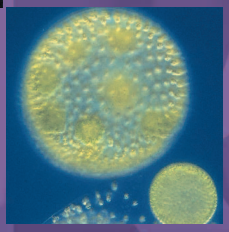
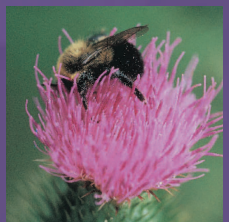
# National Science Resources Center



# 2004 ANNUAL REPORT

***Delivering Excellence in Science Education***



*National Science Resources Center*

THE NATIONAL ACADEMIES Smithsonian Institution

## *In Dedication*

BRUCE ALBERTS, President, National Academy of Sciences and Chair, National Research Council

*This report is dedicated to Bruce Alberts, whose term as president of the National Academy of Sciences and chair of the National Research Council expires in June 2005. Dr. Alberts is a stalwart supporter of the National Science Resources Center and a tireless advocate for science education in the United States and around the world.*

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**The National Science Resources Center** was established in 1985 by the Smithsonian Institution and the National Academies to improve the learning and teaching of science in the nation's school districts. The NSRC is committed to establishing effective science programs for all students. We employ strategies that are informed by research, incorporate best practices, and leverage change through the development of strategic partnerships.

### The Smithsonian Institution

In the early 19th century, Englishman James Smithson bequeathed his fortune to found the Smithsonian Institution "for the increase and diffusion of knowledge." The Smithsonian fulfills that mission in many ways, including promoting innovation, research, and discovery in science. The Institution is also deeply committed to its outreach to the public. The Institution provides the NSRC with support for space, operations, and management. The Smithsonian facilitates access to expertise and resources from the world's largest museum complex, as well as from its research, archives, and extensive library system.

### The National Academies

The National Academies—the National Academy of Sciences, National Academy of Engineering, Institute of Medicine, and National Research Council—work outside the framework of government to ensure independent advice on matters of science, technology, and medicine. Because knowledge of research and application of best practices are critical to the development of effective NSRC programs, the Academies provide the NSRC with access to research and scientific and engineering expertise to inform its services and products.

## "What is science . . .

. . . if not the investigation and exploration of the wonders of our world and our universe? It's also the excitement, the thrill, the sense of marvel that young people experience when they discover something on their own for the first time. The NSRC helps children have those intellectual and emotional experiences in the classroom, and the children are better prepared for life as a result."

*—David Evans, Under Secretary for Science, Smithsonian Institution*

# Message from the Advisory Board Chair S. Anders Hedberg

In the year of its 20th anniversary, the NSRC is stronger now than it has ever been.

While financial pressures have increased, due to a shift in government support of non-profit grant making, the NSRC has successfully adjusted its strategic and business plan to maintain a strong positive trend in its profit and loss account. So strong, in fact, that it is now realistic to begin building an endowment—a long-term sustainability strategy, as well as a "rainy-day" reserve. While many non-profit organizations face similar challenges, only a few take the thoughtful approach of adjusting their organizational "behavior" to become an entrepreneurial alliance partner, as the NSRC has done. The NSRC's organizational strategic thinking now involves intellectual property protection, international relationships, communications, and marketing—unusual and maybe even intimidating concepts in the non-profit world. However, none of these strategies and tactics would make a difference for the NSRC unless the core business—quality goods and services to improve science education for all children—were in excellent order.

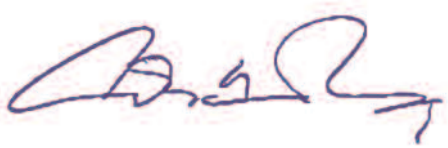
So, success lies in the wisdom of bringing together some of the best science educators and curriculum developers in the country, serving on the NSRC staff with creative and experienced advisors, serving on the NSRC National Advisory Board, and inspiring both with the leadership from within the National Academies and the Smithsonian Institution.

The NSRC has been fortunate to enjoy the leadership of Dr. Bruce Alberts, who, throughout his tenure as the President of the National Academy of Sciences, has applied his unparalleled passion for science education to inspire the organization to greatness. He and his partner-leader, Dr. David Evans, Under Secretary for Science at the Smithsonian Institution, have together challenged the NSRC Advisory Board to evolve into a fearless, risk-taking group of counselors and partners. The members of the board have worked side by side with the NSRC staff and become close friends and passionate advocates, sharing their experience, and pulling hard for the cause—Quality Science Education for All Children.

It's all about people!

The people in the NSRC and their friends are skilled and driven! Their leaders are focused and dedicated! The mission and vision are clear! No wonder they are successful!

It has been a privilege to serve. Thank you,



**Anders Hedberg, Ph.D.**
*Chair, National Advisory Board*

# Message from the Executive Director Sally Goetz Shuler

In May 2005 the National Science Resources Center will mark the beginning of its 20th year. Our organization will celebrate this important milestone throughout 2005 by looking back over two decades of growth and maturity, and by looking ahead to our role in the continuing challenge that is science education.

Last year, the NSRC expanded its portfolio of products and services by premiering several new program offerings and classroom materials. A new planning symposium targeted to middle schools, for example, will expand our emphasis on science education reform in grades 6 through 8. Our publication of a suite of science reading books that complement the NSRC's curriculum for grades 4 through 6 signals a new literacy emphasis that integrates science studies with reading, social studies, and history—and represents the NSRC's first venture into self-publication of curriculum materials. The Professional Development Center began planning a new summer academy for science teachers, which will take place in the facilities of the Smithsonian and the National Academies. In addition, we continued to expand our electronic presence by improving and expanding our Web site.

On other fronts, we continued to learn from the experiences of other nations as we worked with educators in Africa, Asia, Europe, and South America in improving science education programs there. We continued to pursue options that will ensure continuous funding for our operations. And by pursuing collaborative working relationships with other units of the Smithsonian, we more than ever before are a part of—rather than apart from—the heartbeat of the Institution.

As always, I thank the NSRC staff for their dedication to science education and their hard work toward achieving our goals. I also thank our parent organizations—the Smithsonian and the National Academies—for their continued support, the members of the NSRC Advisory Board for their sage and practical counsel, and our partners and sponsors for their sustained commitment to science education.

