

SEP Newsletter

June 1, 1996 No. 26

ASSESSMENT AND STUDENT LEARNING

Imagine going into a final exam on electromagnetism and instead of just being given a fill-in-the-bubble score sheet and a booklet of multiple choice questions, you were also given magnets, wires, batteries, buzzers, and light bulbs and asked to design an alarm system for your bedroom. As this newsletter is going to print, 8,000 5th and 8th graders and their teachers throughout San Francisco's public schools are engaged in new ways of assessing students' understanding of science, which go beyond traditional testing methods. The tests are simultaneously being given in other urban districts in California to a combined total of 40,000 5th and 8th grade students through the efforts of the California Systemic Initiative Assessment Collaboration (CSIAC). Analysis of the results will help educators to

assess student learning and to begin assessing the effectiveness of professional development programs with respect to student learning.

"The issue is: Are students understanding more science and becoming better scientific thinkers?"

The new approach to assessment, called "authentic assessment," uses strategies that support the learning of science—and the assessment of that learning—as a physically and mentally active process. In authentic assessments, students are engaged in tasks that allow them to apply facts, concepts, and skills in new situations and appropriate ways. One strategy for

authentic assessment is the use of performance tasks. For example, students who have been actively learning about electricity by using batteries, bulbs, and wire may be asked in a performance assessment to use these materials in order to solve a problem. Students then construct a series of tests in which they generate, organize, and analyze data, and then draw conclusions. These kinds of tasks call for a much richer demonstration of student understanding that can be assessed by a teacher. These instructional and assessment strategies are called for in the 1990 California Science Framework and the 1996 National Science Education Standards.

"The 5th and 8th grade assessments are giving us the opportunity to determine the effectiveness of what we've been doing in science education with respect to student learning," notes Carmelo Sgarlato. Sgarlato is the

Assessment to p. 3

Principal ReJois Frazier gets ready to dissect a flower with a student at Gloria R. Davis Academic Middle School's Triad Family Night. See story, page 6.

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The Science and 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, and the UCSF Chancellor.

CUSER Looks at Roles and Barriers for Scientist Involvement

On March 26-27, educators from 13 urban school districts, including San Francisco, that are involved in innovative science education reform programs participated in a seminar held by the Center for Urban Science Education Reform (CUSER) in St. Louis. The role of CUSER, which is part of the Education Development Center, Inc. in Newton, MA, is to bring these groups together several times a year to share their experiences and to learn from each other. The focus of the March meeting was on the role of scientists in reform programs and on the importance of improved science content for teachers. Participants discussed professional development, materials, teacher enhancement opportunities, and scientists in the classroom. The scientist consultants each represented a different aspect of scientists' potential involvement in reform.

Ramon Lopez, Director of Education & Outreach Programs for the American Physical Society (APS) and Professor of Astronomy at the University of Maryland, gave a presentation in which he discussed roles and barriers for scientists interested in science education reform and how the APS addresses these issues. In describing roles for scientists, Lopez reported that they are typically involved by being science fair judges, providing field trip venues, and visiting classrooms. They may also provide materials or mentor students. In more intensive reform efforts, they can serve as community advocates, assist in professional development, mentor teachers, help design and evaluate curriculum, and assist in strategic planning. Lopez then identified barriers to scientists' effective participation. According to Lopez, scientists are often ignorant about elementary education and may have an "unflattering opinion of teachers." Many teach as they were taught, through lectures, and have "a latent desire to take over." They are

generally ignorant about making partnerships with teachers and districts, and mechanisms to put good will to work are often lacking. Lopez said that schools and districts often have a fear of intrusion by outsiders, and that teachers can be intimidated by and have poor attitudes toward scientists.

To overcome these barriers, APS invites scientists interested in learning about good science

"Scientists may hold diametrically opposed opinions simultaneously about science education, and this must be confronted."

-Ramon Lopez

education to attend a Teacher-Scientist Alliance Institute. There, they are introduced to the National Science Education Standards and are put into situations in which they confront their contradictory notions of science education against their experience of how science works. "Scientists may hold diametrically opposed opinions simultaneously about science education, and this must be confronted," said Lopez. Scientists are then introduced to active learning, curriculum kits, and teacher inservice. After scientists have gone through the workshop, they are asked to participate in a teacher inservice, but in a supportive role. "They go in with nervousness and disequilibrium, which puts them in an inquiry mode instead of the expert mode. This is good."

