

SEP Newsletter

Winter 1998 • No. 31

Rekindling the Spirit of Partnership

Before there were Lesson Plan Contests, before there were Triad teams, before there were City Science workshops, there were partnerships. SEP began back in 1987 with equipment and supply donations and individual, one-on-one partnerships between SFUSD teachers and UCSF volunteers. Many of these partnerships were very productive. Teachers and their students visited UCSF labs, volunteers took science activities into classrooms, partners worked together to create structures that were tailored to the needs of the teacher and the resources of the volunteer.

It takes a special team, however, to work independently and create a successful partnership. In an effort to provide more opportunities for teachers and scientists to work together, SEP has created or worked with a number of programs over the years to provide structure and support for teacher-volunteer partnerships. Thus developed the current configuration of SEP programs: MedTeach involves teams of medical students who partner with middle school science teachers for an entire year to teach about the human body; City Science volunteers work with partner teachers to give summer workshops, or with the entire faculty of a particular school as Scientists

in Residence, to help teachers learn about new kit-based elementary school science curricula; SF Base puts scientists together with high school teachers and their students to help the students use micro-

grown and changed with each passing year, and have provided a wealth of opportunities for UCSF volunteers to work in the San Francisco schools.

The development, implementation and coordination of these programs, however, have taken time and attention away from individual partnerships to the point where few exist. Recognizing the value that exists in such partnerships, SEP is embarking on a renaissance of the individual partnership program. We hope to take the best of the independent partnership experience together with what has been learned

One of the beautiful things that happens in teacher-scientist partnerships is the illumination and bridging of the professional cultures of science and education.

pipettors and restriction enzymes to learn about molecular biology; Triad has teams of teachers and scientists investigating gender equity in science learning in the context of after-school science clubs; and one-shot classroom presentations put experts on a particular field or topic together with teachers and their students to create a lesson for one class period. These various programs provide different structures for teachers and volunteers to work together, but each is centered on the idea of the teacher and the volunteer as partners, working together to create value for their students.

SEP's partnership programs have

from more structured programs to create a support structure for new partnerships to form and flourish. As a beginning, a small pilot program of partnerships with elementary school teachers is being put together. Contact Erin Strauss (476-0338) if you are interested in participating in this new beginning. Individual partnerships are also slowly being set up in the middle and high schools. Contact Helen Doyle (502-6324) or Tracy Stevens (502-5137) if you are interested in participating at this level.

(For more on partnerships, see pages 4-5)

INSIDE:

Students' Reflections on Bones	2	Orienting Scientists	5
Lesson Plan Contest in Transition	3	Triad Takes a Lickin' & Keeps on Tickin'	6
Flame in a Flask	3	City Science Names New Director	7
Common & Uncommon Ground	4	Events Calendar	8

SEP

SEP Main Phone Number

(415) 476-0300

SEP / City Science FAX 476-9926

SEP Resource Center

502-6689

SEP Core Programs

Helen Doyle, Ph.D., Coordinator
502-6324 / hdoyle@itsa.ucsf.edu

Tracy Stevens, Ph.D., Coordinator
502-5137 / tracys@itsa.ucsf.edu

Roberta Heidt, Admin. Ass't.
476-0300

City Science

Erin Strauss, Scientist Coordinator
476-0338 / citysci@itsa.ucsf.edu

Cynthia Gusman, Admin. Ass't.
476-6937

cgusman@muse.sfusd.k12.ca.us

Triad Project

Kimberly Tanner, Ph.D., Coordinator
502-6690 / kim@phy.ucsf.edu

Executive Director

Liesl Chatman
476-0337 / liesl@itsa.ucsf.edu

<http://itsa.ucsf.edu/~sfiles>

The Science & Health Education Partnership (SEP) is a collaboration between the University of California, San Francisco (UCSF) and the San Francisco Unified School District (SFUSD). Its mission is to support high quality science and health education. SEP is the organizational umbrella for the UCSF-end of the partnership and is made up of both core programs and specially funded projects. Core programs include equipment and supply donations to schools, partnerships between UCSF volunteers and SFUSD teachers, the operation of a resource center, and the SEP Student Lesson Plan Contest. Specially funded projects include *City Science*, *The Women's Triad Project in Science Education* and summer research internships for teachers and high school students. SEP also supports SFUSD projects including *SF Base* and the newly adopted K-8 science and health curricula. SEP is made possible through funds from NSF, NIH, Howard Hughes Medical Institute, Genentech, Herbert W. Boyer, the UC Office of the President, the UCSF Chancellor, Merck Pharmaceutical, PG&E, and private donations.

