



Science Everywhere

Project 2061 Partnership Brings Science and Families Together

At a time when schools increasingly need to account for how well students are learning, parents and community leaders can be crucial partners in the success of reforms aimed at improving science literacy. The research behind Project 2061's *Blueprints for Reform* showed that children benefit when schools recognize and encourage parents' roles in reform efforts. But while most parents want their children to receive a good education that includes learning science, Project 2061 has found that many parents have only a minimal understanding of what their children's science education needs to include.

Through focus groups and a national survey conducted in 2001, Project 2061 learned that parents may have mixed feelings about science and science education. Although parents see their children as fascinated by science, they are less likely to view science as important to their children's future and more likely to focus their attention on reading and math. Not surprisingly, the parents in the study were only somewhat familiar with their state's science standards.

To take the first step toward building public support for science literacy, Project 2061, working with the AAAS Directorate for Education and Human Resources, launched the Partnership for Science Literacy in 2003. With start-up funding from the National Science Foundation, the initiative aims to increase awareness—particularly among parents, families, and caregivers of Latino/Hispanic, African American, and other minority students—of the value of science literacy for their children's future. By providing materials to help parents find out more about science and about the kind of science education that will help all children learn, the initiative supports the strategies for change that Project 2061 recommended in *Blueprints*.

The initiative-with the message "Science. It's Everywhere"-is reaching out to families across the country through television, radio, and print public service announcements endorsed by the Advertising Council. The ads invite families to request a bilingual (English/Spanish) Family Guide to Science and to visit a Web site designed especially for parents and families. At www.ScienceEverywhere.org, parents will find a wealth of resources-including links to Project 2061's Benchmarks for Science Literacy and other materials-that can help them understand why science matters for students of all backgrounds, interests, and abilities, how science education is changing, and what they can do to support their children in making progress toward science literacy.

While the Partnership is national in scope, it has begun in Austin, Chicago, Pennsylvania's Lehigh Valley, Los Angeles, and Tampa—the five communities selected for *continued on page 2* N O today

Science Literacy for a Changing Future

Mathematics Natural Sciences Social Sciences Technology

Winter 2004 Volume 14, Number 1



Science Everywhere from page 1

their geographic, ethnic, and socioeconomic diversity to help launch the campaign. The sites have brought together science centers, museums, other institutions, and community groups to work as partners and have created specialized versions of the *Family Guide to Science* that list local community resources. In spring 2003, they also hosted the first set of annual Partnership events designed to promote an interest in science learning and involve local families in the science education resources that surround them.

The Science of Design

Events in Los Angeles and Austin drew on design activities to engage families in science. Because design involves problem-solving related to real-world contexts, it effectively links practical projects to concepts like design constraints, trade-offs, and feedback. At the Natural History Museum of Los Angeles County, members of the community were asked how they would design a science museum of the future. Students and parents were asked to reflect on why they come to institutions like the Natural History Museum, and what type of information and experience they want from their visits. They could then create projects and drawings of what a future science center might look like and get feedback from a local architect. "The drawings made by the students of a future museum have inspired an idea for a component in a new

exhibit at the museum working with the same students," said Megan Walsh, director of education at the museum.

In Austin, a creative competition invited children and their parents to design "the world's greatest rollercoaster" by selecting various materials and challenges such as a loop-de-loop, a ramp, or a corkscrew. Basing the activity at the Austin Children's Museum and on the campus of Huston-Tillotson College, a traditionally African American institution, helped make the event accessible to the community, said Wendy Womack, director of public and science programs at the Austin Children's Museum.

Children visited various stations to pick a style, a special design component, and desired materials, and soon learned the design tradeoffs associated with each—such as the limits of motion for the coaster made from toilet paper tubes. Engineers were on hand to explain the mechanics of each project underway and participants took home handouts explaining the dynamics of their designs.