San Francisco was represented by SFUSD K-5 Science Coordinator Bonnie Coffey-Smith and Elementary Science Specialist Caroline Satoda, and SEP Executive Director and City Science Co-Principal Investigator Liesl Chatman, all of whom are involved in San Francisco's Local Systemic Change Initiative. SEP Core Programs Coordinator Helen Doyle also attended the meeting as a

Sickle Cell Workshop at the Exploratorium

Always eager to acquire knowledge and new activities to share with their students, nearly 20 San Francisco high school teachers participated in an all-day workshop about sickle cell disease at the Exploratorium on May 15. The workshop was organized and facilitated by SEP Core Programs Coordinator Helen Doyle, SEP Teacher-In-Residence Eva Gordon, Karen Kalumuck of the Exploratorium's Teacher Institute, and recent UCSF graduate Cristina Weaver. The topics covered included the history of sickle cell disease, the biological basis of the disease, and the state of current research and treatments. Beth Touchette, a biology teacher at Philip and Sala Burton High School who has trained as a genetic counselor, discussed current screening and diagnosis programs for sickle cell and the ethical dilemmas faced by people in these programs.

The workshop activities emphasized the historical importance of sickle cell disease in laying the foundation for our current understanding of genetic diseases, i.e. diseases caused by mutations in our DNA. Teachers looked at blood samples from a normal and an

afflicted person, analyzed family histories, studied models of red blood cells, and investigated the difference between the hemoglobin (the protein that carries the oxygen in our red blood cells) of normal and sickle cells. Karen Kalumuck led teachers through several Exploratorium exhibits that enhanced the activities. Seven high schools were represented by attending teachers.

Besides providing teachers with a stimulating in-service opportunity, the workshop facilitators plan to create a kit that teachers can check out for classroom use. The kit will contain the background materials, student labs and worksheets, equipment, models, specimens, and the consumable materials needed for all the activities and lessons. SEP hopes to develop the kit with feedback from participating teachers and from students involved in classroom pilots.

SEP would like to thank Len Poli, Director of the San Francisco Biotechnology Alliance in Science Education (SF Base) program, administered through the San Francisco Unified School District with support from the Genentech Foundation, and the Exploratorium's Teacher Institute for making this collaboration possible.

Assessment from p. 1

SFUSD High School Science Coordinator and is spearheading the District's involvement in the CSIAC assessments. "The issue is: Are students understanding more science and becoming better scientific thinkers?"

The science assessment being used this spring consists of the following elements: a section of enhanced and justified multiple-choice questions in which students give reasons for their answers, and three performance tasks in the areas of life, earth, and physical science. The 8th grade assessment also includes open-ended questions that encourage a broader, deeper range of responses. All 5th and 8th grade SFUSD students eligible for the California Basic Skills Test (CTBS) will take the test, and Spanish versions are available for 5th grade.

CSIAC is a collaboration of systemic initiatives in science which have funding from the National Science Foundation (NSF). The term systemic initiative refers to efforts that 1) target entire districts or consortium of districts which share a common decision-making process and vision of quality education; and 2) support a comprehensive approach to educational reform that incorporates policy-making, curricula adoption, ongoing professional development, student assessment standards, partnerships and commitments from various stakeholders, instructional supports, and materials management. Systemic initiatives involved in CSIAC include: the California Science Implementation Network (CSIN), which is a component of California's State Systemic Initiative;

UC Regents Honor SEP's K-12 Outreach

In February, the University of California Regents identified SEP as an exemplary K-12 outreach program within the 9-campus UC system. Two other programs were also identified: UC Irvine's STAR Bridge program, and UC Riverside's University/Eastside Collaborative Project. A presentation on SEP was given to the Regents by SEP volunteer Kimberly Tanner, a doctoral student in the Neurobiology Program, and Executive Director Liesl Chatman. In attendance were Governor Pete Wilson, UC President Richard Atkinson, State Superintendent of Schools Delaine Eastin, and fellow Regents.