Reflections on Human Bones

Today we saw parts of a human skeleton. At first, I thought the bone will be all stinky, ugly, rotten, and heavy. But I guess I was wrong. They weigh differently. I think the skull was the heaviest bone in the whole skeleton. But the femur was the longest. I like the skull the best. It showed alot of details. I have experienced seeing and touching a real skeleton, I won't need to be so grossed up next time. I learned the parts just by experiencing it.

– Julia Vuong

Today we looked at a real human skeleton. We sat on the floor and passed around the bones. I was surprised at how some of the bones looked like. Some were lighter and more delicate than I expected. Others were stronger and larger than I thought they would be. They were rough, smooth, and some even transparent. At first I thought we were going to look at a plastic skeleton, but it was real. It was the first time I held the bones of a human skeleton. It was an exciting experience.

– Deaglan Halligan

Today we saw and touched a real human skeleton. I think it was really neat. I learned what bones looked and felt like. When I get older I think that I will be an organ donor. If I am dead they won't do me any good. If I donate my organs I could save someones life and they can live longer. I think that donating your body to science is also something that you should think about. Donating your body to science will give other people a chance to extend their education by seeing real human body parts. To some people it might seem gross, but it is an effective way to learn a lot and have fun.

– Carmen DeLeon

Today we talked about bones in the skeletal system and how they work. We learned about their scientific names. We also talked about bones in the skeletal system one by one and got to hold real bones. I think the rib-bone protects the organs. If something hard hit the rib-bone, it is going to break easily. As a matter of fact, it might even hit the organs inside the body.

– Kenneth Liu

Reflections by 6th grade science students from Aptos Middle School; bones by SEP Resource Center.

Lesson Plan Contest Benefits All

SFUSD students and teachers and UCSF judges find many rewards through participation in the SEP Science & Health Lesson Plan Contest. In planning their lesson plan, students delve into a science or health topic and tackle the challenges of teaching. Those teams who become finalists and teach their lesson gain leadership skills and receive valuable feedback from the judges. Teacher sponsors report the satisfaction and pride they feel when assisting their students with planning, practicing, and finally observing them in the teacher's role. And the UCSF judges not only enjoy the presentations – they learn new science activities and teaching skills from San Francisco students! Judges also reflect on what makes a good science lesson as they write a brief evaluation for each lesson they view and help decide the winning teams.

How can you get involved in the Lesson Plan Contest? If you're an SFUSD middle or high school teacher, you should have received information and entry forms in the mail in January. The submission deadline for written lesson proposals is Feb. 27, so you still have time to enter. Please call Helen at 502-6324 for more information or to get forms. If you're at UCSF, let us know if you can be a judge; it requires three visits to SFUSD schools over a three-week period in April and attendance at the judges' meeting.

Last spring was the Contest's tenth successful year. At this pivotal point, the SEP staff is considering changing the structure and objectives of the contest to increase participation, decrease its competitive nature, and establish sustainable funding. SEP recently spoke with teachers, students, and judges to gather feedback about the

contest and ideas for its future. Surveys will be distributed to this year's participants, but ideas are welcome from all members of the SFUSD and UCSF communities. SEP would like to maintain the emphasis on students teaching science to others and perhaps increase the involvement from sponsoring teachers and judges. Please let us know what kind of science and health education contest would interest you and your students or colleagues!

An example of a lesson plan proposal submitted by a team from Presidio Middle School is reprinted in part below. This is a fascinating activity that generated intense discussion between the judges, the teacher, and the students when it was presented. Try it yourself in your kitchen, lab, classroom, or office and see what you think!

Flame in a Flask

Overview: In our lesson plan, we are going to talk about the contraction and expansion of air with temperature change.

Objectives: 1) To sharpen the students' observation skills, we will ask them to observe everything that happens during our activity; 2) To demonstrate the expansion and contraction of air with temperature change by doing a lab activity; 3) To develop critical thinking skills by having students analyze cause and effect relationships and devise ways to isolate variables during the lab.

