



Community Resources for Science

practical support for great science teaching

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Report Links Environmental Ed and Academic Achievement

In September CRS presented a report reviewing existing research that links environmental education with academic achievement outcomes. StopWaste.org commissioned this project in order to learn more about how environmental education programs can promote the interests of teachers, administrators, and parents around improved student learning in many different subject areas. This work is part of our ongoing effort to help expand our local science and environmental education community's knowledge about effective approaches.

Many educators have strong opinions about the role of environmental education in academic achievement. It is important to be able to base those opinions on valid research that provides convincing data to decision-makers, as well as to gain more information about effective approaches.

With the support of researcher Lisa Wahl, CRS discovered approximately 200 documents investigating a wide variety of environmental education learning outcomes. CRS focused on research about programs conducted at K-12 school sites, and that showed changes in student achievement on standardized tests in traditional curriculum subject areas. In addition, we used research guidelines developed by the U.S. Department of Education to sort the levels of evidence provided by the research. For the report, 100 original research papers, compilations, analyses, and related studies, meta-analyses, and articles were analyzed and categorized, and findings of the strongest and most relevant studies were discussed in detail.

Top studies reveal positive outcomes. Eight studies met the most rigorous standards for "possible evidence." An additional ten studies provided supporting data. The results of these top studies demonstrate a strong trend of positive impacts on academic achievement across many curriculum subjects as a result of environmentally-related experiences. This evidence is sup-

ported by additional data from a larger group of studies that look at a broader range of EE impacts.

EE achievement based in broader best practices While environmentally-related experiences were the focus of these studies, the achievement outcomes also show strong correlation with other educational best practices. Some current practices that are associated with positive results in this analysis include: project-based, interdisciplinary teaching that uses learner-centered, constructivist methods in both collaborative and independent experiences.

All of the programs showing strong results used natural environments regularly and were active learning, project-based experiences. Seven of the eight most relevant research documents studied programs that were at least two years in length. These results also point to the difficulty of creating a causal relationship between any single approach and positive academic outcomes. Future research on how EE affects the many contributing factors could help clarify these relationships.

The overall results indicate that the academic achievement impacts of environmental education can be strengthened by drawing on best educational practices while preserving strong connections to natural environmental experiences.

Conclusions and Implications Based on the literature surveyed there is meaningful evidence showing that environmentally-related education can increase academic achievement across curriculum subjects. Additional research could strengthen this conclusion and also improve the likelihood of positive outcomes in practice by illuminating other important teaching and learning factors.

The full report and bibliography of the research reviewed can be found at www.crs-science.org/pdf/aa_report.pdf



Teachers observed hundreds of shorebirds from the deck of Crab Cove Visitor Center at our most recent Science Social. Teachers also met program providers from Kids for the Bay and Friends of San Leandro Creek, and learned about great curriculum materials from National Geographic. CRS holds Socials three times a year at a variety of great science and environmental education locations.

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New Experiments for Scientists in Local Classrooms

CRS's popular Community in the Classroom program is growing! Based on enthusiastic input from teachers and volunteers, we are offering three ways for volunteers to participate this year:

Individual Classroom Outreach Scientists work with CRS staff to develop a one-hour, hands-on classroom presentation and visit at least three classrooms during the school year. Regular orientations are offered throughout the community. Last year scientists visited



Scientists in the CIC program present activities that link "real world" science ideas with classroom curriculum.

more than 100 classrooms.

Team Outreach Projects In this pilot project, research groups at UC Berkeley are invited to create a team project, visit a different classroom each month, and become an ongoing resource for their classrooms for the year

Scientist Teacher Partnership This year at Cragmont Elementary in Berkeley, two scientists are paired with the teaching team at each grade level to co-plan and co-teach a unit.

Be CuRious: About Scientists and Their Work!

"Who needs to know this?" is a question teachers often hear. With a little help from the Web, you'll be able to show your students that scientists are everyday people, using every bit of science the kids are studying right now. They'll also see scientists who look like themselves and, like them, are a diverse group of individuals.

Techbridge was started in Oakland as an after-school and summer program that encourages girls in technology, science, and engineering. Techbridge Careers offers brief biographies of local women who are scientists in our community, including their hobbies and what they like to do outside of work. The bios are written by girls for girls.

<http://www.techbridgecareers.org/bios/index.html>

Sally Ride Club Not just for girls, the "Meet an Expert" page on Sally Ride's website highlights female scientists in their habitats. Currently featured are a geophysicist who studies Mars, Venus and the moon, and an environmental engineer who takes her students to study beaches.

http://www.sallyrideclub.com/member_home.do

WHOI At the Woods Hole Oceanographic Institute website, students can go on an online underwater expedition

with the scientists. Its "Remarkable Careers in Oceanography" page features women scientists who explore the oceans. http://www.whoi.edu/home/index_education.html

The Futures Channel The Futures Channel website provides very cool short movies about ways in which math and science are used in the real world by real scientists. Meet a wild animal vet, a bat expert and a scientist who designs spacesuits. Concepts are discussed with kids in mind. For example, as veterinarian Mark Pokras weighs an injured fox, he notes what science and math he needs to know in order to be able to release the fox back to the wild. Each movie includes a corresponding movie lesson guide with curriculum connections.

