National Science Resources Center

2002 Annual Report

National Science Resources Center

THE NATIONAL ACADEMIES Smithsonian Institution

In Dedication

PHYLIS MORRISON and JOHN ALEXANDER MOORE

Former NSRC board members

Each made a profound and lasting contribution to science education.
We will honor their legacy by continuing this important work.

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Established in 1985, the NSRC is an organization of the Smithsonian Institution and the National Academies. Through its parent institutions, the NSRC has actively engaged the scientific, engineering, and education communities in all of its programs.

The Leader

IN SCIENCE EDUCATION REFORM

THE NATIONAL SCIENCE RESOURCES CENTER IS COMMITTED TO ESTABLISHING EFFECTIVE SCIENCE PROGRAMS FOR ALL STUDENTS. THE NSRC EMPLOYS STRATEGIES THAT ARE INFORMED BY RESEARCH, BASED ON BEST PRACTICES, AND LEVERAGE CHANGE THROUGH THE DEVELOPMENT OF STRATEGIC PARTNERSHIPS.

MESSAGE FROM THE ADVISORY BOARD CHAIR

S. Anders Hedberg

2002 was a landmark year for educators across America and brought new challenges to those of us who care particularly about science education. The past year also had a significant impact on the NSRC and how it will move forward to fulfill its mission of improving the teaching and learning of science.

The John Glenn Commission's report *Before It's Too Late* spoke eloquently for improved instruction and learning of math and science. This argument was put into practice through the Math Science Partnerships request-for-proposal from the National Science Foundation. Coinciding with this RFP, the NSF also executed a significant redistribution of grant funds from the hands of the science education service providers into the hands of their customers. Such shifts in economic empowerment resulted in a significant change in the "business" environment of education. As is true for biological species evolution, the survival of organizations is predicated on their ability to adapt to new challenges and opportunities.

The NSRC responded – with urgency – by reforming its operation into one sensitive to the changing needs of its customers in a global marketplace, and by adjusting its products and services accordingly. A strong business plan will guide the fee-for-service operation, and formation of new strategic alliances around well-defined centers of excellence in curriculum development, teacher professional development, and systemic science reform progression.

Our nation, increasingly faced with challenges to its global economic leadership status, its citizens' trust in corporate practices, and threats to its internal security, must implement a reliable education system to prepare the next workforce generation. And, as corporate America defines its own "reform agenda," it must include a strategy to assist in the preparation of talent to feed the employee pipeline and build a base of educated customers. Science education is at the core of this agenda, now, more than ever before.

The NSRC recognized from the very beginning the need to collaborate with the private sector to achieve its objectives. All partners have benefited from this truly symbiotic relationship. The return on investment on the part of the end-customer – the student – has been tremendous. We must now use this formula for success to expand the NSRC-business alliance, and accelerate systemic science education reform to reach all children.

Every student has a right to learn – and we will all benefit.

S. Anders Hedberg
Chair, NSRC Advisory Board

MESSAGE FROM THE EXECUTIVE DIRECTOR

Sally Goetz Shuler

The year 2002 marked a significant transition for the National Science Resources Center – a year of analysis, deliberation, and reinvention.

This year we recognized that we are in a critical phase as an organization. As we reflected upon our 17–year history of contributions to the field of science education reform, we noted several important challenging goals. First, we need to develop a strategic approach for helping school districts in the NSRC network sustain current research-based science education programs. A second important task is to scale up reform, with the goal to increase the number of districts implementing effective science education programs to 40% by 2010. Finally, we need to become more business-minded as an organization.

This past year we have made significant progress in positioning ourselves to accomplish these goals. We initiated a business planning process with our staff, members of the NSRC National Advisory Board, and many of our "customers" for building upon our accomplishments and for moving the organization to a more strategic position. An outgrowth of the process was the formation of three NSRC centers of excellence – Leadership Development, Curriculum Development, and Professional Development. We have linked the business planning process to a major communications initiative designed to establish the NSRC brand, including a new visual identity and standard messages. The result of this effort will be the production of a new portfolio of the NSRC brochures along with an improved Web site for better serving the needs of our customers.

