



## Collaboration helps evolve science teaching

By B. Roscoe

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It's your first day teaching science to eighth graders. Twenty four pairs of expectant eyes are trained on you. Nothing could have prepared you for this moment.

And in fact, nothing has.

That's how it was for 32-year-old Frederick Logan at Montera Middle School last year.

A science background made him desirable in the "hard science"-starved school district. He was asked to begin right after he applied. With no formal training, the only tools the Oakland school district equipped him with were a two-page document listing state science standards and an old textbook.

What about equipment, strategies and suggestions for lesson plans or tested, age-appropriate experiments? That wasn't available to Logan or other middle-school science teachers in the Oakland Unified School District -- until now.

There's a quiet revolution taking place in Oakland's middle school science classes, and the sea change is enabling a more finely tuned curriculum, diagnostic tools and enhanced peer support.

Plus, it should markedly improve the quality of science education for all the district's students. "There's an inequity cycle that we're really trying to break in delivering curriculum and tools throughout the district," said Melia Dinell, an eighth-grade science teacher at Bret Harte Middle School.

"Just because you know something, people think you can teach it," Logan said. "The district's attitude (some 18 months ago) was 'We need a body, just show up.'"

The determined Logan faced a host of challenges. As a result, he volunteered to join a group of instructors developing a new, grassroots approach to teaching middle-school science: Curriculum in Focus.

The project is led by Anthony Cody, a tall, soft-spoken science teacher at Bret Harte Middle School who is nationally board certified.

Cody, Logan and about 12 devoted associates are forging a comprehensive curriculum with lesson plans, ideas and materials for hands-on experiments. The program also provides the district's science teachers with a network of supportive, accessible colleagues. For the 100 or so science teachers districtwide, such resources are vital.

### Brain drain

Teachers say peer support is essential given the myriad job pressures they face. "Within your school, within your district, it's important to be able to network," said Kenzo Sung, an eighth-grade science teacher at Roosevelt Middle School.

That type of support, he said, should be systematic and structured so the onus is not on teachers to find it. Moreover, this network has helped reduce the turnover rate of science teachers at one middle school, at least.

At Roosevelt the turnover rate among science teachers dropped to 25 percent this year from 50 percent the year before, a shift Sung attributed to peer support and the new curriculum.

People with a science background have plenty of job opportunities, especially in the Bay Area, Cody said. Weighed against the difficult conditions teachers face in some middle schools - the pressure to raise consistently low test scores and discipline problems -- make the lure of better pay too much for some to resist.

Many who stay, though, credit the peer support and practical tools supplied by Curriculum in Focus with making their teaching lives more meaningful and manageable.

Cody is profoundly aware of the program's impact, choking up as he described the experience of one instructor. The teacher told him that he would not have made it through his first school year -- or returned for the next -- if it had not been for Curriculum in Focus.

#### **From the bottom up**

Before the program, networking between science teachers took place through Walkabouts, an informal professional development project. The gatherings, held monthly at different schools, allowed science teachers throughout the district to share ideas and support on their own time.

Three years ago, several schools, including Bret Harte, received a grant from the state Department of Education to do more collaborative small-group work. Though productive, the program didn't reach most of the district's middle school science teachers, Cody said.

But in January 2001, the Chabot Space and Science Center received funding from several local foundations and put out a call to teachers: develop a comprehensive middle school science curriculum -- with our support.

Eileen Engel, director of education at Chabot Science Center at the time, knew Cody and was familiar with Walkabouts. "We were able to tap into what they'd already been doing, which was wonderful," she said.

#### **Culture of collaboration**

Cody recruited teacher leaders from the sixth, seventh and eighth grades to develop the project's initial curriculum during summer 2001. The course work was put in place in the '01-'02 school year.

The teacher groups, with about four members per grade level, met again this past summer at Chabot. The first task was to review the curriculum.

"We really had some problems with the eyes and ears (unit). But that was mostly because we were stressed and pressed for time," admitted Caleb Cheung, who taught seventh-grade science at Carter Middle School as a nationally board certified teacher last year.

The group taught the same units at roughly the same time districtwide. That's important, said eighth-grade science teacher Phil Cotty of Calvin Simmons Middle School, because it makes the curriculum more equitable. Everyone is learning roughly the same thing, he said, so no schools or classes are "left behind."

This fall, district administrators partnered with Curriculum in Focus' leaders to conduct development meetings specifically for science and math teachers.

The teachers' network is "unusual in that it's teacher-inspired, teacher-led -- and even more unusual is that it's been going on, in some form or another for so long," said Mike Atkin, dean of the education school at Stanford University, who served as an informal advisor for the project.

## Getting results

But like the concepts taught in the program, Curriculum in Focus' methods had to be tested.