This annual report provides details on these and other NSRC accomplishments during 2004. But if the past truly is prologue, we must regard our historical achievements as building blocks to a brighter, but even more challenging, future. In 2005 and beyond, therefore, we look ahead to the looming science requirements of the No Child Left Behind Act as well as to myriad workforce pipeline issues as we seek to remain at the cutting edge of science education thought and action.

**Sally Goetz Shuler**
*Executive Director*

# Looking Back on 2004

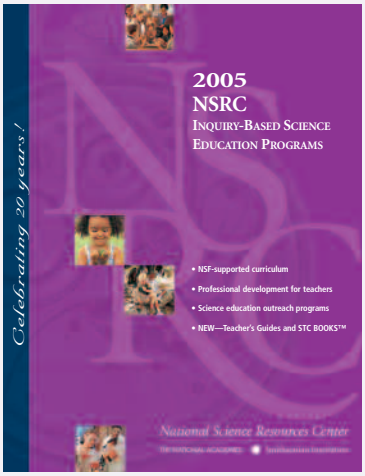
During 2004, the NSRC turned the corner on its internal reorganization. We spent much of the year preparing not only to move to new office space but also to change and establish programs and services that will better position us to face future challenges and opportunities in science education. Highlights from 2004:

**ALL NSRC STAFF WILL SHORTLY BE UNDER THE SAME ROOF** with the move of our administrative and financial functions from the Smithsonian's venerable Arts & Industries Building on the National Mall. By the spring of 2005, the entire NSRC staff will be housed in the Aerospace Center Building on D Street, SW, adjacent to L'Enfant Plaza. Although we will miss the visibility and ambience we enjoy at A&I, we will experience the advantages of proximity to each other and better space in our new working home.

**THE ESTABLISHMENT OF TWO DIVISIONS WITHIN THE LASER (LEADERSHIP AND ASSISTANCE FOR SCIENCE EDUCATION REFORM) CENTER** is a logical extension of the first phase of the LASER initiative, in which we concentrated on the early stages of science education reform. The new LASER Strategic Planning Division is now responsible for building awareness of NSRC programs and services and for planning the reform effort. The new literary initiative will build a program for enhancing literacy skills—reading, writing, and discourse—through the study of science. *more on pages 8 and 9*

**RECOGNIZING THAT EVEN THE BEST CURRICULUM IS BEST TAUGHT BY TRAINED INSTRUCTORS,** the NSRC's Professional Development Center expanded the range of its classes and entered into a long-term agreement with Oklahoma State University's Center for Science Literacy to train middle school teachers and teacher-trainers on the Science and Technology Concepts for Middle Schools™ (STC/MS) courses. The Center is also working with Northeastern University in Boston to develop graduate-level courses for science teachers, and planning a week-long summer science academy for science teachers in Washington, D.C. *more on pages 10 and 11*

**WITH PUBLICATION OF THE GRADES 4–6 SCIENCE AND TECHNOLOGY FOR CHILDREN BOOKS™,** we have made available a science reading complement to our *Science and Technology for Children® (STC®)* curriculum. These books can also be used as stand-alone reading resources. The NSRC also announced the availability of updated STC Teachers' Guides and of *The Guide to Probeware and Computer Applications for STC/MS.* ***more on pages 12 and 13***


**THE CREATION OF A NEW COMMUNICATIONS AND PUBLICATIONS DIVISION** during 2004 added an exciting new dimension—a communications function—to our existing publications effort. The assistant director for communications and publications helps ensure the integrity of the NSRC brand while maintaining communications and marketing bridges between the NSRC and our public—school districts, corporations, foundations, and the trade and mass media. The NSRC has a vital role in the national agenda, and the new division will help people learn and remember who we are and what we do. ***more on pages 14 and 15***

**WE MOVED TO STRENGTHEN OUR WORKING RELATIONSHIPS WITH OTHER UNITS OF THE SMITHSONIAN INSTITUTION.** The STC BOOKS, for example, are unique in the education marketplace in that they feature many stories about Smithsonian research and researchers. In late summer, the NSRC teamed up with the Smithsonian's Center for Education and Museum Studies to sponsor a thought-provoking presentation on "How People Learn" for more than 125 Smithsonian educators by National Research Council social scientist Suzanne Donovan.

**THE NSRC CONTINUED WORKING WITH OTHER COUNTRIES** that seek to improve their science education programs using the NSRC model for reform. The progress made in countries such as Chile and Sweden demonstrates how the implementation of complete systems of science education can achieve documented improvements in student classroom achievement and increases in their science content knowledge. ***more on pages 18 and 19***

**WITH NEARLY TWO DECADES OF SERVICE BEHIND US,** we look forward to future challenges in science education reform. During 2005, we will conduct a series of events to commemorate 20 years of the NSRC's commitment to exemplary science education. A C hinese proverb says that the best time to plant a tree was 20 years ago, and that the second-best time is today. Although we planted the NSRC "tree" nearly two decades ago, we recognize that we're still a seedling in terms of the job ahead of us—and that the true record of our growth will be written in tomorrow's classrooms and job sites.

# Meeting Our Business Goals

The NSRC's business plan will help the organization maintain its focus on several internal and external goals in service of organizational sustainability, core products and services, and exemplary science programs for all students.

## INTERNAL GOALS

### GOAL 1

**Institutional Capacity and Management Excellence**

*Establish and sustain organizational capacity by continuing to attract, cultivate, and retain highly skilled and innovative staff that can develop and deliver exceptional programs and services.*

Hired a new director of communications and publications and refocused the work of this division to marketing and communications rather than publishing curriculum materials.

### GOAL 2

**Capacity Building**

*Leverage our intellectual capacity and impact through the continuous development and expansion of strategic partnerships.*

Conferred with the National Academies' Teachers Advisory Council, which was established to involve classroom teachers and integrate their "wisdom of practice" into the research of the National Academies and other education work . . . Entered into a working relationship with Oklahoma State University's Center for Science Literacy to train teacher-trainers in the content and pedagogy of the Science and Technology Concepts for Middle Schools™ (STC/MS) modules, and graduated our first 40 teachers.