The NSRC staff also remained focused on achieving our mission to improve science education for all K–12 students through leadership programs and the development and dissemination of research-based curriculum programs. The NSRC's Leadership and Assistance for Science Education Reform (LASER) Center has continued to deliver dozens of programs for both sustaining and scaling up the number of districts establishing effective science education programs. In the area of curriculum development, the NSRC reached a major milestone this past year when the final four modules of the Science and Technology Concepts for Middle Schools™ (STC/MS) were completed. The NSRC communicated these accomplishments along with other science education reform issues in an improved edition of the NSRC's *ScienceLink*, the NSRC newsletter disseminated to the more than 20,000 members of its network and the nation's 16,000 superintendents of schools.

None of these accomplishments could have happened without a talented staff. I would like to take this opportunity to thank the staff for all that we have been able to accomplish this year and to commend them for their attention to quality, flexibility in this year of change, and commitment to children.

Sally Goetz Shuler
Executive Director

A New Era for the NSRC

As the NSRC enters a new, more business-oriented era, it became necessary to look at how the NSRC presents itself to various audiences. During the past year, the NSRC created an updated brand identity, formalized its core messages, and began applying the new identifier and messages to marketing and informational materials. Below are visuals that are a result of that work.

National Science Resources Center

THE NATIONAL ACADEMIES Smithsonian Institution

The National Science Resources Center Identifier Mark

The National Science Resources Center is an organization of the Smithsonian Institution and the National Academies. To communicate this relationship, a "lockup" was designed, incorporating the full NSRC name and the visual identities of the two parent organizations. This relationship was carefully designed to ensure that the parent organizations are given equal weight and that the NSRC is associated with both.

NSRC

The National Science Resources Center Ligature Mark

Because the National Science Resources Center is most often referred to by its initials, the identifying mark for the organization is a typographic ligature comprised of these initials.

Examples of Collateral Material Utilizing the National Science Resources Center New Identity

OVERVIEW BROCHURE

POCKET FOLDER

2002 – ANALYSIS, DELIBERATION, REINVENTION

2002 was a year of analysis, deliberation, and reinvention for the National Science Resources Center. Although the NSRC recognizes that it is faced with significant challenges in the coming years, the NSRC is determined to meet these new demands as it continues its work to establish effective science programs for all students.

Through work with Advisory Board members, Corporate Coalition participants, business consultants, representatives of our customer base, and our staff, the NSRC addressed the following initiatives during FY 2002:

- To accelerate the NSRC's leadership role in science education reform
- To scale up the number of school districts involved in implementing science education reform
- To improve the effectiveness of the NSRC products and services for the hundreds of school districts in the NSRC network
- To explore business opportunities to broaden the NSRC's funding base

During the past year the NSRC staff began the process of writing a strategic plan to address each of these goals. The comprehensive plan will focus on programs and strategies to strengthen and expand the NSRC's position as a national and international leader in science education. In order to facilitate this process, an external facilitator worked with the staff, the NSRC Advisory Board, many "customers," and other advisors to conduct an internal and external analysis of the NSRC's strengths, weaknesses, opportunities, and threats.

As part of the planning process, the Center examined its established relationships with hundreds of school districts, corporations, academic institutions, and museums. This analysis was important because it provided critical information about the NSRC's customers. The NSRC will use this data to develop new or improve current programs, products, and services.

THE NSRC CENTERS OF EXCELLENCE

One significant outgrowth of the planning process was the creation of three Centers of Excellence: the Professional Development Center, the Curriculum Development Center, and the Leadership and Assistance for Science Education Reform (LASER) Center. Each center will independently and jointly explore new business opportunities, use a strategic approach to broadening its client base, and form new strategic alliances. Each center will review its existing product and service line and will consider revisions, extensions, or additions in order to maintain and expand its base. All products and services will be marketed under the revitalized NSRC brand.

