

Learning To Love Science

Innovative science education partnerships are changing the way we learn science.

BY AL STAROPOLI

Sometimes when science class ends, students complain. “They’d rather stay and tinker some more,” says Mario Godoy-Gonzalez. His students are working intensely on *Click and Clone*, an Internet genetics activity developed at the University of Utah with NCCR support. Their mission is to create Mini-Mimi, a genetically identical clone of Mimi, a cartoonish virtual mouse.

“The activities are extremely cool. I like them because they get the students motivated,” says Godoy-Gonzalez, who teaches high school science to 18 young adults, all of them Hispanic, in



Professional development sessions help high school science teacher Mario Godoy-Gonzalez learn the art of blending science and fun.

the small rural town of Royal City, Washington. “The activities show students relevant topics in science. And instead of just reading about science, students can do science.”

Across the nation, thousands of children, teachers, and adults are learning about science through projects supported by NCCR’s Science Education Partnership Awards (SEPA) Program. SEPA stimulates curiosity and encourages scientific investigation through hands-on activities.

Now in its 15th year, SEPA is implemented in more than 30 states, Puerto Rico, and five Native American communities and reaches tens of thousands of people every year. The Program’s goal is to improve understanding of health and biomedical research by supporting projects that increase the scientific literacy of children, young adults, and the public at large. A better understanding of health and research issues allows people to make more informed decisions about lifestyle and medical care that can prevent disease and maintain health. The Program also contributes to the development of future scientists and clinical researchers by exposing young people to the excitement and value of scientific investigation.

SEPA projects come in a variety of styles, customized for each community. While one SEPA project may be led by a museum, another may be carried out in the classroom. “SEPA’s public outreach through museums and science centers is fantastic, covering the basic and clinical research programs that NIH funds, as well as providing a community forum for discussing topics of high public interest, such as stem cell research,” says



NCRR's Tony Beck, who oversees NCRR's SEPA Program. "In the classroom, SEPA is a phenomenal way to expose students and teachers to science and inquiry-based investigation."

Although every SEPA project is different, they all have one element in common: partnerships. In a Maryland SEPA project, universities partner with elementary schools in African American communities to educate children on health and fitness. In Hawaii,

■ **Utah high school student Katie Stokes gains understanding of genetics and cloning through an online activity called *Click and Clone*.**

Learning Center, which is a powerhouse for spreading the word about genetics (<http://gslc.genetics.utah.edu>).

The SEPA project in Utah has relied strongly on the Internet to explore the intricacies behind genetics. The success of its Web site, visited by more than 150,000 people every week, may be

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universities form local collaboratives to bring science to Native Hawaiians and other Pacific Islanders. And in Utah, a SEPA project works with Hispanic schools and the public at large through an Internet initiative. These are just a few of the 65 SEPA projects implemented nationwide.

UTAH'S GENE GAMES

When geneticist Louisa Stark first launched the SEPA activities on the Utah Web site, she had no idea that *Click and Clone* would be such a hit. Stark directs the University of Utah's Genetic Science

explained by its highly visual design, similar to what teens see in video games and on TV. The site offers over 100 online activities, podcasts, virtual labs, interactive animations, and feature articles with topics ranging from cloning to stem cells to gene therapy.

The development of materials was driven partly by the need to fill a gap in educating students about genetics—a high-interest topic frequently on the front page of newspapers. "Teachers often told us that most genetics materials were too advanced or not hands on," says Stark. For Stark and her colleagues, based at a university with an outstanding record in genetics research,

developing educational materials became a natural choice. “More genes for genetic disorders have been discovered at the University of Utah than anywhere else in the world,” she says.

Materials, however, are effective only if used. Thus, professional development remains one of the SEPA Program’s core strategies. By teaching teachers, the center indirectly educates students on today’s genetics developments. Through partner-

SEPA project that explores the science behind exercise. “Be Active Kids! (BAK!) is a set of curricular materials that uses physical education to teach students science,” says Ennis. What makes BAK! unique is its integration of physical education with reading, science, and math. The project reaches about 3,000 children in grades 3 to 5 every year. BAK! is implemented in partnership with Prince George’s County Public Schools, which serve a student

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ships with school districts and teacher associations, about 1,500 middle school and high school teachers have been taught to use the center’s SEPA materials.

Professional development helps build the confidence of teachers. “At first I was nervous teaching science, because I’m not a scientist,” says Godoy-Gonzalez, who has used *Click and Clone* and other activities with his students. “But the support has been magnificent. I feel like I have a backup team of scientists helping me.”

Teachers who do not attend the instructional workshops can still download any of the 51 hands-on activities available at the site. “Some activities get 500 downloads every day, consistently,” says Stark. All activities are free of charge.

One online module was expanded into a full-size museum exhibit, called *Stem Cells and You*. The exhibit was developed in collaboration with Utah’s Museum of Natural History to support a public outreach component of the NIH Roadmap for Medical Research. This traveling exhibit explores the science, medical applications, and social and ethical issues related to stem cell use and is currently touring museums around the country.

In the future, Stark plans to enhance the Web site to communicate the importance of research to the public. “We would like individuals to understand more about genetic tests, the benefits of participating in clinical trials, and ultimately the new genetic treatments that could help them and their loved ones,” she adds.

MARYLAND’S BRAIN FITNESS

How much science goes into running up the stairs? Apparently a lot, if you ask kinesiology professor Cathy Ennis. She and her colleagues at the University of Maryland, College Park, have developed a unique

population that is roughly 75 percent African American (<http://www.hhp.umd.edu/BeActiveKids>).