To complete this lab, follow all of the directions below and refer to diagram.

Materials:

cork stopper
tray (at least 2 cm. deep)
birthday candle
glass flask or bottle (1/2-1 liter)
copper wire
matches
water

Directions

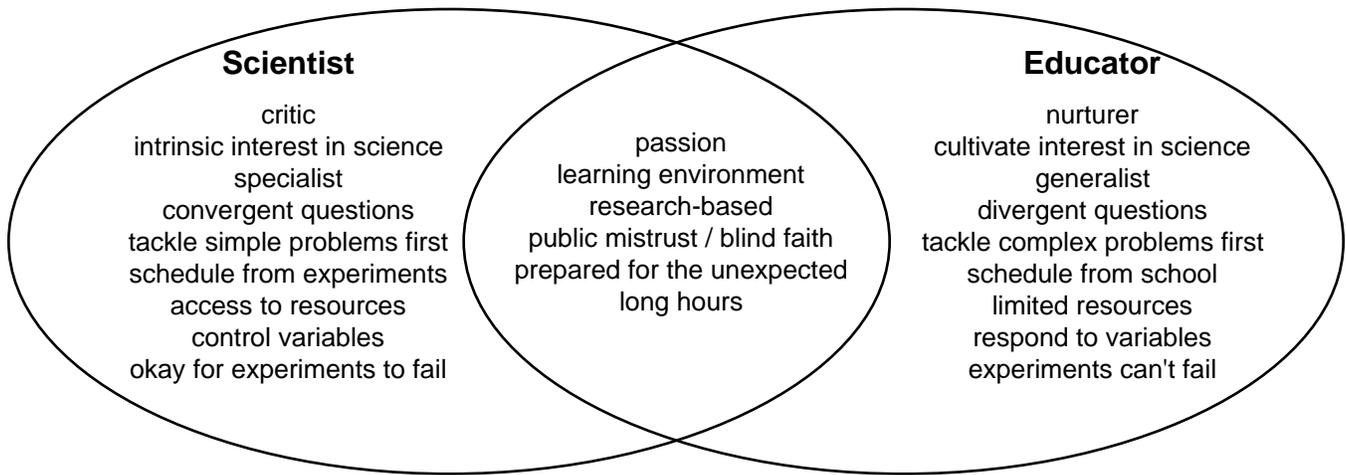
- 1) Wind some copper wire around the thinner end of the cork stopper. Make a hole on the other end and put the candle into the hole.
- 2) Add water to the tray until it is about 1 cm. deep.
- 3) Put the cork stopper with the candle up into the water.
- 4) Put a small piece of wire at the bottom of the tray next to the cork stopper. The wire will prevent a suction seal from forming.
- 5) Light the candle.
- 6) Quickly place the flask over the candle so that the mouth is on the piece of wire.

7) Carefully observe everything that happens.

(If necessary, repeat steps 3-6.)

Questions

- 1) Describe all the things that happened.
- 2) Why do you think the water goes into the flask?
- 3) Why does the cork stopper rise even when the flame goes out?
- 4) What causes the bubbles?



The Professional Cultures of Science & Education:

Common & Uncommon Ground

One of the beautiful things that happens in teacher-scientist partnerships is the illumination and bridging of the professional cultures of science and education. The more partners are aware of each other’s professional culture – its language, customs, values, traditions – the more they can share a productive partnership.

Common Ground

Educators and scientists both have tremendous passion for their work, toil long hours, operate within a learning environment in which they constantly ask questions, and need to be prepared for the unexpected. In the lab, an unanticipated result can be the most enlightening; in teaching, the “teachable moment” often cannot be planned in advance – or is interrupted by a fire drill. Both professions are based on a body of research, and both have a complex relationship with the public.

Uncommon Ground

One of the salient differences between scientists and educators is that scientists are trained to be critical and teachers are taught to be nurturing. This difference in orientation can confuse communication in partnerships. One scientist put it this way: “In science, if it’s 98% effective, we’re

trained to pick apart the 2%,” – to which a teacher responded, “And in education, if it’s 45% effective, that’s sure better than the 40% it was last year!”