"By working in partnership with one district, we can strategically place our resources where they contribute to reforms that benefit all students," said Chatman. Tanner talked about her partnership with science teacher Jane Gerughty of Aptos Middle School. "My partnership with Jane has given me great insight into the difficulties and rewards of being a teacher and has instilled in me a deep respect for the talent, creativity, and dedication that our teachers bring to the classroom."

Urban Systemic Initiatives in Fresno, Los Angeles, and San Diego; and Local Systemic Change Initiatives in San Francisco (a.k.a. City Science) and Oakland. Schools and districts in San Mateo County that are also interested in science instruction and assessment but do not have NSF support have also been enlisted.

The analysis of the assessment results will be used by CSIAC to determine the effect on student learning that their efforts in professional development for teachers have had. Using a 20% sample of the current performance assessments, researcher Steve Klein of the Rand Corporation will perform an analysis that compares districts with NSF systemic initiatives to demographically similar districts doing science but without NSF support.

SEP Student Lesson Plan Contest Concludes with a Gala Ceremony

On Tuesday, May 7, the 9th Annual SEP Lesson Plan Contest Awards Ceremony was held in Cole Hall at UCSF. The ceremony was attended by nearly two hundred people, including SFUSD Superintendent Waldemar Rojas, UCSF Vice-Chancellor Dorothy Bainton, and Michelle Wright, a representative from Governor Wilson's office. Most of the audience comprised the many middle and high school students who participated in the contest, their teachers and parents, supporters from other District offices, and UCSF judges and volunteers. After a brief welcome by SEP Executive Director Liesl Chatman, Core Programs Coordinator Helen Doyle modeled the use of the scientific method in a hands-on lesson called "Shake It Up, Baby", involving mysterious color-changing liquids. The audience participation in this lesson was exemplary, if a little unruly at times.

The students eagerly awaited the

main part of the Ceremony: the announcement of the winners of the first, second, and third place prizes in the middle and high school divisions (see below). Winning lessons were chosen by UCSF judges, who looked for effective teaching methods, appropriate and accurate content, active involvement of the students in hands-on activities, and use of the scientific method. The first place winners for middle school taught a lesson on hot and cold chemical reactions, using a simple yet effective activity that engaged the students in making observations, discussing hypotheses, and drawing conclusions. The winning high school presentors, who taught about simple machines, provided a strong learning experience by giving challenges to students working in small groups and encouraging them to experiment with and observe how levers and pulleys work to meet these challenges.

After the prizes were awarded, everyone gathered in the lobby for a

festive reception. SEP would like to thank all the students who entered the contest, the teachers and families who coached and encouraged them, the UCSF judges and supporters, and the Herbert Boyer Fund of the Department of Biochemistry for their generous

LPC RESULTS

support of the annual Lesson Plan Contest. SEP hopes to see you all again next year!

High School Division

The winners in the high school division were: First Place: Patrick Kessler, Christina Toy, Alex Chen, Yin Yuen, and Ms. Ruth Green, Washington HS. Second Place: Shantel Brooks, Joaquin Ragland, and Ms. Anne Marie Grace, International Studies Academy. Third Place: Frank Trang, Michael Chen, William Kong, Henry Yeung, Xiang Guan and Mr. Gary Shimamoto; Yvonne Fong, Angela Kwan, Christine Ou and Mr. Paul Koski; Billy Chau, Tony Lau, Phillip Yim, and Mr. Clark Soave; Jack Liu, Pollyanna Ma, Sahra Park, Danny Quang, and Mr. Daryl Zapata, all of Washington HS; Kien Lam, Kelvin Sang Chau, and Mr. Douglas Spalding, Balboa HS.

