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Local biotech companies help low-performing schools teach science

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SF Public Press

— May 17 2011 - 4:43pm

A science lab class is about to begin at Ronald McNair Academy in East Palo Alto on a recent Tuesday morning and the universal seventh-grader's mien says, "I couldn't care less."

Visiting scientists Paul Sauer and Mary Varghese from the Redwood City-based biotechnology company **OncoMed** are telling the students about natural selection. After a while, the students start to show some interest by volunteering to take part in a little experiment, closing their eyes for 10 seconds in front of a piece of red paper and then picking one of the colorful toothpicks scattered on the paper. Students are the "gobblers," toothpicks represent the gobblers' food and the large paper is the environment. The idea is to show how natural selection works, and it soon becomes clear that the toothpicks that blend into their background are most likely to survive. The students pick yellow or green toothpicks instead of the red ones that blend in with the red background. This exercise was not possible at McNair middle school last year. A year ago, the science laboratory was a boys' locker room. With the help of local volunteers and a portion of a three-year \$4.5 million federal grant, the school has converted the locker room into a lab and increased the number of science classes

The school is also collaborating with **Bio-Community.org**, a science education network sponsored by Northern California life science association **BayBio**, and designed to help underperforming and poor schools. The network enables local biotechnology companies to send visiting scientists to the school to give new perspectives on learning and on teaching science.

Bay Area biotechnology companies want to help educational institutions from middle schools to community colleges teach science because they worry about finding qualified workers such as research associates and lab technicians. That's why they want students not only to learn science but also to make science a prospective career option.

There is good reason to worry about Californian students' science skills. The U.S. ranked 23rd in science and 31st in mathematics out of 64 countries in the Organisation for Economic Co-operation and Development's **2009 rankings** of international secondary education performance. Nationally, California ranks next to last (only beating Mississippi) for both fourth and eighth grade science skills according to the **National Center for Education Statistics**.

An obstacle for some students

Ravenswood City School District has students from kindergarten through eighth grade in East Palo Alto and east Menlo Park. The majority of the district's high school age students, (about 250 out of 350) go to Sequoia Union campuses. Only about 35 percent of Sequoia students graduate, whereas the national graduation rate is 68.8 percent.

A Ravenswood district principal told Elizabeth Schar, a volunteer at McNair, that science was one of the biggest obstacles. The students would go to high school science lab, feel ashamed for not knowing what to do, stop going to class and drop out by the end of their freshman year.

"When we heard that science labs were one of the hurdles, we said, 'We can do something about that,'" Schar said, referring to the local community. She originally came to help the school district through Menlo Park Presbyterian Church.

Schar may be the most important person revising McNair science education. She sits down with the teachers, discusses what they want to teach, makes sure the lab has the necessary resources and together with BayBio organizes visits from local biotechnology companies.

Her background is in marketing but that might be even more useful than experience in science. She says that marketing is changing people's minds about something. "And that's what I'm doing here," she said, laughing.

Schar said she believes people are put on earth to care for each other. "These kids are threatened," she said. "If we can help them graduate from high school it makes all the difference in their lives."

Many California schools could use similar practical help from volunteers. Lori Lindburg, director of BayBio, says that with budget cuts, pink slips and standardized tests, teachers feel they are under siege. Though outside help is needed, getting schools on board has been challenging.

"The teachers cannot take on one more thing," Lindburg said. "We really need to go to the schools and make it easy for the teachers."

Boosting under-performing schools

Bio-Community.org selects schools where more than 50 percent of students receive free or reduced-price lunch and where more than 50 percent of the students underperform in science and math.

McNair School easily fits these requirements. Only 30 percent of the students were "proficient" or better in science, and 45 percent in mathematics, according to California Standards Tests in 2010. And 85 percent are listed as socioeconomically disadvantaged (for the purpose of receiving free lunch, for example) in the 2009–2010 school accountability report card, a yearly report required from every public school in California.

Without the \$4.5 million federal School Improvement Grant, McNair would not have had the money for science labs.

"When you have a budget crisis, the first things that go will be your science lab, electives and music program," said Michael Lyons, the school's principal. "The focus here in California in most school districts is language arts and math. I think that's why our schools are low nationwide" on standardized test scores in science.

Sheryl Denker, Bio-Community.org program adviser, said California's property tax law, Proposition 13, is partly to blame for the lack of resources. It greatly limits property tax increases, which are a major local source of school funding.

Denker has been involved with Bio-Community.org since she joined BayBio in February 2010. After an initial test period, the program launched in September. Six schools and four companies actively participate, but any school or teacher can request help on the Bio-Community.org website. The site is meant to bring together schools that need help and companies that want to volunteer. The companies can do whatever feels right for them, from taking an intern or visiting schools to reviewing resumes.

Widening students' horizons

Back in the lab, the visitors have to make a constant effort to keep everyone's attention on the subject. Schar admits that seventh-graders are a tough crowd, but she says that they generally value when somebody from the outside comes to teach.

"Having that scientist in the room makes all the difference in the world because the scientist is excited about what he or she is teaching," she said. "What's also of value is for these kids to see what these people do for a living."

A visiting scientist recently told the class that it doesn't even feel like work when he goes in every day and works on things he finds cool. "The room was just silent. The whole idea of going in to do something you really like to do is not something that's in these students' reality," Schar said.

Of course, not all this exposure to science converts every student to a science geek. Seventh-grader Natasha Rios thinks science is "OK" but it's not in her career plan. "When I grow up I want to be a lawyer," she said.