Partners also differ in the types of questions they ask and how they approach problems. Teachers ask divergent questions for the purpose of stimulating and revealing student thought. Scientists construct convergent questions in order to solve a

specific problem. In science, investigations of simple problems lead to solutions for more complex problems. In education, complex problems such as equity need to be taken on first. In both fields, members engage in experimentation. There are some critical differences, though. The challenges for scientists are to figure out how to limit and control variables. Teachers face a larger number of variables which are often beyond their control. Finally, in the lab, experi-

ments can fail – and, more often than not, do – and scientists are able to learn from them. In education, especially at a system level, experiments can’t fail. They involve children.

Both scientists and teachers work long hours but their schedules differ in character. A teacher’s schedule is imposed by the structure of the school day; a scientist’s schedule is dictated by the nature of experiments. A scientist learns that a teacher “is on” from 7:30 in the morning until 3:30 in the afternoon and then faces after-school faculty meetings. It may not be so obvious to a teacher, though, that the scientist is going back to the lab at 7:00 PM to work until past midnight because of the timing of an experiment.

While not always ideal, scientists function with adequate resources; teachers for the most part do not. Scarce resources for teachers can be as basic as access to water, phones, and electrical outlets. It is important for scientist volunteers to understand these physical limitations and either work within them or augment them.

Language

Lastly, a word about language. Scientific terms are usually identifiable

Orienting Scientists to Partnerships

One of the partnership support structures that SEP has developed is the Scientist Orientation workshop series. These workshops help prepare volunteers to work with any of the structured programs or to work in individual partnerships. This fall's workshops were attended by a diverse group of close to 30 interested volunteers.

All were willing to roll up their sleeves and grapple with lots of questions about the who-what-how-and-why of working with teachers and students. Participants spent the first session learning about the stages of cognitive development and how it affects what is age appropriate in a lesson. They experienced techniques to assess students' prior knowledge of a topic through a model lesson from the *BrainLink Curriculum* and saw how understanding progresses from the concrete to the abstract. And they considered some of the similarities and differences between the professions of science and education.

The second session's activities gave the volunteers an opportunity to experience formal groupwork or "cooperative learning." The challenge for each group was, given a set of unidentified mystery white powders and a limited amount of time, to devise

a set of tests to uniquely distinguish each powder in the absence the other samples. Within every group, every member had a procedural role to perform such as facilitator, materials manager, reporter, and timekeeper. The protocols each group produced were tested and evaluated by another group, and feedback was exchanged in face-to-face interactions.

The final workshop had the volunteers working in teams to develop lesson plans. They also learned a bit about strategies for classroom management, the demographics of the San Francisco public schools, how SEP works with district teachers and students, and were introduced to the *National Science Education Standards*.

Here are some of their comments about what surprised them in what they learned:

"There are at least four stages of cognitive development – and I usually don't operate at the highest one."

"I hadn't thought about a word being an 'abstraction' before - that without at least a picture, or better yet an actual object, the word just doesn't mean anything."

"I realized I'm used to doing things in a very abstract way, and this really showed me how that would come across in a teaching environment

(lousy for most kids!)"

"When all of the concepts, interactions, and beliefs are broken down and explored, it all seems so complicated. (*fig. a*) The surprise is that it can all work and does work." (*fig. b*)

"Teaching begins with the basics. By looking at how I learn, I can speculate how others learn."

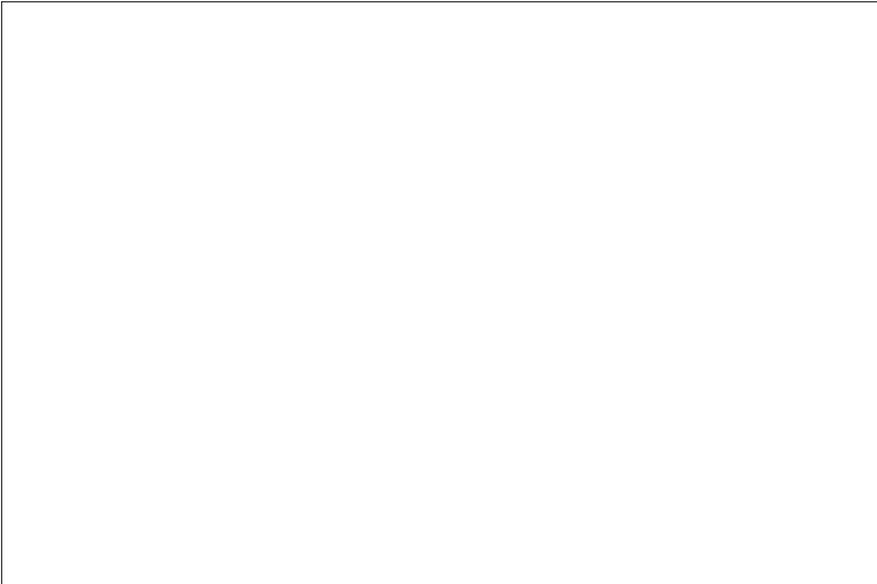
"It was surprising how distinct the environments of teachers and scientists are."