Middle School Division

The winners in the middle school division were: First Place: Raymond Ho, Corey Lee, and Ms. Irene Uesato, Presidio MS. Second Place: Clara Porter, Katy Tang, and Ms. Annette Anzalone, Herbert Hoover MS; Tony Kwong, Eric Sid, and Ms. Melissa Graviss, Marina MS. Third Place: Christine Camacho, Adrienne Frey, Darneshea Jones, Tracy S. Lopez, Karen Cai, Alice Choi, Eva Crummett, Sarah Holcomb, Brianne Vorse, and Ms. Lorraine Perry; Chris Recla, Jimmy Fu, David Luu, Tony Liao, Joseph Leong, Jeremy Horn, and Mr. Kevin Barth; Huong Do, Ibis Espinoza, Judy Chiu, Jacalyn Yuan, and Ms. Julie Zastrow, all of Marina MS.

Middle and High School Winners of the 1996 Lesson Plan Contest from Presidio Middle School and George Washington High School. From left to right: Liesl Chatman, Alex Chen, Yin Yuen, Corey Lee, Patrick Kessler, Raymond Ho, Superintendent Bill Rojas, and Christina Toy. Absent from the photo are teachers Ruth Green and Irene Uesato.

Student & Teacher Summer Interns Ready To Go

The SEP Summer Intern Program is off to an exciting start with thirteen student interns and two teacher interns eagerly awaiting their mentor and project assignments. Interns will begin work at UCSF during the week of June 17 and will be on campus until the middle of August. This year's interns were chosen from diverse and competitive applicant pools of teachers and students. Two interns from last year were so successful in their labs that they will return this year to continue their research projects. The new students come with a variety of experiences and goals, and represent seven San Francisco high schools.

This year's interns will be funded by the National Institutes of Health, the American Chemical Society, and the Lange Fund of the Department of Physiology. SEP has a waiting list of additional qualified students pending additional funding.

The teacher interns are Patricia Kudritzki from Aptos Middle School and Larry Alegre from Cesar Chavez Elementary School. The student interns are: Michelle Lau of Lincoln HS and Janel Tate from Philip and Sala Burton Academic HS, both returning from last year; Sandra Rodriguez and Shaun Morris from Balboa HS; Mario Mercurio from High School of the Arts; Cherrilyn Yamat and Charity Ancheta from Mission HS; Valerie Timog and Wendy Zeng from Burton HS; Michelle Chu, Nicole Wong, and Kamilah Jones from Lowell HS; and Karen Winn from Galileo HS.

Interns are currently being interviewed by and matched up with their summer mentors, while program coordinators are planning the summer's seminars, tours, and field trips. UCSF students, faculty, or staff interested in participating in the Summer Intern Program can call Helen Doyle at 502-6324 for more information. For the summer of 1997, SFUSD teachers and students should keep their eyes open for information coming their way in early December.

Students from Balboa High School teach a lesson called "Work in Everyday Life," which won third place in the 1996 Lesson Plan Contest.

Coaching the Lesson Plan Contest

by Lorraine Perry

Every year at least five different people listen to my beleaguered cries of, "I'll never do this again!" And every year I return yet again with a new batch of students yearning to win that big \$1,000 prize. What brings me back are the wonderful memories, those every-so-precious glimpses of students engaged in independent learning, doing everything we as teachers are told at in-service workshops we're supposed to be teaching students.

The Lesson Plan Contest is a vehicle for stretching the limits and abilities of your students beyond your and their expectations. I'm always surprised at the talent and creativity that emerges in these lessons but is seldom expressed in the classroom. This is a show, it's improvisation at its finest! Every once in a while you find a star, a student who gets on that stage and shines. And most of the time, I'm as surprised as they are.

It's also about students learning to work together towards a common goal. Just as in adult groups, their commitment varies and often a strong leader will carry the weaker members along on the coattails of his or her enthusiasm. Other times, best friends help each other get past their fears or weaknesses. Although some groups

can barely stay together until the day of the lesson, all who do will learn useful lessons for their future.

Because I was raised in an extended family and am still living in the house I grew up in, in the town I was born in, and teaching in the school district that I attended as a child, I want to give some of that sense of continuity and belonging to the students I coach. Therefore, I strongly encourage students to go back to their former school, to one of their "favorite" teachers. It's in this classroom that the "magic" can happen—where students can share with younger students some of the excitement of science and where we teachers and judges can share this excitement.