BRANDING, COMMUNICATIONS, AND A NEW WEB SITE

Reinvention also engendered a program to improve the way that the NSRC presents itself to various audiences through its brand identity, messaging, collateral materials, and Web site.

The NSRC retained the services of two external consulting firms to guide it through the process of refreshing and standardizing the NSRC image, defining the NSRC's audiences and related core messages, and creating new collateral materials. Patricia Kennedy Communications is managing this process and working with the staff to create the collateral materials. Fassino/Design is working with Patricia Kennedy Communications to design and produce materials. Both firms are located in Boston.

LASER Center

HIGHLIGHTS

The NSRC has played a critical role in science education reform since 1989. One of its most important functions is to provide services and products to plan, implement, and sustain science education reform in individual school districts. Much of this work is conducted through the NSRC's Leadership and Assistance for Science Education Reform (LASER) Center.

The LASER Center, one of the National Science Foundation's Science Education Dissemination and Implementation Centers, is recognized as one of the nation's most strategic and systemic reform programs focusing on systems thinking, incorporating research and best practices, and leveraging change through the development of strategic partnerships with corporations, museums, and academic institutions.

FY 2002 ACTIVITIES

LEADERSHIP PROGRAMS

National

January 2002
National Lead Scientist Institute for K–8 Science Education
Conducted in partnership with the American Physical Society
Washington, DC

July 2002
National K–8 Science Education Strategic Planning Institute
Washington, DC

October 2002
National Middle School Science Education Implementation Conference
Keystone, CO

Regional

February 2002
Washington State K–8 Science Education Strategic Planning Institute
Vancouver, WA

June 2002
South Carolina K–8 Science Education Strategic Planning Institute
Florence, SC

IMPLEMENTATION OF REFORM AND BUILDING LEARNING NETWORKS

National

March 2002
Association of Science Materials Centers (ASMC)/NSRC LASER Center Annual Networking Forum
San Diego, CA

March 2002
NSRC/Merck Institute for Science Education Program for National Leaders
San Diego, CA

Regional

November 2001
K–12 Science Education Curriculum Showcase
Yakima, WA

December 2001
K–8 Science Education Curriculum Showcase
Birmingham, AL

May 2002
Middle School Curriculum Showcase
Providence, RI

ADVANCED IMPLEMENTATION

October 2001
Association of Science Materials Centers (ASMC)/NSRC LASER Center Next Step Institute
Greenville, SC

Winter 2002
Lucent Initiative
School District Site Visits – Irvine, CA; Allentown, PA; Plainfield, NJ; Warren, NJ; Oklahoma City, OK; Fulton County, GA; Napierville, IL

April 2002
K–8 Science Education Symposium
Irvine, CA

May 2002
Lucent Initiative
Community Leaders' Meeting
Murray Hill, NJ

Professional Development Center

HIGHLIGHTS

This year the NSRC moved forward with the formation of the Professional Development Center. Through the work of the Center, teachers gain a conceptual understanding of the science content and pedagogical knowledge needed to teach effectively. Teachers learn how to assess what students know, how to engage them actively in scientific investigations, and how to apply their knowledge and skills to new situations.

The Center will independently and jointly explore new business opportunities and broaden the NSRC's client base through effective marketing, branding, the development of new services and products, and the formation of new strategic partnerships with academic institutions, corporations, and museums.

The NSRC Professional Development Center's mission is to create and support a network of talented, inspired, and highly professional education consultants by connecting research-based science curriculum materials and educational practices with classroom instruction and student achievement. The Center will accomplish this by:

- Creating professional development products and services to support and promote high quality science curricula
- Forging partnerships to provide mutual support for training and materials
- Recruiting, training, and organizing a network of consultants to provide exemplary professional development for teachers
- Using fee-for-service professional development services and products to generate revenue to become self-sustaining

During the coming year the Professional Development Center will establish an advisory board and seek support from major corporations and foundations for its work.

Curriculum Development Center

HIGHLIGHTS

The NSRC science curriculum programs align with the National Science Education Standards of the National Research Council. Instructional materials are developed using a rigorous research and development process including field testing with diverse student populations and external evaluations to determine impact on student achievement.