Common Ground from p. 4

as specialized words (i.e., "endogenous alkaline phosphatase"). The same is not true of educational terms because often times educators use common words in specialized ways (i.e., "cooperative learning"). Connotations of words also differ. The word "training" as applied to people is acceptable within the scientific community. In the education community, the word "training" can be interpreted as offensive. Hence, a scientist may start off on the wrong foot by talking about "training teachers" instead of "providing professional development."

As scientists and teachers explore these issues, they begin to develop a common understanding of each other's culture and can begin capitalizing on these commonalities and differences as strengths.

In addition to the SEP community, ideas from several other individuals



Tim Finco, Richard Shanks, and Rebecca Smith get their hands on science education during the SEP Scientist Orientation Series this past fall.

Triad Perseveres With A Groundswell of Support

Just as excitement about the 97-98 year of Triad peaked, project staff received unfortunate news. Although the National Science Foundation found the Triad proposal for renewed funding to be outstanding, it did not receive a high enough score to receive funding for the upcoming school year. What followed the arrival of this unhappy news was an outpouring of support beyond staff expectations. Triad's work over the last three years has impressed many and won allies who have helped make the project possible this year. Not only was there rallying among Triad's over 70 scientist and teacher participants and alumnae, but also extensive support and financial assistance from SFUSD through the efforts of Maria Santos, SFUSD Associate Superintendent for Curriculum Improvement and Professional Development.

Project staff are pleased to report that Triad is in full swing at 12 San Francisco middle schools with 23 UCSF scientists, 22 SFUSD teachers, and more than 300 students participating. Enthusiasm for Triad this fall was unprecedented, with more applications and interest than the program could accommodate. Over 50% of this year's Triad club co-sponsors are new, although several veteran participants have been with Triad for four years.

At many schools the interest in Triad is so overwhelming that club co-sponsors are challenged with providing quality hands-on science for 30-60 girls. Already this year, Triad club members have dissected mushrooms, flowers, sharks, and appliances; built bridges, towers, musical instruments, and kaleidoscopes; and visited the Explorium and the UCSF laboratories of their scientist sponsors.

While the goals of Triad are still to promote the interest of girls and women in science and gender equity in the schools, Triad is pursuing these goals in new ways. Until now, Triad has been a single-sex program; however, since most public school classrooms are co-educational, there is a need to develop ways to promote gender equity in co-ed settings. In addition, an increasing number of male scientists and teachers are passionate about making science an equitable place for women and girls. This year three Triad sites, James Denman,

Francisco, and Marina Middle Schools, are piloting experimental mixed-sex science clubs, each co-sponsored by male and female teachers and scientists. Each team designed a structure for their