### GOAL 3

**Financial Strength**

*Sustain and expand the work of the NSRC through the increase and diversification of the NSRC's funding base from $4.2 million to $6.3 million in five years.*

Completed a feasibility study and began planning for an NSRC endowment . . . Established a "quasi-endowment" fund set aside from royalties for ongoing operating funds and emergency reserve . . . Began receiving royalties from a new revenue stream, the Science and Technology for Children BOOKS™ series of science readers . . . Instituted a program to more aggressively market NSRC products, including development of an NSRC program brochure for distribution to school districts nationwide.

**"The NSRC's newly developed business plan is an essential tool for designing and building the next phase for the NSRC."**

*Sally Goetz Shuler, Executive Director*

## EXTERNAL GOALS

### GOAL 1

**Public Understanding of Education**

*Champion public understanding of research-based science education programs with officials in the United States and abroad.*

Conducted a well-received half-day seminar on "How People Learn" for Smithsonian staff both as a professional development opportunity and to build bridges between the NSRC and other Smithsonian units . . . Conducted workshops and seminars and exhibited at the annual National Science Teacher's Association annual convention in Atlanta, an event attended by nearly 20,000 science teachers . . . Began planning, in collaboration with other organizations, a national forum on science education to be held during 2005 with follow-up events extending into 2006 . . . Completed Phase I of the NSRC Web site, www.nsrconline.org.

### GOAL 2

**Supporting Sustainability**

*Assist school districts in sustaining the implementation of their science programs based on research and best practices.*

Published the 12-volume STC BOOKS™ series of science readers to complement the grade 4–6 units of the NSRC's elementary science curriculum . . . Released *The Guide to Probeware and Computer Applications for STC/MS* to accompany the NSRC's middle school curriculum.

### GOAL 3

**Scaling Up Reform**

*Engage school districts representing an additional 20 percent of the U.S. K–12 student population in the process of improving their science programs based on research and best practices.*

Increased to more than 750 the number of school districts that have completed NSRC leadership development institutes or strategic planning institutes . . . Worked with a group of Georgia leaders in business and academia—the Georgia Alliance for Science Education—as they began to explore ways of improving the state's students' achievement in science . . . Conducted a successful planning symposium for middle schools.

### GOAL 4

**International Capacity**

*Work with other countries to develop scientific and leadership capacity in the establishment of research-based science programs.*

Continued working with interested partner countries on adapting NSRC-developed products and services for use abroad . . . Saw significant progress on a broad scale in implementing elementary curriculum in Sweden and on a pilot basis in Chile . . . Conducted preliminary discussion with Chinese educators about the establishment of inquiry-based science in the classroom—and came away impressed by the resolve of Chinese educational leaders to institute immediate, nationwide science education reform . . . Participated in discussions for major international science education conferences to be held in Mexico and Italy during 2005 . . . Conducted teacher training for science teachers in Namibia

## Achieving Literacy through Effective Science Education Programs

The ability to read and understand complex information is important to success in college and in the workplace. Increasingly, the language and concepts of science and technology are becoming essential building blocks for productive careers and effective citizenship. The NSRC's literacy initiative seeks to support a literate America, whose people have the ability to read, write, and reason effectively. Its mission is to promote literacy in America by informing educators of effective strategies for integrating the fundamental skills of reading, writing, and discourse with science instruction. Over time, the initiative will:

- Increase children's mastery of science content locally and throughout the United States
- Help children function as world citizens in an information-based society by being able to read, write, and communicate effectively
- Motivate children from all socio-economic classes to become part of the scientifically and technologically trained workforce of the future.

# Science Education Reform

When the LASER (Leadership and Assistance for Science Education Reform) Center was begun in 1998, the first task was to build a regional structure and acquaint school districts with the inquiry process advocated by the NSRC. During the year 2004, we restructured the LASER Center to strengthen the existing efforts through creation of a Strategic Planning Division and a new literacy initiative. The principal responsibilities of the LASER Center are:

- Conducting awareness and strategic planning events
- Working with existing LASER regional sites
- Identifying and promoting leadership capacity in new LASER regional sites
- Developing innovative ways to assist LASER regional sites in helping school districts implement and institutionalize innovative science education programs
- A new initiative, "Achieving Literacy through Effective Science Education," which will use the study of science to enhance students' literacy skills—reading, writing, and discourse

Another exciting occurrence during 2004 was an overture from the Georgia Alliance for Science Education, a coalition of concerned businesspeople and academicians who see an alarming decline in the understanding of science among Georgia's schoolchildren. The Alliance's "Call to Action" workshop, held in Atlanta in March, drew more than 100 leaders from around the state, including the state secretary of education, to Atlanta's SciTrek Museum. A national LASER Middle School Science Education Planning Symposium was held in Atlanta on December 1–5, 2004, in an effort to build capacity in that state. Other states, including Indiana and Michigan, have expressed interest in working with the NSRC through the LASER Center.

## KEY LASER EVENTS, 2004

### INITIATION OF REFORM

NATIONAL

**March 2004**
National LASER K–8 Science Education Strategic Planning Institute
Washington, DC

Math/Science Workshop: "How People Learn" #1
Washington, DC

**April 2004**
Baker Forum
San Luis Obispo, CA

**May 2004**
Chemical Heritage Foundation Leadership Initiative
Philadelphia, PA

**June 2004**
Math/Science Workshop: "How People Learn" #2
Washington, DC

**December 2004**
National LASER Middle School Science Education Planning Symposium
Atlanta, GA

REGIONAL

**March 2004**
Georgia Alliance for Science Education Organizational Workshop
Atlanta, GA

**June 2004**
Washington State LASER K–8 Science Education Strategic Planning Institute
Tukwila, WA

**July 2004**
Western Pennsylvania LASER K–8 Science Education Strategic Planning Institute
Pittsburgh, PA

INTERNATIONAL

**October 2004**
InterAmerican Strategic Planning Workshop for Inquiry-Based Science Education Programs
Santiago, Chile

### IMPLEMENTATION OF REFORM AND BUILDING LEARNING NETWORKS

NATIONAL

**October 2003**
Association of Science Materials Centers (ASMC)/NSRC LASER Center Next Step Institute
Green Bay, WI

**March 2004**
"Achieving Literacy through Effective Science Education" Initiative Kickoff
Atlanta, GA

NSRC/Merck Annual Showcase of New Science Education Resources
Atlanta, GA

Association of Science Materials Centers (ASMC)/NSRC LASER Center Annual Networking Forum
Atlanta, GA