During this past year the NSRC Curriculum Development Center reached a major milestone as it completed the Science and Technology Concepts for Middle Schools™ curriculum program. The NSRC also launched an initiative to revise its elementary science program, Science and Technology for Children®.

SCIENCE AND TECHNOLOGY CONCEPTS FOR MIDDLE SCHOOLS (STC/MS) FINAL FOUR MODULES

In FY 2002, the STC/MS project staff brought the following four modules to final publication.

- *Organisms – From Macro to Micro* stimulates student interest in observing and investigating the structure and behavior of living things
- *Light* introduces students to the behavior and properties of light
- *Earth in Space* taps students' natural curiosity about space and space travel
- *Electrical Energy and Circuit Design* demonstrates to students the transfer of electrical energy in circuits and the design of circuits to control a variety of devices

STC/MS Guide to Probeware and Computer Applications

The Guide contains dozens of lessons that are adaptations or extensions of existing STC/MS lessons in the eight modules for which probeware and the computer provide versatile, portable, and more efficient methods for the collection, display, and analysis of experimental data.

STC/MS Science Equipment

In 2002 the STC/MS curriculum developers designed simple, inexpensive, and unique equipment to engage students in activities associated with specific concepts. All of this equipment can be used in a standard course on physical, life, or earth science, independent of STC/MS.

- Earth science – A model that shows the moving plates of the earth, a convection tube apparatus for studying convection currents, a seismograph, a fault laboratory, an ash tube, a model magma kit, a Sun-Earth-Moon board for studying the relative positions of those celestial bodies, a planetary motion model, and a moon orbiter device
- Life science – Equipment for modeling the heart's action, an arm model kit, the liter ruler measuring for lung capacity, the human spine model, a butterfly house, and the plant growing system
- Physical science – A unique apparatus for determining the density of air, a simple electrolysis apparatus, a basic, but effective, ripple tank, and a kit of basic electrical components to be used for investigating electrical circuits, a water analogy model

SCIENCE AND TECHNOLOGY FOR CHILDREN

In FY 2002 the NSRC staff developed a strategic plan for revising the STC program of 24 units for students in K–6. The NSRC will move forward with implementing this plan in FY 2003.

STC/MS IMPROVES STUDENT ACHIEVEMENT

"Consistent, statistically significant differences provided evidence to support the contention that the four curriculum units were more effective in teaching the scientific concepts assessed than were the more traditional instructional approaches employed with the control groups. Students exposed to the STC/MS curriculum also outperformed the national and international groups. Together, this pattern of results suggests that all four of the curriculum units were very effective in teaching science and technology concepts to middle school students."

The Center for the Study of Testing, Evaluation, and Education Policy (CSTEEP)

Joseph Pedulla, PhD
Boston College,
Boston, MA

International Programs

IN 2002

The NSRC extends its work internationally through the National Academies and the InterAcademy Panel (IAP). The IAP is a global network of 90 science academies designed to help its members develop the tools they need to participate in science policy discussions taking place beyond university classrooms and research laboratories. The IAP is a significant force in the global effort to reform science education.

The National Academies released a statement last August reaffirming the importance of international collaboration in science and emphasizing the need to maintain close collaboration among the world's national science academies.

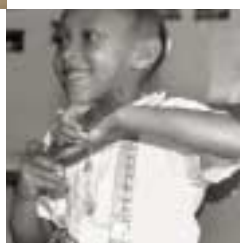
IN FY 2002 THE NSRC WORKED WITH THE FOLLOWING INTERNATIONAL GROUPS

Chile

The NSRC's Science and Technology for Children curriculum and instructional materials were featured at a workshop held in Santiago, Chile, in January. Sally Goetz Shuler presented the NSRC's programs at the workshop, which was organized by the Chilean Academy of Sciences with the sponsorship of the Ministry of Education and Fundacion Andes. The primary goal for the meeting – "The Generation of Experimental Materials and Learning Modules for Science Education" – was to share experiences in improving the level of science education through the use of experimental materials and inquiry-based learning modules. In addition, the workshop explored ways to stimulate the generation of a large project in Chile to introduce this type of approach and materials to the public schools of the country, and to encourage support from international groups of science academies for this endeavor.