After it's over and I walk back to the car with my students, I usually recall the student who, after teaching an exceptionally successful lesson, said to me, "Now I don't care if we win at all. We did a good job. We did the best we could." His name is Thai Hoa Tran and his group won first prize that year! Whether they win or just participate, I assure you the experience is invaluable for everyone involved.

Lorraine Perry teaches at Marina Middle School and has coached many winning lessons over the past several years.

Triad Schools Host Family Science Nights

An exciting addition to the Women's Triad Project this year has been the inclusion of Family Nights, during which girls and their families come together at the school with teachers, scientists, and project staff for an evening of hands-on science and good food. The events have provided an opportunity for parents and siblings to gain a better understanding of the project and to do science together as a family. An unanticipated outcome of the Family Nights was that teachers report meeting parents who have not attended school events before. Family Nights have been held at the following middle schools: Aptos, Francisco, Gloria R. Davis, Marina, Martin Luther King, Jr., Presidio, and San Francisco Community.

The following is a first-hand account by Patricia Caldera, Sumita Ghosh, Mishwa Lee, and Linda Payne of the event at San Francisco's newest middle school, Gloria R. Davis:

Triad Family Night at Gloria R. Davis Academic Middle School

On February 27, 1996 we had our first Family Night. It was a time to bring together all of the families of the female scholars who belong to our science club. We had an incredible turnout of 60 people. The evening started out with a catered dinner from James and James Ribs and Thangs with servings of ribs, chicken, and catfish. Then Linda Payne and Mishwa Lee introduced Principal ReJois Frazier and

In one room, six club members helped families dissect flowers and fish.

the coordinators of the Triad Project, Katherine Nielsen and Liesl Chatman. We gave an overview about the Triad Project and why we have our SISTA (Sisters in Science Taking Action) club. The highlight of our evening was after dinner when the girls presented activities previously conducted at their

SISTA meetings for their families.

We had four different stations set up for the parents to see: dry ice, acids and bases, fish dissection, and flower dissection. In one room, Scientist Sumita Ghosh and Teacher Mishwa

The girls were fully responsible for conducting the activities with their parents and answering all of their questions.

Lee along with six club members helped families dissect flowers and fish. Everyone enjoyed observing flower ovaries and fish scales through microscopes. Adults and children alike marveled at their beauty and complexity. In another room, Scientist Patricia Caldera and Teacher Linda Payne assisted six members who led two hands-on activities—cabbage juice chemistry and ice versus dry ice. There were many discussions and questions, including why does dry ice bubble when it is in water, and what is the

Families discuss science at Gloria R. Davis Academic Middle School's Triad Family Night

“fog” around dry ice? Nearby, like a magic show, the purple cabbage juice turned green or pink by the addition of mysterious substances that turned out to be plain household items (acids and bases).

The girls were fully responsible for conducting the activities for their parents and answering all of their questions. It was great to see and hear the interactions between the parents and the scholars. All of the girls did an excellent job of answering families' questions. It was clear that our girls had gained a great deal of confidence and pride in science, and they were happy to share it with their families. The parents also beamed with pride watching their daughters conduct experiments with such assurance.

Members then waited with great anticipation for the door prizes drawing: six people got the coveted mini-microscopes, while others received calculators, water testing kits, pencil sharpeners and crystal radio kits. All in all, everyone agreed that it was a very exciting, interesting, and informative Family Night '96.

City Science's Summer Institutes Gain Momentum

To strengthen the foundation for a strong elementary science program, the City Science Local Systemic Change Initiative will provide professional development both for beginning teachers and teacher leaders this summer. If you see a UCSF scientist building a model of Mount Shasta on the lab bench or looking for “mini-beasts” in Saunder’s Court, you can assume it’s in preparation for the 4th grade curriculum unit called “Land-forms” or the 2nd grade “Habitats” unit.

Last summer, 80 beginning teachers attended a two week summer institute in which teacher leader/scientist teams guided them through half of the SFUSD science curriculum units at their respective grade levels. This summer the same teachers will return to visit the remaining science units and will be joined by an additional 75 teachers who are new to the program.