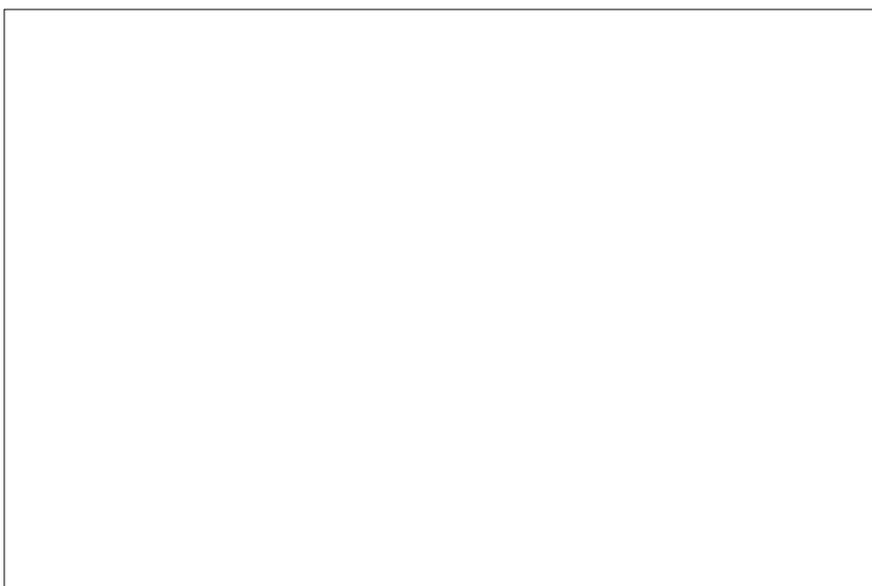
co-ed club, producing three different pilot models. At least half of the Triad club meetings at each site are still all-girl science club meetings. The establishment of these mixed-sex models will engage male teachers and scientists, as well as boys as active

participants in promoting gender equity. In addition, by pursuing both single-sex and mixed-sex approaches, Triad will be able to evaluate the relative effectiveness of each in promoting the interest and achievement of girls in science.

Lastly, several new gender equity efforts are happening in SFUSD this year, stemming in part from the success of Triad. In collaboration with Triad and SFUSD, the San Francisco Education Fund formed the Equity Collaborative which recently sponsored a district-wide conference on equity and awarded grants to promote equity on a school-wide basis at three Triad sites, Aptos and Gloria R. Davis Academic Middle Schools and Lawton Alternative Elementary School. In addition, Marina Middle School, a Triad site since 1995, received a grant from the State of California to implement single-sex boys' and girls' academies as an option for middle school students. Marina's innovative program has been highlighted in both *The New York Times* and *Time Magazine*.

The efforts of many teachers, scientists, and girls over the past three years have made gender equity a focus in the San Francisco public schools and Triad a highly regarded program nationally. The Triad staff thanks everyone at UCSF and SFUSD for their support during this transitional year and will continue to provide updates on efforts to sustain Triad in the future.

What followed the arrival of this unhappy news was an outpouring of support beyond staff expectations.



Triad reunites past participants and welcomes new ones at the fall retreat.

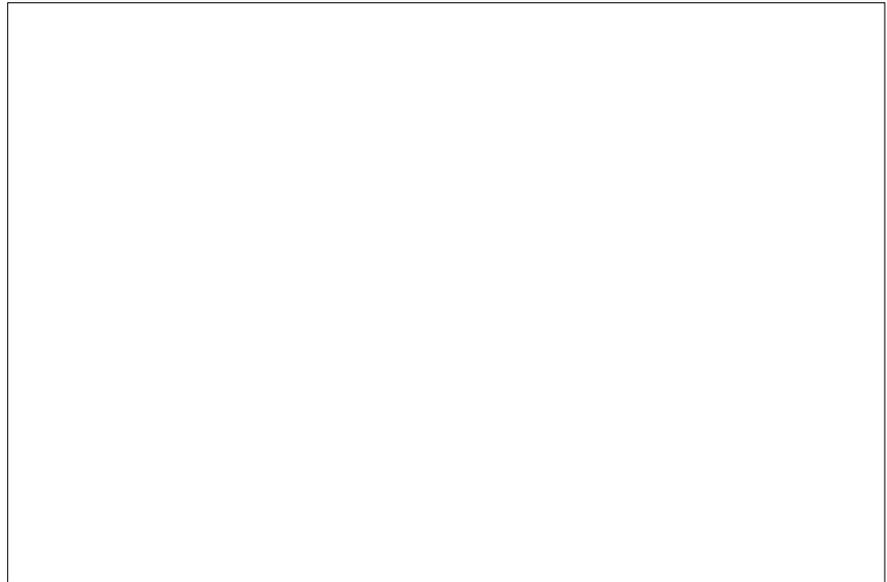
City Science Names New Director

When asked what drew her to the City Science directorship, Rosario Martinez's face lit up and she replied, "I love this kind of thing!" As the new Director for the City Science LSC, Rosario looks forward to supporting the district-wide reform effort in elementary science education. She is particularly excited about finding ways to develop increased leadership among SFUSD's teachers. In addition, Rosario is committed to bilingual education and wants to help ensure that all of San Francisco's students have equal access to the core curriculum, including science – a goal that is vital in a district in which nearly a third of the students are English language learners.