**October 2004**
"Achieving Literacy through Effective Science Education" Initiative Working Symposium #1
Washington, DC

**November 2004**
"Achieving Literacy through Effective Science Education" Initiative Working Symposium #2
Washington, DC

REGIONAL

**June 2004**
Alabama LASER Networking Forum
Montgomery, AL

# Teacher Professional Development

Research tells us that students learn science best through an inquiry process. When coupled with an exemplary curriculum, the inquiry process leads to better understanding and retention of content. For that reason, many educators are changing from the traditional textbook approach to hands-on, inquiry science. This substantive change in approach requires an equally substantive change in professional development practices.

To be effective science educators, teachers must also be effective learners, continually building on existing knowledge and skills. The courses offered by the NSRC's Professional Development Center (PDC) provide teachers with the opportunity to learn and practice the skills needed to create supportive classroom environments for student inquiry and move teachers through all levels of the proficiency continuum—from novice to expert.

As teachers' understanding of science and pedagogy increases, they become more able to engage young minds in the sciences. Professional development is especially valuable when it ties into the curriculum that teachers are using. The PDC's courses are tailored to the NSRC's curricula.

### Teacher-Trainer Courses

With generous support from the Lucent Technologies Foundation and through a cooperative working agreement with the Oklahoma State University Center for Science Literacy, the PDC has trained the initial cadre of teachers who can train other teachers in the conceptual framework and classroom management of the eight Science and Technology Concepts for Middle Schools™ (STC/MS™ ) curriculum modules. The first phase of this project, introduction to the courses, was completed during 2003. Forty consultants have now completed the three-day immersion courses and have begun conducting intensive workshops for teachers who are using the STC/MS curriculum in their classrooms.

The next phase of this activity will be a series of courses for teachers who have one or two years' experience with inquiry science in the classroom. These courses will focus on the "big ideas" of the science and the conceptual sequence of the lessons.

## Cooperative Training Opportunities

The PDC also developed and piloted a course called "The Nature of Inquiry" at the Bristol-Myers Squibb Teaching and Learning Center at Rider University, Lawrenceville, New Jersey. The course will be offered during the summer to provide professional development to teachers in New Jersey school districts where the Bristol-Myers Squibb Corporation has facilities. The PDC has entered into planning events for teachers in 2005. Events introducing STC and STC/MS to schools have been scheduled at Montclair University in the spring of 2005, and advanced courses for STC/MS users are scheduled for August 2005 at Ryder University. The PDC has consolidated its relationship with the Center for Science Literacy at Oklahoma State University and conducted seven workshops during 2004. Further workshops and additional areas of cooperation are planned in 2005.

## Graduate-Level Content Courses for Science Teachers

With support from a W.K. Kellogg Foundation grant, the PDC is developing two-week-long graduate-level science content courses based on the STC/MS curriculum. Christos Zahopoulos of Northeastern University is leading the development team. So far, planning meetings have been held with course developers, and the syllabi for three of the projected eight courses are being written and tested.

## Electronic Literacy Supplement

The PDC is planning to post Internet-enhanced STC/MS teaching materials in a secure, password-protected location on the Internet and to include links to other Smithsonian science resources. This activity will not only make the STC/MS materials more accessible and useful in the classroom but also make them more attractive through the Smithsonian connection. Planning for the Electronic Literacy Supplement is being supported by a Smithsonian Institution Transformation Grant, awarded to the PDC from a field of 28 applicants. The first phase will involve creating the supplement for the most popular STC/MS course, *Properties of Matter.* The PDC will pilot this prototype in late 2005.

## Smithsonian Science Education Academy for Teachers

During summer 2005, the PDC will host the inaugural Smithsonian Science Education Academy for Teachers. Sixty to 75 middle school science teachers from around the nation are expected to attend. Morning sessions of the five-day academy will be devoted to classroom work related to the content and pedagogy of STC/MS physical science courses. The afternoons will be given over to behind-the-scenes experiences in local Smithsonian research facilities as well as in non-Smithsonian science laboratories and museums. The 2005 academy will focus on the topic "Motion and Energy." In subsequent years, the academies will expand to include elementary as well as middle school teachers and to encompass the life and earth sciences. Planning and implementation of the 2005 academy is made possible by a generous grant from the Lucent Technologies Foundation.

# Inquiry Science Curriculum

During 2004, the NSRC added several new products to its family of curriculum products:

- Twelve *Science and Technology for Children BOOKS™* for students in grades 4 through 6, with accompanying Teacher's Guides
- Second-edition *Science and Technology for Children® Teachers' Guides* in an easier-to-use binder format, including the a new tab to accompany the *STC BOOKS™* series
- The *Guide to Probeware and Computer Applications for STC/MS,* a supplement to the NSRC's middle school curriculum

The staples of the NSRC's curriculum offerings remain the 24-course STC® curriculum for elementary students (K–6) and the eight-course *Science and Technology Concepts for Middle Schools™ (STC/MS™)* curriculum for children in grades 6 through 8. These research-based, inquiry-centered products are available for purchase through our publisher, Carolina Biological Supply Company (www.carolina.com).

## STC BOOKS

The *STC BOOKS* series adds a literacy component to our popular curriculum program for elementary students. Each book was designed to be used in science lessons or as a stand-alone reader that conveys topics in a way that makes science fun. The books are colorfully illustrated with drawings and photographs and have undergone rigorous review to ensure that all information is current and accurate and that the reading level for all stories is appropriate for students in grades 4 and 5 or grades 5 and 6. Each book is part of a Life and Earth Science or Physical Science and Technology library.

The NSRC is now planning 12 additional books for students in kindergarten through grade 3 for release during the next two years, as well as books to accompany the STC/MS curriculum.