Outdoor Discoveries

In Chicago and the Lehigh Valley, outdoor events showcased the science around us every day. "People don't think of the Park District as being 'science,'" said Peggy Stewart, manager of outdoor and environmental education for the Chicago Park District. So to try to "hook" families and broaden their understanding of















what science is, the Park District and its area partners-Field Museum, Lincoln Park Zoo, Museum of Science and Industry, and Peggy Notebaert Nature Museum-joined a preexisting parks event to use the great outdoors as a natural classroom. Their daylong event included prairie tours, a birdhouse-making activity, popcorn made with solar energy, and a popular jewelry-making project using beads that change color with UV light. The Lincoln Park Zoo even brought its traveling zoo. The "Science Around Town" event, which attracted 400 attendees and provided leadership roles for Girl Scouts who served as tour guides, proved successful, said Doug Widener, vice president of education at the Peggy Notebaert Nature Museum, largely because the partners "worked so well together, and collaboration was key."

Because the Lehigh Valley partners collaborated with an already-planned local art fair, "Mayfair," they were able to offer five days of hands-on fun and educational activities at a "science tent." A rainy day made the array of activities under the tent especially welcome. "There were live critters, bubbles that engulfed children, optical illusion and cognitive thinking programs, bug creations, engineering feats, just to name a few," said Carol Woodley, the initiative's coordinator at the Discovery Center. Not only does she estimate that the science tent reached more than 75,000 of the 200,000 people who attended the fair, but Woodley reports that the tent "allowed the festival to boast a 400% increase in programming."

INCREASING ACCESS

Tampa's "Family Fun Day" at the Museum of Science and Industry (MOSI) made reaching new families a special priority. An outreach effort that offered free admission coupons to underserved communities resulted in the participation of more than 3,000 children and parents from Title I schools alone, said Amy Emmert, education coordinator for MOSI. The day included a wildlife presentation and educational activities led by community groups as varied as the University of Tampa, the Sierra Club, the Tampa Bay Fossil Club, and the Tampa Bay Mineral and Science Club. The Museum Astronomical Resource Society had a telescope out for hands-on demonstrations and information on upcoming sky viewings, while the Tampa Water Department had water bracelets that help to teach the water cycle.

All five communities agree that the informal science education community is uniquely positioned to offer families access to science through local institutions. "The Partnership for Science Literacy is at the heart of MOSI's vision to be a community education resource that leads in providing an informal science education opportunity for people of all ages and backgrounds," Tampa's Emmert said. "We aim to empower families to explore issues The informal science education community is uniquely positioned to offer families access to science through local institutions.

WINTER 2004

The Partnership's next step is to connect parents' awareness of community science resources to state science standards.

Science Everywhere from page 3

and develop creative problem-solving skills, making them better citizens and enhancing the community's quality of life."

The importance of this vision was confirmed when the Association of Science-Technology Centers (ASTC) invited the Partnership sites to share their experiences at the group's 2003 annual meeting in November. Chicago and the Lehigh Valley represented the Partnership, highlighting their collaborative approaches to providing greater access to, and use of, science learning resources by parents and caregivers.

Connecting to Standards

Building on the first year of outreach and events, the Partnership's next step is to connect parents' awareness of community science resources to state science standards and national standards like *Benchmarks for Science Literacy*. The sites will develop materials and activities that help parents appreciate why science literacy is important for their children's future and help them work with their children to build their science literacy. As they involve more partners in their planning and spring 2004 events, the sites will con-



tinue to spread the "Science. It's Everywhere" message to the general public while involving groups of Latino/Hispanic and African American parents in more specialized programs. AAAS will work with the sites to develop a new brochure explaining how community science resources support state and local science standards.

For more information, visit **www.ScienceEverywhere.org**, hosted by TryScience.org. To request the free *Family Guide to Science*, call AAAS at 1-888-737-2061.

SB&F: Your Guide to Science Resources for All Ages



Science Books & Films (SB&F) gives teachers the expert information they need to make the best decisions when choosing science materials for their classroom. Published by AAAS, SB & F is the only critical review journal devoted exclusively to science. Every issue contains timely features and more than 150 evaluations of books, videos, software, and Web sites for teachers and for students from kindergarten through college. SB & F's two annual guides provide additional resources:

- The SB&F Science Fair Resource Guide (September/ October issue) helps teachers and students choose the best books when preparing for the science fair.
- ▶ The SB&F Best Books list (January/February issue) presents the past year's top science books for K-12 students, as chosen by the editors and reviewers of SB&F.

