

THE MORNING CALL

To really learn science, let students do research

By Jacqueline S. McLaughlin -- December 9, 2008

They're coming soon, the results of the science PSSA test scores, and as a recent feature article in The Morning Call bellowed, results may be a wake-up call. The article hit the nail right on its head by exclaiming that it is time to focus on improving science education, and that "inquiry," engaging students in actual research activities, is the key.

More teachers and students need to be engaged in actual research. To do this, we must break away from our dependency on textbooks, and properly embrace technology. It's time to engage students in activities that allow them to "think" and "do" like scientists. When teachers identify actual research for their students to engage in, the content of the course will shift toward inquiry. The teachers see themselves as researchers, and they see their students as future researchers. Then, students engage in the same activities and thinking as scientists; making observations, formulating questions, gathering evidence, interpreting reproducible data, and communicating results.

One way to do this is to strengthen Act 48, (House Bill 8), which defines the requirements for maintaining a professional educator's certificate. Professional development programs that provide opportunities for teachers to experience and taste real research are the catalyst for change, as are curricula set for student teachers in the state's universities and colleges.

The other way to break out of the textbook mentality is through technology. Pennsylvania teachers and students have wide access to both computers and the Internet. The Classrooms for the Future Program, initiated in 2007, is the largest tech-ed initiative in the nation. Basically, over a three-year period, Gov. Ed Rendell aims to spend \$200 million to make sure that every high school student in the state has a laptop and that teachers are trained to take full advantage of these tools.

But access to technology isn't enough. Teachers need to change the packaged products they deliver to our classrooms. Save the textbooks as a backup resource. We need innovative "products" that offer virtual research experiences, field trips to authentic field sites and laboratories around the world, and interactive lessons that allow teachers and students to work with real data and scientists.

Here's just one example of what's possible: A student on a laptop works through activities that teach the core principles of Earth's terrestrial and atmospheric layers, and the carbon cycle. Next, backed with this core knowledge, the student heads off to Greenland to be greeted on a snowmobile by Dr. Richard Alley, a leading paleoclimatologist and one of many scientists who wrote the IPCC Fourth Annual Report on climate change. Dr. Alley studies samples of ice that record Earth's past climate. Following an enthusiastic introduction on his field research and methods, he invites the student to join him at a drill site to study ice cores right alongside him. Suddenly, earth science isn't so boring. In fact, it's exciting.

Textbook companies, teachers, research scientists, and experts in teaching and learning must work together to develop even more new tools, such as laptops, to help change the way science is taught in our school classrooms. Ingenuity can turn a computer into a research bench to help teachers and students "think" and "do" real-world research. We can create teaching tools that are totally different. Teaching tools that bring the

critical thinking, rigor, creativity, and spirit of experimentation that defines research itself to the classroom. The challenge we must meet is to take full advantage of the technology and get it in front of our teachers and students -- sooner, rather than later.

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