Under the watchful eye of UCSF graduate students Elizabeth Buchen and Friederike Haass, who use yeast in their advanced genetics research, Presidio Middle School seventh-grade students are doing real science.

They learn about yeast, ask questions and do experiments to answer them.

The fact that these middle school students in the San Francisco Unified School District (SFUSD) are able to run sophisticated experiments at all is due to a UCSF-sponsored program called the Science & Health Education Partnership (SEP). For nearly 20 years, SEP has been bolstering science education in San Francisco public schools by getting scientific teaching materials and actual scientists into the classroom to work directly with teachers and the kids.

Founded by former president of the National Academy of Sciences Bruce Alberts, professor of biochemistry and biophysics in the UCSF School of Medicine, SEP started out as a way to donate surplus laboratory equipment to local schools. Alberts recently talked about his past and future involvement in SEP and improving science education in general.

**Multifaceted Outreach**

Today, SEP has grown into a multifaceted outreach effort that supports science and health education in San Francisco’s public schools. Last week, UCSF learned that it will be awarded a $2.1 million grant — the largest single grant for SEP — by the Howard Hughes Medical Institute to build on its long-standing collaboration with SFUSD. HHMI invited 214 research universities that have a proven track record in preparing students for graduate education and careers in research, teaching, or medicine to compete for the undergraduate science education awards.

“This has been a phenomenal year” for the SEP program, says SEP co-director Rebecca Smith. “We have more classroom partnerships than ever before.”

More than 80 percent of the public schools in San Francisco are involved in the program, with 112 teachers and 152 UCSF scientists working together in 108 classrooms across the city, Smith says.

SEP is actually a number of different programs, each tailored to students at different grade levels and with varied skills and needs. Classroom-based partnerships are aimed at bringing UCSF scientists to students in kindergarten though 12th grade.

Another elementary school program is MedTeach, in which first-year medical school students work with teachers to present lessons on health and the human body. Students in the program may learn about the immune system, or the digestive system and the body’s nutritional requirements, for example. Or the students may examine healthy and diseased human lung...
specimens, provided by the SEP Daly Ralston Resource Center, to learn about the dangers of smoking.

**Great Response**
SEP program directors are especially excited about the response to Quattro — a program supported by the National Institutes of Health’s National Center for Research Resources — which is aimed at students for whom English is a second language. The Quattro program integrates lessons in science and English language development. Every year, the students put together scientific demonstrations for their families at an evening Family Science Night, explaining the science they learned in the program in English to their families in their native language.

“The response is always really great,” Smith says. “Administrators say that families who don’t show up for other school functions come for this, and they are always so impressed by what the kids can explain.”

At the high school level, there are also classroom-based partnerships with UCSF scientists and a summer internship program in which the students conduct biomedical research in UCSF laboratories. Teachers at all levels take advantage of SEP’s extensive library of science teaching materials.

The students at Presidio Middle School studying fruit flies are part of a class taught by Irene Hirota, who has been participating in SEP for a number of years. “I’ve had really good experiences with my UCSF scientist-partners,” Hirota says. “They’ve been really good.”

This year, Hirota’s classroom is part of a new program called Partners for Inquiry. This Noyce Foundation-supported SEP program is meant to help make classroom experiments more closely emulate the true process of science.

“Students think up their own questions, and the scientists help them design experiments to answer their questions,” Smith says. “We are moving lessons from being simply didactic demonstrations to making them more inquiry-oriented, toward doing the science as scientists would do it.”

In Hirota’s class, the students have learned about yeast and how it is used in science and food production. Each student then develops a question about how the yeast’s growth will be affected by different temperatures, foods or spices. Hirota’s class is the only middle school class in the city using the new program.

“The energy level in class was very different, much higher,” Hirota says. “The students were very good at figuring out possible reasons for the results they got, and they really enjoyed reporting their results to the rest of the class.”

The public school students and teachers are not the only ones to benefit from the program. The UCSF volunteers, who donate precious hours from their schedule, say they also get something out of the program.

“It’s really fun to see the students learn concepts that might be hard to pick up from a lecture,” says Ammon Corl, a graduate student who has participated in the SEP program for three years, and spent last year in Hirota’s class. “The program gave me a boost of confidence. It was a good experience.”

For more information on the Science & Health Education Partnership, call 415/476-0300 or visit the Sep website at http://biochemistry.ucsf.edu/~sep/.

Each partnership team at an elementary school site is responsible for four lessons in two different classrooms. The team scientists are mostly graduate or professional students or postdoctoral fellows at UCSF.

“The elementary school program is very important because elementary school is where students may form attitudes about science that stick with them,” says Katherine Nielsen, also co-director of SEP. “Some schools don’t teach science at all, or teachers may feel anxious about teaching a subject that they haven’t studied since their own high school days.”