**DRAFT – PolarTREC Needs Assessment – DRAFT**

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**Personal Vision :**

(Personal vision for classroom that incorporates the realities of the classroom and clearly states realistic ways to share the experience with the students.)

I have been chained to classroom realities regarding teaching science that I can no longer accept. Therefore, I am officially taking a year’s leave of absence for the 2013-14 school year. I believe science should be taught in a hands-on, facilitated learning environment in which students dig deeply into content, examine and participate in authentic research and projects, and discuss real issues related to science. During my leave of absence, I will be pursuing opportunities to create student-centered field-oriented science programs. Currently I think of this concept as “Earth Systems Science.”

Student learning opportunities connected with such programs could include:

* High school level: after-school Earth Systems Science credit classes focused on Earth Systems and Earth Systems changes (climate change). Classes would be teacher-facilitated, use research professionals as advisors, and have a large field science component (possibly incorporating weekend time).
* Middle School and possibly elementary school level: Saturday Science and/or Sunday Science programs, similar to the above, based around field science projects.
* Online Courses: as I learn more about online communication tools, I am starting to see possibilities for creating Earth Systems Science classes in which non-local students could participate. As with the GLOBE program, students can learn to set up research sites and gather data, then share online. Home school students and students from anywhere could participate and compare data sets!
* Summer (or anytime) field programs – it is time to get students out on field science projects. Citizen Science is happening, and Student Science needs to be part of that. Students would be excellent for gathering baseline data, and monitoring areas repeatedly in the long-term.

**Changes in teaching methods:**

* The focus of Earth Systems Science would be having a strong field science component. Students need to get OUTSIDE to work and learn. I have been exceedingly limited in my ability to do this (lack of time and support) in the district classroom, yet have seen the desperate need.
* I need to incorporate technology – both as a tool for science and for communication – to a much greater degree than I have in the traditional classroom.
* Earth Systems Science (ESS) needs to be integrated science. I have been teaching science disciplines separately as the district requires: 7th grade life science, 8th grade physical science, high school earth science, high school biology (etc.). The impacts of climate change need to be viewed through the lens of integrated science (and integrated with other disciplines). Years ago I was one of a group of teachers who designed an integrated science curriculum for the district, and this idea has never died!
* I need to use authentic data in ESS programs – both data students gather themselves, and data from ongoing and past research projects. I have not been very successful at doing this in my traditional classroom.

**Expected learning during experience:**

* I really hope to learn some detailed chemistry and carbon cycling science. This is a weak knowledge area for me, yet critical to understanding climate change overall.
* I anticipate learning a great deal about conducting a research project – the realities, the pleasures, the pain…
* I also anticipate learning how to be a good lab assistant – I have not done detailed lab work in ages.
* Ditto for data analysis. Field work is the fun part – I need to update my ability to analyze the data!
* Through PolarTREC I have already learned a lot about using technology to communicate, and I anticipate learning a lot more!

**Concepts to teach better or differently:**

* “CLIMATE CHANGE” – this is a huge topic, and something students are asking about. But how do you ‘fit it’ into ‘required curriculum’? It is not really a subject on its own, but something that affects all parts of Earth’s systems (Hence the name I am using for now, Earth Systems Science). I have yet to figure out how to ‘cover climate change’ in a traditional classroom … so instead I am planning to start a program based on climate change science.
* Carbon cycling – this is sort of a subset of the comments above, but it is something I will be specifically focusing on through my Kevo expedition.

**Equity and expectations related to ethnicity, gender, socioeconomic, and differently-abled students:**

* In recent years I have taken classes that focus on teaching strategies for reaching all students. I have learned a great deal and am firmly committed to reaching all students, yet have been very frustrated by my inability to do so in the regular classroom. When you are faced with 150 teenagers per day, 30 per class, all in chopped-up time frames, these wonderful strategies (that seem so easy to institute if you had 22 kids all day in an elementary classroom…) appear to be nothing more than impractical great ideas.
* Because of this, I want to start Earth Systems Science programs with a strong emphasis on teaching strategies as well as sound science content.
* Strategies would include:
  + Using clear learning targets and language objectives at all times
  + Using cooperative learning strategies for active engagement of all students (no group work allowed!)
  + Applying differentiated learning techniques as appropriate
  + Employing student-generated ideas, following student interests as much as practical
  + Research and project-centered work, using materials and people as support (rather than as the focus)
  + Standards-based assessment of progress, incorporating some student choice of how concept and skill mastery is demonstrated

Sounds a bit overwhelming right now... anyone know where I can look for funding to do all this???? I don’t ask for much, do I? ☺

I hope the connections between Earth Systems Science, Climate Change Science, and Polar Science is fairly transparent here!