"The state doesn't assess science at the middle school level," said Dale Koistinen, the recently retired science coordinator for the district. But including an assessment gives new curriculum more legitimacy in school administrators' eyes. It also gives it a better chance of long-term success. "If we have the accountability pieces, like assessments, in place, and principals give it emphasis, then we will see results," Koistinen predicted.

Carol Balfe, a consultant with a background in science education, was hired last year to help write the eighth-grade assessment test for the new science curriculum. The test she designed bucks the trend of teaching to the test, meaning incorporating material into a set curriculum to prepare students to pass a standardized test. Instead, the science assessment matches the curriculum.

"We could tell, by unit and teacher . . . which (units) needed revision so they could teach them more effectively," Balfe said. Though teachers are not obligated to use Curriculum in Focus, most have adopted it.

In addition, the science assessment provides comprehensive information about individual students and teachers.

Teachers can look closely at the test results and each student's needs, giving them more individualized attention -- more teacher time, said Carter Middle School's Cheung. "Time is probably one of the most valuable resources to teachers. What makes teachers good is how they allocate and spend their time."

"(The assessment) was a real match of what the district was looking for and what the teachers wanted," Koistinen explained.

Eighth-graders took a science pre-test in the fall. Balfe is developing a test for sixth-graders later in the school year. The test for seventh-graders should follow in the next school year.

## In their hands

During an open house this summer, middle-school science teachers were invited -- for the first time ever -- to pick up materials and curriculum for use in their classrooms. The nearly 100 percent turnout was due in large part to the teacher leaders' outreach efforts in the days preceding the event. They visited every middle school to let teachers and principals know about available materials.

"We're distributing probably \$20,000 worth of materials today," Cody said at the event. Curriculum in Focus leaders then delivered materials to teachers who didn't make it to the open house. Additional materials for curriculum taught later in the year are being provided at mini-conferences held roughly every six weeks.

## The way it is

Forging the new curriculum was no easy feat, according to Angela Grimes, a nationally board certified science teacher at Bret Harte. But "It hasn't been an uphill battle because of Anthony. He has a vision, and he goes for it. He finds the resources, and he makes it happen."

U.S. Rep. Barbara Lee, who attended a mini-conference earlier this month at Calvin Simmons Middle School and spoke with teachers, believes their grassroots approach is a good strategy.

"Teaching from the top down, teaching to a test -- sure you can learn by rote memory, but what does that say about students in terms of really understanding

and processing what they're taught?"

Lee is even hopeful that the district's science program will catch on elsewhere. "Maybe it can be a national or state model," she said.

For Cody, that's a worthy goal. At the moment, his focus is closer to home.

"Our real objectives run far deeper than a curriculum guide - this is just the surface form our work takes," he said. "Our deeper goal is to change what is normal in our schools. We want teachers to be well-prepared, well-supported and well-supplied. Our creative teachers have a tremendous amount to learn from and to teach one another. We want an ongoing process that recognizes this collaborative process as central to our growth as teachers, and makes teacher leadership not only possible, but expected."

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[http://www.bayarea.com/mld/ccetimes/2002/12/27/news/local/states/california/counties/alameda\\_county/cities\\_neighborhoods/montclair/4822721.htm](http://www.bayarea.com/mld/ccetimes/2002/12/27/news/local/states/california/counties/alameda_county/cities_neighborhoods/montclair/4822721.htm)

## Lesson Plans By B. Roscoe

The Curriculum in Focus project is teacher-designed to maximize student comprehension. Each grade level focuses on several different science concepts.

- The sixth-grade curriculum focuses on Earth sciences. Following an introduction to scientific methods, students conduct inquiries to learn more about density and convection. In one experiment, students observe the different behavior of bubbles blown into the air and when falling into an aquarium with dry ice.

They are encouraged to test their observations. One test involves slowly lowering a lit candle into the aquarium. When it reaches the layer of carbon dioxide, the candle goes out, showing that the bubbles, which are filled with a mixture of gases dominated by nitrogen and oxygen, are floating on a layer of carbon dioxide.

- Life sciences, including investigations into what qualities make something alive, are the focus of the seventh-grade curriculum. In one lesson, teachers have fun with students by introducing them to "nuclear fleas," large, bloated "creatures" that dive up and down in "sewage water." In actuality, the fleas are raisins, and the sewage water is a light-colored carbonated beverage. Students are asked to observe the creatures and formulate questions about what they've seen.

- Density and buoyancy, fundamental concepts in physical science, are the main topics of the eighth-grade curriculum. Students learn the relationships between mass, volume and density. For instance, they're asked to measure a gram of cotton balls and a gram of sand. They then record observations, list any problems in taking measurements and their solutions.

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Source: <http://tlc.ousd.k12.ca.us/%7Eacody/lessons2.html>