Through the materials, three fictional characters—Flex Coolbody, Dr. Love’s Healthy Heart, and Mickey’s Mighty Muscles—guide students in learning about their flexibility, target heart rate, and strength training. At the beginning of the semester-long project, students are given their own science journals. As the project progresses, they become junior scientists by jotting down data, completing tables, and drawing graphs in their journals related to the exercises they perform.

Fourth graders in Hawaii learn about the bones of the human body as they help to solve “Medical Mysteries” during a classroom activity.



But the curriculum goes beyond exercise to also encourage a healthy lifestyle. As part of the project, students are asked to choose a snack from a list that includes fruit, milk, a candy bar, soda, chips, a carrot stick, and french fries. They are then given the calorie counts for each snack and learn that it takes approximately 22 steps to use up one calorie. With this information, the children perform some quick calculations. Among oohs and aahs, students learn that it takes only 100 steps to use up the calories in a carrot but more than 6,000 steps for the candy bar. “Students begin to learn that there is a direct and immediate consequence to their decisions,” says Ennis.

BAKI’s innovative approach is a welcome sign as the nation struggles to reduce obesity. During Family Science Night, up to 200 parents and siblings also participate in health and fitness events. The project will soon be expanding from the 15 schools it currently serves to 150 schools in Prince George’s County, Maryland.

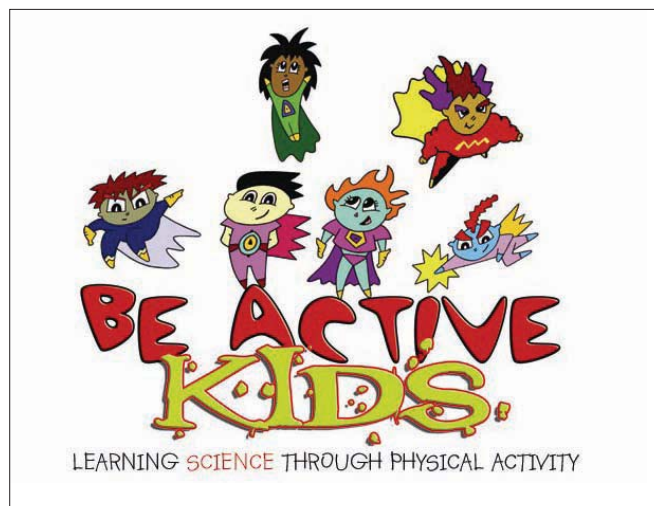
HAWAII’S NEXT WAVE

Planes and boats are part of the daily life of the SEPA staff in Hawaii. In a state of islands, this type of commute is typical. Hawaii is highly rural, with some islands being fairly distant or having small populations. Family physician Kelley Withy, who directs the SEPA project in Hawaii, sees the islands’ geographical barriers in a positive light. “Remote communities are often the ones that need the project most, because they are exposed to less opportunities,” she says.

In Hawaii, the SEPA project strives to guide students toward institutions offering degrees in health science. The lack of role models can make this challenging, though. Some islands completely lack not only a hospital but also, at times, a resident doctor. To counteract this, Hawaii’s SEPA project piques the interest of young adults, families, and teachers by hosting a free Family Science Night in collaboration with local schools, community organizations, and the Bishop Museum.

In one station, students can become “doctor detectives,” determining a patient’s breath flow, heart rate, and body temperature and then matching them to a list of specific diagnoses. At other stations, students and parents can chat with health career professionals and learn more about careers, starting salaries, job outlooks, and health education projects in Hawaii. In all, more than 2,000 people have attended Family Science Night in rural communities throughout the islands.

Family Science Night is one of several strategies to interest, recruit, and encourage students to pursue health careers. Following Family Science Night, SEPA recruiters capitalize on stu-



■ Flex Coolbody, Mickey’s Mighty Muscles, and other fun characters guide Maryland elementary students in learning the science behind physical education.

dent’s enthusiasm by visiting the community’s classrooms. Often accompanied by Hawaii health professionals, recruiters discuss health careers in depth.

Seeing recent college graduates motivates many students to apply for a three-day summer program, during which high school students gear up to attend the University of Hawaii. To many students, some of whom have never left their home islands, this can be a life-changing experience. They live in the university’s dorms and work with faculty to learn about health careers through hands-on activities. Students perform hearing tests, intubate mannequins, examine X-ray equipment, and participate in other educational endeavors.

But activities do not end with the summer project. SEPA of Hawaii works year-round by making staff available to answer questions via phone, e-mail, or personal classroom visits. Over the years, the project has become the glue between communities and institutions of higher learning, building a bridge between students and health careers. As with all SEPA projects, success depends on dynamic partnerships among universities, public schools, museums, or community centers. “We couldn’t do half of what we do without our partnerships,” says Withy.

TO LEARN MORE:

- The SEPA Program supports the creation of innovative partnerships between biomedical and clinical researchers, teachers and schools, museums, and other organizations. SEPA grants provide from two to five years of support. Domestic organizations with a scientific and/or educational mission are eligible to submit applications. To learn more or apply for SEPA funding, visit www.ncrr.nih.gov/clinical/cr_sepa.asp.
- Details on all 65 SEPA projects currently implemented across the nation, information on teacher and curricular materials, and links to SEPA project Web sites can be found at www.ncrrsepa.org.