### SCIENCE AND TECHNOLOGY FOR CHILDREN BOOKS ™

| Grades | Life and Earth Sciences | | Physical Sciences and Technology | |
|---|---|---|---|---|
| 4–5 | Animal Studies | Land and Water | Electric Circuits | Motion and Design |
| 4–5 | Microworlds | Ecosystems | Food Chemistry | Floating and Sinking |
| 5–6 | Experiments with Plants | Measuring Time | Magnets and Motors | Technology of Paper |

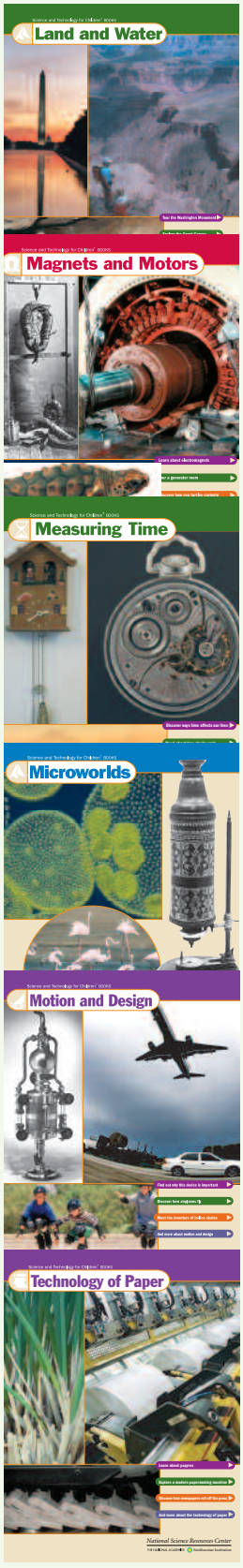
## STC Teachers' Guides

The *STC Teacher's Guides* for the grades 1-5 courses have been reviewed and revised to give teachers an easier-to-use format. The second-edition guides have been published in sturdy three-ring binders to replace the old perfect-bound books, and they include a tab that accompanies the new *STC BOOKS* series.

## *Guide to Probeware and Computer Applications for STC/MS*

*The Guide to Probeware and Computer Applications for STC/MS*, released during 2004, is designed to facilitate the integration of probeware and computer-related technologies into the middle school classroom. The developers of the eight STC/MS modules have identified lessons in each module that adapt well to the use of probes and sensors for collecting and analyzing data. Developers have also included some inquiries that are extensions of lessons in the STC/MS curriculum.

To use this supplement effectively, teachers should become familiar with the corresponding lessons in the relevant STC/MS modules; become familiar with the objectives, goals, and background of the lesson as described in the Teacher's Guide; review the procedures for the regular lesson; study the suggested modifications in this probeware supplement, and if necessary make minor procedural changes to an inquiry once the students have set up the probe or sensor.



# Communications and Publications

In addition to supporting the publication of curriculum and related materials, the NSRC's newly formed Communications and Publications Division has begun a strong marketing effort aimed at improving the visibility and sales of NSRC products and services. The division seeks to improve the targeting of NSRC communications so that our messages reach the audiences who most need to know who we are, what we do, and what we have to offer. The division has developed a number of communications products that will support this effort and increase public understanding of science education in the United States. All of these activities are part of an umbrella campaign to build awareness of and name recognition for the NSRC as an organization of the Smithsonian and the National Academies.

## Communicating Through the Internet

After 18 months of research and development, the NSRC launched its new Web site in April 2004. The site now highlights research and science education resources for school districts, teachers, parents, corporations, and foundations. It provides links to the sites of our parent organizations, the Smithsonian Institution and the National Academies, as well as to other museums and quality resources. The site had nearly 140,000 visits between April 1 and December 31, 2004.

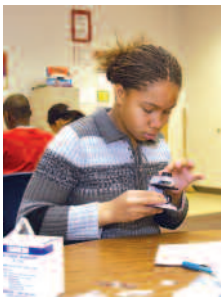
## Leveraging the Smithsonian Connection

The division is helping the NSRC more aggressively take advantage of the name recognition and vast scientific capability of the Smithsonian Institution by linking the NSRC and other units of the Smithsonian more closely than ever before. Each of the STC BOOKS, for example, contains several stories about Smithsonian scientists working in the Institution's museums, research facilities, or the National Zoo. This unique resource will be part of the next generation of books for elementary and middle school students as well.

The NSRC also cooperated with the Smithsonian Center for Education and Museum Studies to sponsor a presentation, "How People Learn," by Suzanne Donovan of the National Research Council. The presentation provided important information to Smithsonian professionals in publications, education, and museum positions.

## Publicizing Professional Development Opportunities

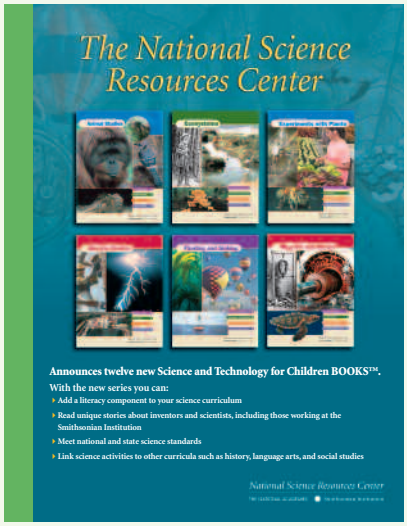
As the NSRC's Professional Development Center (PDC) prepares for the Smithsonian Science Education Academy for Teachers (see page 11) in the summer of 2005, the Communications and Publications Division is advising the PDC on the publicity needed to reach and attract 60–75 teachers from across the country.



## Marketing the STC BOOKS

Publication of the Science and Technology for Children BOOKS™ series afforded an opportunity to explore different ways of marketing these unique resources. The Communications and Publications Division prepared and distributed a brochure describing each of the 12 books in this series and sent it to schools and school districts known to be using one or more of the Science and Technology for Children® (STC) units. Advertisements in journals and magazines are also expected to generate interest in and sales of the books.

To facilitate distribution, the division contracted with the National Academies Press for fulfillment of orders for books singly, or in sets of one title, in a Life and Earth Sciences library of six books, or in a Physical Science and Technology library of six books. Carolina Biological Supply Company will also fill orders for the books.




