Interactions – how one system or population within an ecosystem affects others.
* Continue to integrate more elements from math, engineering, technology, social studies, and language arts into daily lessons and activities (preferably so the students don’t even know it’s happening!)

## Differentiation

I simply want to do a better job of giving students options for how they learn and what is available to them to provide them with the right level of challenge. This will help to insure that a broader range of student interests and strengths can be accommodated while still meeting the curricular objectives defined by the state of North Carolina and the Common Core. If I am successful at getting at least part of the class “flipped”, this will free up time for differentiating in-class activities to meet student needs.