For the first time, workshops for science units appropriate for grades K/1 will be offered in both Chinese and Spanish. To help the teachers prepare for conducting their science lessons in cooperative groups, SFUSD teacher Pat Forte will also conduct workshops that will give them deeper insights into the theory and practice of cooperative learning. The Summer Institute is planned for the first two weeks of July, addressing Earth and Environmental Science units July 1-5 and Life Science units July 8-12.

Teachers and scientists who will be working together to present the units for the Summer Institute include Kindergarten - Jane Huey, Sandy Canchola, Judy Kerr, Erin Peckol; K/1 Chinese - Danny Wong, Sophie Tom, Germaine Chan, Walter Lau; K/1 Spanish - Nancy Serraga, Sue Parmelee; 1st Grade - Oliver Glover, Kimberly Tanner, Jonathan Knight; 2nd Grade - Jeanette Chin, Jennifer Cressman, Kent Nybakken, Dana Smith; 3rd Grade - Denise Ebisuzaki, Supriya Shivakumar, Tracy Ware; and 4th Grade - Steven Green, Reuben

UCSF scientist Patricia Caldera (center) works with teachers Yvonne Cheung (left) of Cabrillo Elementary School and Susan Lee (right) of Monroe Elementary School at the City Science Lab Day this past spring.

Peters, Emily Wilson. Cristina Weaver will be assisting Pat Forte in her presentations on cooperative learning.

One of the important elements of the new approach to teaching science that the SFUSD is implementing is the emphasis on inquiry. This means getting students to observe closely, generate questions about what they observe, design experiments to find answers to their questions, and think deeply as they interpret new observations to reach conclusions or develop new questions.

To prepare City Science lead teachers and interested scientists to work with District teachers on developing their skills in inquiry, Barry Kluger-Bell, a physicist at the Exploratorium and Director of the Bay Area Science Project, will lead a two-part Inquiry Institute. The first part will be a three-day session May 22, 23, and 24 at the Exploratorium. During these three days, in which the participants will work with simple phenomena like swirling colors and foams, the emphasis will be on making observations and

seeing what questions arise that may form the basis for investigation.

During the second part, which will take place in the third week of July, the exploration of what inquiry means will continue with an in-depth inquiry experience. As the week comes to a close, participants will begin to consider how they can use the SFUSD kit-based science units to support student inquiry in the classroom. City Science Teacher Leaders will be working throughout the year in a variety of roles, especially at their school sites, to help all teachers engage their students in active learning in science.

Classified Ads

WANTED: Anatomical models
for the SEP Resource Center.

**AVAILABLE: Aquarium
equipment** - pump, heaters,
gravel, nets, etc. Contact
Margaret.

POSITION AVAILABLE:
Scientists for the Women's
Triad Project. Academic year
commitment for '96-97. \$3,000
stipend. Contact Katherine.

POSITION AVAILABLE:
Scientists for City Science Kit
Clubs during the '96-97 school
year. \$450 stipend. Contact

Margaret.

WANTED: Modems for schools.
**WANTED: MACINTOSH
external floppy disk drive** for
the SEP office.

WANTED: IBM computers
(especially 386 models) for
schools.

**WANTED: Blood pressure
cuffs** for the SEP Resource
Center.

WANTED: Plastic petri dishes,
any size for teachers.

WANTED: Calipers for measur-
ing body fat for the SEP
Resource Center.

SEP Summer Hours

SEP staff members will be keep-
ing varying hours over the summer.
If you need to visit SEP or are having
trouble contacting a specific staff
member, please call SEP's adminis-
trative assistant, Roberta Heidt to set
up an appointment at least a day
ahead of time. Roberta works on a
half-time basis and is available from
8:30 to noon, Monday through Fri-
day. She can be reached at the SEP
general number, which is 476-0300.
Also note that the Resource Center
will be closed over the summer ex-
cept by special arrangement.

June 14..... Last Day of SFUSD Instruction
July 1-12.....City Science Beginning Teacher Institute
July 4.....UCSF Holiday, SEP Closed
July 14-19.....City Science Inquiry Institute
August 21, 4:00 pm, S-168.....Summer Interns Poster Session
August 26.....First Day of SFUSD Instruction