**This brochure featuring the STC BOOKS series was published in 2004.**


**The NSRC Web site is updated frequently to reflect current news and to revise information as it changes. The site received almost 140,000 visits between April 1, 2004, and the end of the year. Eighty-five percent of the visitors to the site were from the United States; the rest were from countries on every continent.**

# International Activities

The NSRC remained active in international science education efforts during 2004, through participation in international conferences and support for individual countries' reform efforts. The NSRC's investments in other countries' science education programs are far more than philanthropic gestures; every penny that we have invested in science education reform efforts in Chile, Mexico, Namibia, Sweden, and other countries has been returned many times over in insights gained.

## Sweden Uses NSRC Model to Improve Elementary Science Education

Sweden's *Naturvetenskap och Teknik för Alla* (*NTA*)—Science and Technology for All—program, based on curriculum and dissemination models developed by the NSRC, has moved beyond its modest beginnings to gain a strong foothold in that Scandinavian country in less than a decade. The Swedish program began on a pilot basis in the municipality of Linköping in 1997.

An early task was translation of the NSRC's Science and Technology for Children® (STC) units into Swedish. So far, 14 of the 24 units have been translated and are now in classroom use. The 15th unit, *The Technology of Paper,* is in translation.

Forty-one of Sweden's 200-plus municipalities now participate in the program, with a goal of 100 participating municipalities by 2008. More than 40,000 K–6 students and more than 2,000 teachers use the program. Few of the participating municipalities, however, have fully implemented the program. Full implementation means that every science teacher is using the new curriculum in every science classroom. The rest are still making the transition to NTA.

Students exposed to the NTA curriculum show increased eagerness to learn physics, chemistry, biology, and technology. Teachers develop increased competence and self-confidence. As one teacher reported, "The general level of competence has gone up and a certain amount of fear has disappeared. It's a case of daring to let go and letting the imagination and the creativity of the students take over." Parents and local corporations, particularly Ericsson and Saab, have been especially supportive.

## Adoption of the STC Curriculum Aids Chilean Science Education Efforts

The Chilean Academy of Sciences, the Ministry of Education, and the Faculty of Medicine of the University of Chile have inaugurated a program that they call "Inquiry Based Science Education for Children of Elementary Schools." The program was begun in 2003 in six schools and expanded in 2004 to 24 schools, all in the Santiago area. It covers 5,000 students and 120 teachers.

The program uses seven STC units, training of teachers in inquiry instructional methodologies, school-based science materials refurbishment centers, support from both school administration and the community, and continuous assessment. Teachers participating in the program report:

- Positive changes in classroom atmosphere—better collaboration and stronger teamwork
- Progress in the autonomy of learning
- Higher levels of student motivation
- Better participation among children with learning disabilities
- Gradual adaptation among teachers to the inquiry-centered methodology
- Increase in the teachers' science knowledge
- More willingness of teachers to innovate in their pedagogic practices
- Improved collaboration between administration and teachers

The Chilean leaders of the project have presented the results of their work at various conferences in Latin America and throughout the world. In October 2004, the Chilean Academy of Sciences hosted a strategic planning institute attended by representatives of five South American countries: Argentina, Brazil, Chile, Colombia, and Venezuela. Special guests from Bolivia, Canada, and Mexico also attended. NSRC executive director Sally Goetz Shuler led an NSRC delegation to help build awareness among attendees of inquiry science education.

### Namibia Considers Adopting STC/MS for Its Science Education Program

Professional Development Center co-director David Marsland spent two weeks in the southwestern African nation of Namibia helping that country's science teachers evaluate the state of science education there. Marsland visited eight schools in this mostly rural country and conducted seven workshops at which teachers assessed the Science and Technology Concepts for Middle Schools™ (STC/MS) curriculum. The visit followed up participation by a planning team from Namibia in the National LASER Science Education Strategic Planning Institute in Washington, D.C., during June 2003.

### Chinese Leaders Receptive to Science Education Reform

In a visit to China in spring 2004, NSRC executive director Sally Goetz Shuler and Oklahoma State University Center for Science Literacy director Smith Holt (now retired) briefed Chinese education leaders on the NSRC reform model. They found not only a receptive effort for their presentation but also a nation committed to bridging the economic gap between their country and the richest nations of the West, using education—and especially science education—as the fulcrum for that effort.

### International Educational Conferences

NSRC executive director Sally Goetz Shuler is helping plan two major international science education conferences to be held during 2005:

- In March, the Third Monterrey International Conference in Science Education, in Monterrey, Mexico
- In September, the InterAcademy Panel International Workshop on Evaluation on Inquiry-Based Science Education Projects, in Stockholm, Sweden

# Development

The NSRC's work would not be possible without the generous support of corporations, foundations, and government agencies that are committed to supporting science education. They know that today's child is tomorrow's employee and citizen. Whether the student grows up to be a biochemist or an auto mechanic, he or she will benefit from a firm grounding in science and mathematics.

Because support from government sources for inquiry education programs has been declining, the NSRC's business plan calls for increasing reliance on funding from non-governmental sources such as corporations and foundations that have an interest in education. Although we will continue to pursue grants from the National Science Foundation and other government funders, we can no longer rely on them for a majority of our annual operating capital. Additionally, we are investigating the merits of establishing an endowment that eventually would fund our core operations on an ongoing basis.

### Current Projects

Projects for which grants are being sought include the following:

- Improving Public Understanding of Science Education—Informing national, regional, and state officials about the state of science education in the United States, familiarizing them with research about how people learn, and highlighting districts and states that have implemented exemplary science education programs.
- Building Leadership Capacity for Science Education Reform—Providing scientists, engineers, school administrators, and K–12 teachers with experiences that help them become well-informed leaders who will provide technical assistance and advocate for effective science education programs in their states and communities.
- Sustaining the Work of Districts Implementing Research-Based Science Programs—Conducting professional development institutes focused on helping teachers develop the conceptual understanding of science content needed to effectively use National Science Foundation-supported curriculum materials, including the NSRC's Science and Technology Concepts for Middle Schools™ (STC/MS) curriculum program for students in grades 6 through 8.

