Panel #3: Physics First – PRO

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“Physics First”

“Physics First” is a proposed idea designed to improve the quality of high school science curricula. Due to the 1998 test results in the Third International Mathematics and Science Study (TIMSS), American high school seniors ranked “third worst out of all 21 nations studied” (Pattanayak, 2001). This outcome is only one of many test results indicating a need for change in the high school science curricula. Project ARISE (American Renaissance in Science Education) is a group that pushes for science education reform. This specific reform would take the standard science string of biology to chemistry to physics, and reverse the order (Mervis, 1998). Leon Lederman, a nobel prize recipient in physics, has been the leader in this reform. He truly believes that physics lays the foundation for all the other sciences and it is a great introduction into science for many students.

Many of the articles that are proponents for this reform show the great improvement it will have in the American science education. Unfortunately, qualitative data is rare. Schools spearhead these programs and use many informal assessments but do not quite take the time formally assess the success (Pattanayak, 2001). Curriculum overhauls do not take a short period of time to show its success; it takes time and funding to show the results. Regardless of this shortcoming, the data gathered via interviews and school visits show that Physics First is working and can work in many other schools.

Physics First shows good promises to our students successes. Student enrollment will increase a high school physics class. Data shows that enrollment drops 20% at each step of science in the traditional science string. Physics first allows accessibility to all students, not just
the “elite” (Mervis, 1998). Physics is a very conceptual subject and it can easily be applied to our every day lives. Students can easily observe the concepts in experiments. The fear of not having enough math background should not be a concern because the math can be introduced along the way. Students can directly relate the physics concepts to their worlds easily while seeing the math connection (Roeder, 2003).

Allowing ALL students access to physics lays the foundation for all the other sciences. A full understanding of Biology requires chemistry knowledge, especially in the recent advances in genetics and molecular biology. Many of chemistry concepts can be introduced in physics. It unifies all the sciences and creates a bigger picture for our students (Cavanagh, 2006). Students have a hard time seeing how all these disciplines are connected. Laying down the foundation for the students allows teachers to scaffold upon it will allow them to be scientific literate. Most importantly, students will see “coherence in education” (Pattanayak, 2001), not just a disconnect between one science to another.

Physics First allows students to understand a smaller amount of core concepts in science and build upon that knowledge. Students are more apt to learning about other sciences once they have a grasp of these core concepts. Many students in schools with this program are more confident with their science knowledge are more likely to take a second year of physics. They are more willing to challenge themselves in this discipline and feel better prepared for a science course in college (Mervis, 1998).

Many of the articles show the need for quantitative data, but what is being presented displays great promise for our students. This reform will improve the quality of their education, allowing them to be competitive on an international scale. The American Association of Physics Teachers (AAPT) sees the need to introduce physics to more students in high school, not just the
students “good enough” to learn it. Physics First will lay a strong science foundation (Khoury, 2006). It is a reform that many schools should consider and provide the evidence needed to change the “high-stakes” testing within their states to be modified so that we can have future science literate citizens.
References