India

Sally Goetz Shuler, executive director of the NSRC, and Bruce Alberts, president of the National Academy of Sciences, worked in partnership with the Indian National Science Academy (INSA) to organize the Asian Regional Seminar on Science Education. The seminar, part of the IAP Science Education Program, focused on issues related to science teaching and learning at schools. The purpose of the seminar, held in October, 2002, in New Delhi, was to share experiences in science teaching and learning, methodological and experimental models, curriculum development, testing and evaluation, science talent search, and popularization of science.



Mexico

In December, a delegation of senior education officials from Mexico visited the National Science Resources Center to learn about improving science education in Mexico, and to explore opportunities for collaboration between Mexico and the NSRC. Members of that delegation included Daniel Gonzalez Spencer, Mexico's director of international relations; Reyes Tamex, Mexico's secretary of education; Silvia Ortega, Mexico's under secretary for education; Pablo Rudomin, science advisor to the president of Mexico; and, Guillermo Fernandez de la Garza, executive director of the U.S.– Mexico Foundation of Science.

The NSRC staff also organized a field trip to Montgomery County, Maryland, school for the delegation where they observed students and teachers engaged in inquiry-based science lessons and visited the materials center.

Sweden

Much progress has been made by the Royal Swedish Academy of Sciences (RSAS) in translating and adapting the NSRC's STC curriculum materials for use in elementary schools in Sweden. The NSRC and the National Academies have been working with the RSAS since 1997 to bring this project to fruition. In the spring of 2002, members of the RSAS and the Royal Swedish Academy of Engineering Sciences met with the NSRC staff at the National Science Teachers Association (NSTA) national convention in San Diego, California, to review the status of the STC translation project. They also provided a report on their progress implementing the STC program into their elementary schools.

Administration

OPERATING FUNDS

To support NSRC administrative and financial operations, the NSRC received a total of $1,111,000 in support from both the Smithsonian Institution and the National Academies. The Smithsonian Institution provided $914,000 of support from three sources: the Smithsonian's federal appropriations budget ($161,000), the Smithsonian's general trust fund ($287,000) and an indirect budget of $466,000 that was derived from general and administrative rates charged against two National Science Foundation (NSF) grants (the STC/MS project and the LASER Center) the NSRC received. The National Academies supported the NSRC with a total of $77,000 in an indirect budget for NSRC operating and administrative costs. A total of $120,000 in royalty funds from the elementary STC curriculum was transferred from the National Academies to the Smithsonian and was used for operational and administrative services during fiscal year 2002 (FY 2002).

PROGRAM SUPPORT

During FY 02, the NSRC received a total $3,126,000 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

The STC/MS project received a total of $680,000 of support during FY 02. Of that amount, a supplement of $320,000 was received in support from the National Science Foundation. A total of $295,000 was received from the following corporations and foundations: Carolina Biological Supply Company ($120,000); DuPont ($75,000); and The Dow Chemical Company Foundation ($100,000). In addition, $65,000 of royalties were allocated to the STC/MS project.

The NSRC LASER Center received a total of $2,403,000 of financial support during FY 02. Of that amount, the NSF provided a grant for $1,318,000. A total of $615,000 was received from the following private foundations and corporations: Bristol-Myers Squibb Foundation, Inc. ($150,000); Carolina Biological Supply Company ($75,000); DuPont ($25,000); Delta Education ($75,000); Lucent Technologies Foundation ($160,000); the Merck Institute for Science Education ($25,000); The Robert Wood Johnson Foundation ($75,000); and the Shell Oil Company Foundation ($20,000). A total of $293,000 of support was collected in the form of registration fees from school districts, which was applied to the costs of LASER events held in eight regional sites and in Washington, D.C. In addition, $177,000 of royalties were allocated to the LASER Center. In addition to these gifts and grants, the Hewlett-Packard Company presented the NSRC with an in-kind gift of extended life batteries for the MobiLAN computer lab worth an estimated $10,000.