<http://www.thefutureschannel.com/index.php>

National Geographic *Dead Flies Power Flesh-Eating Robot*. How's that for a gross-out grabber? Kids will squirm when they find out scientists in England have built a robot that runs on dead flies, rotten apples and sugar. The National Geographic Kids website has great articles (with pictures) about unusual things scientists are doing.

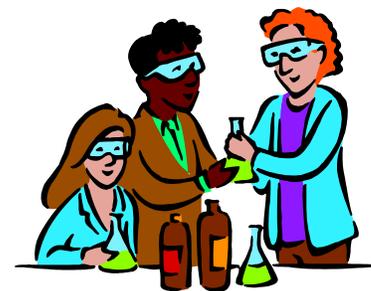
<http://news.nationalgeographic.com/kids/space.html>

Dragonfly If you tell kids that David Ortiz and Katie Broughton are scientists,

they may think of a chemist or an astronaut. How many will guess that David's job is one that many kids (and adults) dream of – a video game designer who creates NFL game simulations? Or that Katie works with toys and created realistic moveable eyes on baby dolls? The Dragonfly website shows that scientists are in every facet of our lives. An ethnically diverse group of over 50 scientists and their work is featured in print articles and short video clips.

<http://pbskids.org/dragonflytv/scientists/index.html>

And of course... CRS! For examples of what scientists in our own community are doing in local classrooms, check out www.crs-science.org. Members may also put in a website request for a list of science careers or additional websites of cool things scientists are doing.



Pushing the Professional Development Envelope

CRS has two roles in strengthening science professional development across our community: 1) connecting teachers with professional development opportunities and resources offered by organizations around the Bay Area, and 2) providing CRS workshops that supplement existing offerings.

This year, we're working on expanding our range of models that help teachers become stronger and more confident in science.

This work is guided by the interesting discussion about science professional development from our first Teacher Services Seminar last May. Teachers and administrators working with CRS last year were invited to participate in this discussion, including reflection about the components of effective science teaching, and how to learn the different skills and knowledge involved. One of the interesting insights was how many different approaches educators find helpful for building the knowledge, skills, and confidence nec-

essary for good science teaching.

The Teacher Services Seminar has had an impact on both of CRS's roles in strengthening professional development. First, it has stimulated an effort to gain a deeper understanding of different approaches being offered in our community. We are also refining our website to provide teachers with easier access to upcoming professional opportunities, as well as other available resources and services. In addition, we are helping teacher leaders offer specific workshops to interested colleagues. Our longer term goal in this area is to develop better



Teachers building tops in an Inquiry workshop.

communication and collaboration among the different professional development providers to give teachers the choices and information to guide their own growth.

We are also broadening our perception about what kind of workshop supports can be helpful, by adding lesson demonstrations to some workshops, and building in more time for collegial lesson sharing and planning. We are offering two new skill-building series on teaching inquiry skills and teaching students how to retain, communicate and apply their science knowledge. We are continuing to explore the way information, mentors, and other experiences contribute to professional growth through the CIC program in our "Teams" and "Partnership" projects.

What kind of professional development opportunities are right for you? Give us a call to plan a workshop or program that meets your needs for building science teaching skills and confidence.

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Your Contributions Say Thanks to Teachers

Making a contribution to CRS is a way of providing direct support to teachers for science professional development. You can use our pledge form to acknowledge a special teacher, or inquire with CRS about how to give a gift membership to your favorite teacher!

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www.crscience.org

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<p>Become an Educator Member</p> <p>CRS Membership provides year-round access to individualized planning, materials, and support. Find out about field trips and in-class programs from hundreds of locally-available organizations—get help with planning activities and units—connect with scientist role model volunteers—receive regular informational updates and invitations to social events! <i>Sign up at www.crscience.org today!</i></p> <p>Be a Scientist Volunteer</p> <p>You can be a science role model for young students! CRS will help you develop a hands-on, standards-based presentation and connect you with host classrooms. <i>Find out more and sign up at www.crscience.org.</i></p>	<p>Make a Donation Today</p> <p>CRS needs your support to continue providing our unique support services to local elementary educators. Help us connect teachers with exciting science experiences that can engage <i>all</i> students in learning, and make a difference in public schools today. <i>It's easy to make a donation using our secure server at www.crscience.org.</i></p> <p>The mission of CRS is to build a community of educators dedicated to getting kids excited about learning through science. This community includes YOU! Whether you're a teacher, a scientist, a parent, or an informal educator, let us help you connect with elementary students, schools, or science programs to support great science teaching.</p>	<p><u>Staff</u></p> <p>Anne Jennings & Nicki Norman, <i>Co-Directors</i> Cecille Harris, <i>Coordinator</i> Corinn Brown, <i>Database Content Manager</i> Susan Bellone, Denise Davila, and Sherry Johnson, <i>Adjunct Educators</i> Nancy Morton, <i>Accountant</i></p> <p><u>Board</u></p> <p>Susan Henderson, <i>President</i> Joshua Gutwill, <i>Vice President</i> Janet Petitpas, <i>Treasurer</i> Anne Jennings Nicki Norman Michael Ranney Ben Sanders Claire Schooley</p> <p style="text-align: center;"><i>1375 Ada Street, Berkeley, CA 94702 (510) 527-5212 www.crscience.org</i></p>