- Establishing the NSRC's National Literacy Initiative—Providing resources and strategies for improving reading and writing skills within the context of learning science. The program will include the sponsorship of two national symposia and several literacy academies for school district leaders and teachers.

  Developing a set of children's books for children in kindergarten through grade 3 to complement the NSRC's Science and Technology for Children® (STC) K–3 revised instructional units.

- Scaling Up the Number of Districts Implementing Research-Based Science Programs—Expanding the existing national and regional program to conduct five to six NSRC science education strategic planning institutes annually.

- Working with Other Countries to Develop Leadership Capacity for Establishing Research-Based Science Programs—Continuing the international science education program to assist other countries in using the NSRC's K–8 science education curriculum programs and implementing the NSRC's science education reform model.

Project-related grants and gifts were received during 2004 from the Bristol-Myers Squibb Foundation, the Dow Chemical Company, DuPont, Hewlett-Packard Foundation, the Lucent Technologies Foundation, the Merck Institute for Science Education, National Academies Kellogg Endowment Fund, the National Science Foundation, and the Smithsonian Institution Innovation Grant Initiative.

## Endowment

The NSRC is now setting aside royalties from the sale of curriculum and associated materials in a "quasi-endowment" account at the National Academies. (Funds derived from earned income are not considered endowed funds. Such funds, although invested in exactly the same way as the funds in an endowment, are therefore referred to as a "quasi-endowment.") It is anticipated that this endowment fund will eventually support the core operations of the NSRC.

In addition, the NSRC has initiated the planning stage of a formal endowment campaign. With encouragement from its Executive Committee and National Advisory Board, the NSRC conducted a feasibility study with assistance from an independent fundraising consultant. Based on the recommendations of the feasibility study, the NSRC has drafted an endowment case statement and conducted research into the resources necessary to establish several NSRC endowment funds within the Smithsonian Institution.

# Finance & Administration

## NSRC Quasi-Endowment

In October 2004, the NSRC established a quasi-endowment at the National Academies. The initial deposit consisted of funds from royalties received from sales of the STC and STC/MS curricula, which totaled $3,326,628.78. The NSRC established this account to eventually achieve sustainability to support core operations.

## Operating Funds

In FY 2004, the NSRC received a total of $1,629,000 to support NSRC core operations from the Smithsonian Institution and the National Academies.

The Smithsonian Institution provided $929,000 of support from three sources: the Smithsonian's Federal Appropriations Budget ($171,000), the Smithsonian's General Trust Fund ($292,000), and an indirect budget of $466,000 that resulted from general and administrative rates charged against two National Science Foundation (NSF) grants.

The National Academies supported the NSRC with a total of $80,000 in an indirect budget for NSRC operating and administrative costs. A total of $620,000 in royalty funds from the STC curriculum was transferred from the National Academies to the Smithsonian and was used for operational and administrative services, communications, and general publications during FY 2004.

## NSRC Three Centers of Excellence

During FY 2004, the NSRC received a total $2,052,000 in support of program activities. Support was obtained from three sources:

- Grants awarded by the NSF and nongovernmental foundations
- Gifts from corporations and foundations
- Registration fees the NSRC collected for services provided to school districts and other institutions in conjunction with NSRC project activities

## NSRC Curriculum Development Center

The STC Revisions project received $309,000 from the STC curriculum royalties during FY 2004, plus a gift of $30,000 from the Dow Chemical Company, for a total of $339,000.

## NSRC LASER Center

The NSRC LASER Center received a total of $1,268,000 of financial support during FY 2004. This included an NSF grant for $774,000. A total of $330,000 was received from the following private foundations and corporations: Bristol-Myers Squibb Foundation, Inc. ($175,000); the Hewlett-Packard Company ($100,000); the Merck Institute for Science Education ($30,000); and DuPont ($25,000). A total of $163,000 of support was collected in registration fees from school districts, which was applied to the costs of LASER events held in one regional site and in Washington, D.C.

## NSRC Professional Development Center

The NSRC Professional Development Center received a total of $445,000 of financial support during FY 2004. This included $200,000 in royalty funds from the STC curriculum, which was transferred from the National Academies to the Smithsonian Institution. The Professional Development Center also received $45,000 from registration fees, $100,000 in gifts and non-federal grants and $100,000 from the National Academies W.K. Kellogg Foundation.

# NSRC Core Operations

## QUASI–ENDOWMENT—NATIONAL ACADEMIES[1]

| *All amounts in $000s* | FY00 (Actual) | FY01 (Actual) | FY02 (Actual) | FY03 (Actual) | FY04 (Actual) | FY05 (Projected) |
|---|---|---|---|---|---|---|
| | **N/A** | N/A | N/A | N/A | N/A | 4,000 |
| **Subtotal** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **$4,000** |

## EXECUTIVE OFFICE, FINANCE, AND ADMINISTRATION

| *All amounts in $000s* | FY00 (Actual) | FY01 (Actual) | FY02 (Actual) | FY03 (Actual) | FY04 (Actual) | FY05 (Projected) |
|---|---|---|---|---|---|---|
| **Smithsonian Institution** | | | | | | |
| Federal[2] | 230 | 153 | 161 | 167 | 171 | 283 |
| General Trust[3] | 274 | 290 | 287 | 278 | 292 | 305 |
| Indirect Cost Budget[4] | 449 | 466 | 466 | 469 | 466 | 110 |
| **Subtotal** | **$953** | **$909** | **$914** | **$914** | **$929** | **$698** |
| **National Academies** | | | | | | |
| Indirect | 93 | 103 | 77 | 81 | 80 | 80 |
| Royalty Fund | 0 | 36 | 120 | 218 | 278 | 325 |
| **Subtotal** | **$93** | **$139** | **$197** | **$299** | **$358** | **$405** |

[1] *In October 2004, the NSRC established a quasi-endowment with the National Academies.*
[2] *The increase in the NSRC's Federal Allocation is due to the reassignment of one FTE who was temporarily assigned to another Smithsonian Institution unit during period FY 2000 through FY 2004.*
[3] *The NSRC was assessed a permanent reduction of $26,000 from the General Trust Fund for FY 2003.*
[4] *These amounts were derived from general & administrative rates charged against two National Science Foundation Grants obtained in support of NSRC projects from FY2000 and one grant from FY2003–FY2005. Additionally, the Smithsonian Institution provided the NSRC with in-kind support for administrative services, office and library facilities, building management services, rental of office and storage space, communication services, and information technology services.*