Learn more about SB&F online at www.sbfonline.com.

The Atlas Advantage Workshop Helps Educators Map Student Learning

Their reasons for attending are as varied as their professional backgrounds and classroom experiences, but their goal is the same: to improve classroom practice and help students achieve important learning goals in science, mathematics, and technology. Participants in the popular "Using *Atlas of Science Literacy*" workshops offered by Project 2061 often arrive with varied perspectives, but leave with a shared vision of how to make the best use of learning goals and the connections among them.

Since 2001, Project 2061 has offered these three-day professional development workshops to introduce participants to *Atlas of Science Literacy* and other Project 2061 tools. *Atlas* features conceptual strand maps that graphically display the connections among key ideas and skills in science, mathematics, and technology. The maps show the sequence in which K–12 students might develop an understanding of topics such as gravity, natural selection, and statistical reasoning.

"To really achieve science literacy, students need to make connections among the ideas they learn from grade to grade," said Ted Willard, workshop leader and senior program associate for Project 2061. "That's why the *Atlas* maps are such a great tool for teachers."

New Perspectives

At an October 2003 workshop at AAAS headquarters in Washington, DC, more than 30 K–12 science and mathematics teachers, administrators, curriculum specialists, university faculty, and researchers engaged in open discussions, group projects, and classroom activities. They worked on developing learning goals, creating a strand map, modeling goals-based instruction, and analyzing assessment tasks.

They also gained valuable contacts, since participants hailed from various states and Canada. "Meeting people from around the U.S. was very beneficial because of the perspectives they bring," said Xavier Fazio, a science consultant for a school district in Ontario, Canada, and a doctoral candidate in science education at the University of Toronto.

The workshop's in-depth look at Project 2061 resources offered new perspectives as

well. "I've been using *Benchmarks* online for three years, not realizing the wealth of information in *Atlas* and the other Project 2061 publications, especially the information related to students' preconceptions or misconceptions," said Linda Knisely, a former teacher who's now an education specialist at the Space Science Telescope Institute in Maryland.

New Understandings

Because *Atlas* workshops focus on both the theoretical and the practical aspects of goalsbased reform, participants in DC were actively involved in discussing and applying reform strategies. "Many teachers believe in the philosophy of 'Tell me and I'll forget, show me and I'll remember, *involve* me and I'll understand," said Akram Molaka, the science department chair for South Plantation High School in Florida. Molaka enjoyed the "open floor" atmosphere, noting that "Interaction is an enriching experience, and here you had more experienced teachers sharing with newer teachers, all of whom have something to contribute."

By grounding this interaction in the detailed use of *Atlas* strand maps, the workshop helped participants see how students' knowledge can grow over time. As one participant put it: "It helps to visualize the relationship of one benchmark to another. This was the first time I could more clearly see the bigger picture of how national benchmarks or standards flow and develop for K–12 students."

Project 2061 co-hosts workshops with science museums and educational institutions around the country. Three workshops have been scheduled for 2004: Los Angeles, March 11–13; Denver, June 16–18; and Washington, DC, October 13–15, at AAAS headquarters. Additional workshops for the summer and fall are being planned and will be announced soon.

To learn more and to register for upcoming workshops, visit **www.project2061.org/workshops**. More details about *Atlas of Science Literacy*—including sample strand maps are available at **www.project2061.org/tools/atlas**.



Photos: David Peery

About AAAS and Project 2061

Publisher of the peer-reviewed journal Science, the American Association for the Advancement of Science (AAAS) is the largest general scientific organization in the world. Its education initiative, Project 2061, has been at the forefront of the K–12 reform movement

- Defining science literacy and promoting it as a goal for all Americans;
- Developing K–12 benchmarks for student learning in science, mathematics, and technology;
- Producing a wide range of innovative tools for educators—books, CD-ROMS, and online resources—to guide their reform efforts; and
- Conducting research on the design and use of curriculum materials, assessment, professional development, and other areas of science teaching and learning.

AAAS gratefully acknowledges the following Project 2061 supporters: Carnegie Corporation of New York, Hewlett-Packard Company, John D. and Catherine T. MacArthur Foundation, Noyce Foundation, David and Lucile Packard Foundation, Siemens Foundation, and the National Science Foundation.

