**NEEDS ASSESSMENT**

Timothy Dwyer – Polar Gigantism in Antarctica

*Classroom Vision*

 In my ideal high school science classroom, students would work collaboratively to explore the scientific method while intermingling these explorations with content knowledge. In collecting real-world data on natural phenomenon, science and mathematics would come together seamlessly as mathematical analyses support and explain the hypothesis-driven experimentation performed by students. Students would develop an understanding of experimental design and then test and answer manageable questions they develop themselves, with the goal of communicating their findings to a larger audience verbally and in writing.

 My ideal middle school classroom is inquiry-based and not time-constrained by content requirements. Students work at times independently and at other times collaboratively to approach questions posed by the teacher. These questions are designed to foster problem-solving skills while helping students develop familiarity with standard laboratory and field equipment, online and electronic resources, graphing software and print material.

 While my school administration is open to exploring shifts in course curricula and classroom methodologies, certain obstacles remain. The compartmentalization of the school day into fifty-minute periods forces students to shift gears constantly between different subjects. It also curtails travel to nearby field sites and limits inquiry sessions to artificially short timeframes.

*Student Curricular Needs*

1. Integration of polar science content into Biology and Environmental Science curricula
2. Integration of climate change content into Chemistry curriculum
3. Integration of algebra skills and algebraic thinking into Biology, Environmental Science, and Chemistry curricula, principally in the form of mathematical models and spreadsheet calculations
4. Development of literature research skills
5. Development of verbal and written communication skills

*Needed Changes to Teaching Methods*

1. Overt attention and exploration of different learning styles of students in my class, e.g. aural, visual, kinesthetic
2. Direct instruction and application of problem-solving methodologies prior to inquiry labs or data collection
3. Covert incorporation of algebraic techniques with more emphasis on the questions that math can answer rather than stressing the applicability of mathematics in general

*Expected Acquisition of Knowledge and Skills*

1. Oxygen physiology testing methods/experiments and how they can be incorporated in a high school classroom in different taxa
2. Biomechanics testing methods and their application in a high school setting using different taxa
3. Written public outreach/communication skills through journal entries and newspaper article contributions
4. Production of short documentary videos highlighting researchers and their work

*Classroom Concepts and Topics to Improve On*

1. Seamless integration of algebra into science curricula
2. Mechanisms explaining how and why the polar regions are experiencing the most rapid changes and dramatic effects of climate change
3. Science as a process and not simply a body of knowledge