The NSRC Communications and Publications department received $43,000 from royalty allocations.

NSRC Operating Funds

All amounts in $000s	FY99 (Actual)	FY00 (Actual)	FY01 (Actual)	FY02 (Actual)	FY03 (Projected)
Smithsonian Institution					
Federal	221	230	153	161	168
General Trust*	261	274	290*	287	300
Indirect Cost Budget **	419	449	466	466	466
Subtotal	**$ 901**	**$ 953**	**$ 909**	**$ 914**	**$ 934**
National Academies					
Indirect	101	93	103	77	81
Royalties Allocations***	0	0	36	120	218
Subtotal	**$ 101**	**$ 93**	**$ 139**	**$ 197**	**$ 299**
TOTAL CORE SUPPORT	**$1,002**	**$1,046**	**$1,048**	**$1,111**	**$1,233**

**Of this amount, $36,500 in lapsed salary was assessed by Smithsonian Institution.*

***These amounts were derived from general and administrative rates charged against two National Science Foundation grants (STC/MS and LASER) obtained in support of NSRC projects. In addition, 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.*

****A portion of the royalties was allocated for operating costs for FY 01 and for FY 02 and will be for FY 03. Smithsonian's fiscal year budget amounts represent the period October 1, 2002 – September 30, 2003. The financial report above for the National Academies has been aligned with the Smithsonian fiscal year. The Academies' fiscal year period is January 1 – December 31.*

NSRC Program Support

All amounts in $000s	FY99 (Actual)	FY00 (Actual)	FY01 (Actual)	FY02 (Actual)	FY03 (Projected)
K–12 SCIENCE CURRICULUM DEVELOPMENT CENTER					
STC/MS PROJECT					
Smithsonian Institution					
Federal Grant	869	912	956	320	N/A
Gifts and Non-Federal Grants	551	375	501	295	N/A
National Academies					
Royalty Allocations	335	500	360	65	N/A
Subtotal	**$1,755**	**$1,787**	**$1,817**	**$ 680**	**N/A**
STC REVISION					
Smithsonian Institution					
Federal Grant	N/A	N/A	N/A	N/A	100
Gifts and Non-Federal Grants	N/A	N/A	N/A	N/A	200
National Academies					
Royalty Allocations					**569**
Subtotal	N/A	N/A	N/A	N/A	$ **869**
LASER CENTER					
Smithsonian Institution					
Federal Grant	1,197	1,246	1,257	1,318	1,167
Gifts and Non-Federal Grants	603	636	748	615	750
Event Fees	509	513	369	293	350
National Academies					
National Research Council Grant	N/A	N/A	35	N/A	N/A
Royalties Allocation	105	105	221	177	0
Subtotal	**$2,414**	**$2,500**	**$2,630**	**$2,403**	**$2,267**
PROFESSIONAL DEVELOPMENT CENTER					
Smithsonian Institution					
Federal Grant	N/A	N/A	N/A	N/A	N/A
Gifts and Non-Federal Grants	N/A	N/A	N/A	N/A	150
School District Fees	N/A	N/A	N/A	N/A	150
National Academies					
Royalty Allocations	N/A	N/A	N/A	N/A	**300**
Subtotal	**N/A**	**N/A**	**N/A**	**N/A**	$ **600**
COMMUNICATIONS & GENERAL NSRC PUBLICATIONS					
Smithsonian Institution					
Federal Grant	N/A	N/A	N/A	N/A	N/A
Gifts and Non-Federal Grants	N/A	N/A	N/A	N/A	50
National Academies					
Royalty Allocations	N/A	N/A	N/A	43	**112**
Subtotal				$ **43**	$ **162**
TOTAL PROJECT SUPPORT	**$4,169**	**$4,287**	**$4,447**	**$3,126**	**$3,898**

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