For more information:

AAAS/Project 2061 1200 New York Avenue, NW Washington, DC 20005

 Phone:
 202-326-6666

 Fax:
 202-842-5196

 E-mail:
 project2061@aaas.org

 Web site:
 www.project2061.org

To order Project 2061 products: Call 1-888-737-2061 or visit www.project2061.org/about/order.htm.

Calling All Atlas Enthusiasts

We already know that many of you are using *Atlas of Science Literacy*. More than 17,000 copies of this unique resource have sold since 2001 and demand for our *Atlas* workshops continues. Now we'd like to know how you are using *Atlas* and how you think this collection of conceptual strand maps

can be improved.

Project 2061 staff are currently developing new strand maps-and updating the 49 existing maps—for a complete edition of Atlas that will map all of the learning goals specified in Benchmarks for Science Literacy. Your feedback will help us make this complete Atlas responsive to your needs. Whether you're a teacher, curriculum developer, teacher educator, or researcher, we need your perspective.

We welcome comments on your experiences with using *Atlas* in your daily work. How helpful is *Atlas* for understanding national and state standards? How have you used *Atlas* to develop or evaluate curriculum materials? How do the strand maps help you plan instruction or construct and analyze assessment? Specific



examples of successes or difficulties will be most helpful.

We also welcome suggestions for fine-tuning both the content and format of *Atlas*. Do you have additions to any of the research summaries that accompany each map? Can you

suggest refinements to the connections between learning goals (either within a map or across different maps)? Do you find the grade level specifications for particular learning goals appropriate? What specific changes would make the strand maps and their supporting text easier to navigate?

Please send responses by May 1, 2004, to project2061@aaas.org (write "*Atlas* Feedback" on the subject line) or to AAAS/Project 2061, Attn:

Cathy Tramontana, 1200 New York Ave., NW, Washington, DC 20005. Feel free to send photocopies of marked-up *Atlas* pages to convey your feedback and be sure to include your name, title, and affiliation. You may also complete an online *Atlas* survey at www.project2061.org/tools/atlas/survey.htm.

Visit Project 2061's exhibit booth at the following conferences this spring:

Presidential Awards for Excellence in Mathematics and Science Teaching March 15–20, 2004, Washington, DC www.ehr.nsf.gov/pres_awards

National Science Teachers Association National Convention April 1–4, 2004, Atlanta, GA www.nsta.org/conventions

National Council of Teachers of Mathematics Annual Meeting

April 21–24, 2004, Philadelphia, PA www.nctm.org/meetings

DIRECTOR'S NOTES

In the Spirit of Collaboration

The concept of collaborating to solve big problems has many precedents in science and technology, as evidenced by the exploration of Mars and the Human Genome Project, to name two. Collaboration has great appeal in education as well, given the magnitude and systemic nature of the problems. Clearly, no one group has all the answers. The trouble is that without a common set of aims and a strong commitment to the joint endeavor, many partnerships end up as collaborations in name only, generating much activity but rarely producing results that last beyond the life of the partnership (or the funding that supports it).

From the start, Project 2061 acknowledged the need for collaborative approaches to the systemic reform of science, mathematics, and technology education. From *Science for All Americans* to our current research, progress has been made through work with scientists, engineers, mathematicians, education faculty, classroom teachers, policy makers, and others. Our 1998 *Blueprints for Reform* identified a dozen key parts of the education system that need to work together to foster science literacy for all. In the same spirit, Project 2061 continues to join with partners from many spheres to develop the knowledge, experience, and outreach needed to achieve that goal.

A Diverse Set of Partners

The last two issues of 2061 Today, for example, reported on NSF-funded collaborations that enable our research staff to work with faculty, classroom teachers, and students through partnerships with universities in Delaware, Texas, Michigan, and Illinois. We are also collaborating with nearly half a dozen other partners on projects ranging from instructional materials aligned with standards to digital libraries featuring K–12 science resources. These partnerships help us to learn more and advance our ideas more effectively than we ever could on our own.