Rosario has been a part of City Science since its inception in 1991. As a bilingual classroom teacher, she was a member of SFUSD's original Science Leadership Team and worked to support the implementation of San Francisco's kit-based science curriculum. From there, Rosario's involvement in science education reform efforts deepened when she was hired as a Teacher on Special Assignment (TSA) in SFUSD and a Teacher-

In-Residence at the Exploratorium. As the only bilingual teacher on the District's science curriculum staff at the time, Rosario focused on supporting science education within the Spanish bilingual program by working directly with bilingual teachers and facilitating the translation of science curriculum materials. In addition, Rosario worked with the District's Project 2061 schools. After two years as a TSA, Rosario gained her administrative credential and worked as a site administrator at James Lick Middle School and Edison Elementary.

What are the primary challenges



Students from Lisa Bishop's 4th grade class at Paul Revere Elementary School get creative teaching their families about the digestive system.

of this new position? Rosario believes that science is a powerful vehicle for language development for all students, not just those who are learning English. She would like to take an active role in helping to establish science as a curriculum area equal in status with language and math. This entails building an awareness on the part of teachers, students, parents, and the larger community that science is important and that it can and should be integrated with other curriculum areas.

When Rosario is not thinking about the big issues in science education, she makes time to laugh, enjoy music, and contribute to her community. Rosario loves humor and is always happy to receive good jokes via e-mail. In addition, Rosario works as a volunteer within the Mission Community, serving on the executive board of Project Respect, an anti-violence/anti-crime project run through James Lick Middle School.

SEP congratulates Rosario Martinez on her appointment as the Director of the City Science LSC and looks forward to working with her to support elementary science education in SFUSD.

Commonly Asked Questions About City Science

What is an LSC? LSC is the abbreviation for programs that are funded through the National Science Foundation (NSF) as Local Systemic Change Initiatives. LSC Initiatives address science reform within a system – often a school district – and address curriculum materials, instructional methods, student assessment, professional development for teachers, administrative support, and the relationships between schools and the greater community. The SFUSD LSC in elementary science education is called City Science.

What are the pieces of the City Science program? The City Science LSC includes a wide variety of program components, including the following:

Science Focus Schools are the loci for the development of site-based professional growth models that include year-long participation of UCSF Scientists-In-Residence.

Summer Institutes provide new and beginning teachers with a two week opportunity to work on materials management, instructional strategies, and scientific concepts appropriate for the kit-based science curriculum units at their grade level. These institutes are

City Science Questions to p. 8

City Science Questions from page 7 facilitated by lead teachers and UCSF scientists.

Professional Development

components furnish the District’s teachers with additional growth opportunities including grade-level specific, school site based, and topic-centered study groups, as well as a science website that provides a forum for informal interaction about science kit use in the classroom.

The Science Systemic Leader

Program offers district teachers additional opportunities to develop their leadership skills through the planning and facilitating of workshops and institutes. In addition, this program engages lead teachers in deeper explorations in inquiry, student assessment, and integration of curricula.

How Can You Get Involved?

There are many opportunities for both teachers and UCSF volunteers to become involved in City Science. If you are a SFUSD teacher and would like further information, call Cynthia Gusman at 759-2950. If you are at UCSF or are intersted in working with a scientist, call Erin Strauss at 476-

0338.

226

Science and Health Education Partnership

University of California

San Francisco, CA 94143-0905

Events Calendar

City Science Teachers at UCSF	February 7
SFUSD Professional Development Days (no school).....	February 9 & 10
Triad Prof. Dev. Days.....	February 11, March 10, & April 22
UCSF Holiday, SEP Closed.....	February 19
Lesson Plan Contest (LPC) Entry Deadline	February 27
SFUSD Science Olympiad.....	February 28
LPC Finalists Notified.....	March 3
SFUSD Spring Break (no school)	April 6 - 10
LPC Presentations	April 13 - May 1
LPC Judges' Meeting	May 4
LPC Awards Ceremony (tentative)	May 13