## COMMUNICATIONS & GENERAL PUBLICATIONS

| *All amounts in $000s* | FY00 (Actual) | FY01 (Actual) | FY02 (Actual) | FY03 (Actual) | FY04 (Actual) | FY05 (Projected) |
|---|---|---|---|---|---|---|
| **Smithsonian Institution** | | | | | | |
| Gifts & Non-Federal Grants | N/A | N/A | N/A | N/A | N/A | N/A |
| **National Academies** | | | | | | |
| Royalty Fund | N/A | N/A | 43 | 162 | 342 | 136 |
| **Subtotal** | **N/A** | **N/A** | **$43** | **$162** | **$342** | **$136** |
| **TOTAL CORE SUPPORT** | **$1,046** | **$1,048** | **$1,154** | **$1,375** | **$1,629** | **$1,239** |

# NSRC Three Centers of Excellence

| *All amounts in $000s* | FY00 (Actual) | FY01 (Actual) | FY02 (Actual) | FY03 (Actual) | FY04 (Actual) | FY05 (Projected) |
|---|---|---|---|---|---|---|
| **NSRC CURRICULUM DEVELOPMENT CENTER** | | | | | | |
| **STC/MS PROJECT** | | | | | | |
| **Smithsonian Institution** | | | | | | |
| Federal Grant | 912 | 956 | 320 | N/A | N/A | N/A |
| Gifts & Non-Federal Grants | 375 | 501 | 295 | N/A | N/A | N/A |
| **National Academies** | | | | | | |
| Royalty Fund | 500 | 360 | 65 | N/A | N/A | 150 |
| **Subtotal** | **$1,787** | **$1,817** | **$680** | **$0** | **$0** | **$150** |
| **STC REVISIONS PROJECT** | | | | | | |
| **Smithsonian Institution** | | | | | | |
| Federal Grant | N/A | N/A | N/A | N/A | N/A | N/A |
| Gifts & Non-Federal Grants | N/A | N/A | N/A | N/A | 30 | N/A |
| **National Academies** | | | | | | |
| Royalty Fund | N/A | N/A | N/A | 569 | 309 | 175 |
| **Subtotal** | **N/A** | **N/A** | **N/A** | **$569** | **$339** | **$175** |
| **NSRC LASER CENTER** | | | | | | |
| **Smithsonian Institution** | | | | | | |
| Federal Grant | 1,213 | 1,267 | 1,318 | 1,304 | 774 | 474 |
| Gifts & Non-Federal Grants | 636 | 748 | 615 | 647 | 330 | 700 |
| Event Fees[1] | 513 | 369 | 293 | 145 | 163 | 230 |
| **National Academies** | | | | | | |
| National Research Council Grant | N/A | 35 | N/A | N/A | N/A | N/A |
| Royalty Fund | 105 | 221 | 177 | 0 | 0 | 0 |
| **Subtotal** | **$2,467** | **$2,640** | **$2,403** | **$2,096** | **$1,267** | **$1,404** |
| **NSRC PROFESSIONAL DEVELOPMENT CENTER** | | | | | | |
| **Smithsonian Institution** | | | | | | |
| Gifts & Non-Federal Grants | N/A | N/A | N/A | 25 | 100 | 144 |
| Event Fees | N/A | N/A | N/A | 5 | 45 | 230 |
| **National Academies** | | | | | | |
| Kellogg Endowment Fund | N/A | N/A | N/A | 149 | 100 | N/A |
| Royalty Fund | N/A | N/A | N/A | 300 | 200 | 100 |
| **Subtotal** | **N/A** | **N/A** | **N/A** | **$479** | **$445** | **$474** |
| **NSRC INTERNATIONAL DIVISION** | | | | | | |
| **Smithsonian Institution** | N/A | N/A | N/A | N/A | N/A | N/A |
| **National Academies** | N/A | N/A | N/A | N/A | N/A | 225 |
| **Subtotal** | **N/A** | **N/A** | **N/A** | **N/A** | **N/A** | **$225** |
| **TOTAL PROGRAM SUPPORT** | **$4,254** | **$4,457** | **$3,083** | **$3,144** | **$2,052** | **$2,428** |

(1) *Reduction in events fees is not an accurate reflection of activities. In FY 2003 corporations and foundations provided $104,000 of support for registration fees that are reflected in the Gifts and Grants category. In addition, several LASER regions collected fees of $100,000 in support of LASER activities which reflected cost-sharing. In FY 2004 $42,000 was reflected as a gift which was used to support LASER regions.*

NATIONAL SCIENCE RESOURCES CENTER

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NATIONAL SCIENCE RESOURCES CENTER

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**Middle School Science Professional Development Project**

*Kellogg Endowment Fund Project of the National Academy of Sciences*

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Project Manager and Consultant for Physical Sciences

**Ian MacGregor**
Program Consultant, Earth and Space Sciences

**Smith Holt**
Program Consultant, Physical Sciences

#### Interns

**Ericka del Rocio Burgos**
**Joe Milone**
**Kenna Shaw**

No sector of the U.S. economy better understands the need for a science-literate citizenry than does industry. For self-evident reasons—businesses are increasingly science- and technology-based enterprises, and the cost of teaching workers what they should have learned in school is becoming prohibitive—as well as for good corporate citizenship, industry has become the NSRC's primary supportive resource.

Over the nearly 20 years of our existence, the following corporations and private foundations have provided support for the NSRC's science education reform efforts. We thank them for their contributions.

Bayer Foundation
Bristol-Myers Squibb Foundation, Inc.
Carolina Biological Supply Company
Delta Education
Dow Chemical Company Foundation
DuPont
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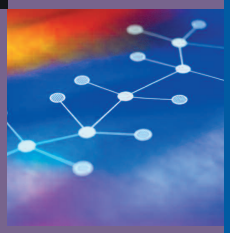

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