This issue's lead article reports on a different kind of partnership, one that reaches deep into five communities to encourage families to take a more active role in their children's science learning. While research shows the benefits of parental involvement in education, not all families are alike. In some communities, parents become engaged in school decision making, sometimes with contentious results. Consider the "Math Wars" or recent disputes over evolution, hands-on science activities, and testing. More often, families lack the opportunity or resources to get involved with their children's schools, let alone their science education.

The Need for R&D and Outreach

Rather than develop a one-size-fits-all strategy for engaging families from the most rural to highly urban areas, our partner communities have brought together coalitions of like-minded institutions and individuals to create outreach models that work for them. Eventually, we'll share these models, on the initiative's Web site (www.ScienceEvery where.org) and at the next annual meeting of the Association of Science-Technology Centers. With new funding from AAAS, we are helping 20 additional communities develop online guides to their local science resources.

While community outreach and R&D require different kinds of collaborations, both are essential to the long-term success of Project 2061's mission. We need to draw on the best thinking available to ensure the high quality of our R&D. We also need to ensure that the innovations produced by our R&D will be understood and well received by all of the stakeholders who play a decisive role in improving science education.

Se Ellen Koseman

Jo Ellen Roseman Director

Project 2061 continues to join with partners from many spheres to develop the knowledge, experience, and outreach needed to achieve science literacy for all.





We're cleaning house!

- To change your address or be removed from our newsletter mailing list, call us at 1-888-737-2061 or 202-326-6666, or write us at project2061@aaas.org or AAAS/Project 2061, 1200 New York Avenue, NW, Washington, DC 20005.
- To switch from a print to online subscription, visit us at www.project2061.org/ newsletter/online.

Introducing...

Project 2061 is pleased to welcome program associate **Deirdre Black**, who is working as a postdoctoral fellow with the Center for Curriculum Materials in Science (CCMS). Before joining Project 2061, Black was a physics researcher at the Thomas Jefferson National Accelerator Facility (Jefferson Lab) funded by the U.S. Department of Energy. Her background includes conducting research in theoretical particle physics; teaching physics, astronomy, and math to university students in Ireland, France, and the U.S.; and tutoring high school students. She holds an M.Sc. in mathematical science from University College Dublin, Ireland, and a Ph.D. in physics from Syracuse University, New York.

New CCMS Web Site

The Center for Curriculum Materials in Science, a partnership of AAAS, Michigan State University, Northwestern University, and the University of Michigan, has updated its Web site. The Center, funded under the National Science Foundation's Centers for Learning and Teaching program, focuses on the analysis, design, and use of science curriculum materials through research, doctoral and postdoctoral programs, and teacher development. The redesigned site at **www.Science MaterialsCenter.org** features information on Center projects and fellowship opportunities, interactive forms for prospective students to contact each institution, updates on related research, biographical sketches of current students and fellows, presentations and other documents from the annual Knowledge Sharing Institute, and a calendar of events.

Advocating Goals-Based Reform

An article by Project 2061 staff will appear in the Spring 2004 issue of *Cell Biology Education*, an online journal published by the American Society for Cell Biology (**www.cellbioed.org**). "Meeting the Challenge of Science Literacy: Project 2061 Efforts to Improve Science Education," by Mary Koppal and Ann Caldwell, reports on the significance of Project 2061's evaluation of high school biology textbooks for teachers interested in goals-based teaching and learning.

Sharing Our Research

You can find Project 2061 staff at three national conferences this spring. Attend the following sessions to learn about our ongoing research studies:

- "Creating Components for the Next Generation of Curriculum Materials: Where Research and Practice Meet" and "Mapping for Curriculum Coherence," both at the National Association of Research in Science Teaching (NARST) Annual Meeting, April 1–4, Vancouver, British Columbia
- "Research Issues in the Improvement of Mathematics Teaching and Learning through Professional Development" at the American Educational Research Association (AERA) Annual Meeting, April 12–16, San Diego, CA
- "Using Classroom Videos as a Vehicle for Teacher/ Researcher Dialogue" at the National Council of Teachers of Mathematics (NCTM) Research Presession, April 19–21, Philadelphia, PA

2061 *today*

American Association for the Advancement of Science 1200 New York Avenue, NW Washington, DC 20005 Nonprofit Organization U.S. Postage PAID Washington, DC Permit No. 5676

Return Service Requested