National Science Resources Center

THE NATIONAL ACADEMIES Smithsonian Institution

2007 Annual Report

Changing the Course of Science Education

Financial and In-Kind Support

The challenge of redesigning and improving science education programs for all children requires dedicated leadership and a long-term commitment to quality science education on the part of our staff, our parent institutions, our National Advisory Board, and numerous sponsors and partners who have contributed materially and substantially to the NSRC's efforts.

SPONSORS

The following organizations and individuals have contributed financial and in-kind support for NSRC programs and services during the past three years.

Public Sector Agencies

National Science Foundation
U.S. Department of Defense, Los Alamos National Laboratory

Corporations and Foundations

Diane and Norman Bernstein Foundation
Bristol-Myers Squibb
Burroughs Wellcome Fund
Carolina Biological Supply Company
Constellation Energy/BGE
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Intel Foundation
Lab-Aids, Inc.
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The Lucent Technologies Foundation
Merck Institute for Science Education
Shell Exploration & Production Company

Nonprofit Organizations and Professional Societies

ASSET Inc.
Education Development Center

Educational Organizations and Institutions

Vanderbilt, Inc.

Individuals

Elwyn Berlekamp
Debra Felix
Mary Langlais
Elizabeth Lodal
Kenneth Miller
Carr Thompson

PARTNERS

The following organizations have worked closely with the NSRC in the delivery of programs and services over the past three years.

Public Sector Agencies

New York State Education Department
U.S. Department of Energy, Los Alamos National Laboratory

Corporations and Foundations

Bristol-Myers Squibb
Burroughs Wellcome Fund
Carolina Biological Supply Company
DuPont
IBM
Intel Corporation
Shell Exploration & Production Company

Nonprofit Organizations and Professional Societies

American Society of Human Genetics
ASSET Inc.
Council of Chief State School Officers
James B. Hunt, Jr. Institute for Educational Leadership and Policy
National Association of Biology Teachers
Van Andel Institute

Educational Organizations and Institutions

Houston (Texas) Independent School District
New Orleans Public Schools
North Carolina Science, Mathematics, and Technology Education Center
Oklahoma State University
Montclair State University: PRISM
Rider University

International Partners

Chilean Academy of Sciences
InterAcademy Panel
Royal Swedish Academy of Sciences
U.S.-Mexico Foundation for Science

National Science Resources Center

THE NATIONAL ACADEMIES Smithsonian Institution

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 for all students in the United States and throughout the world. The prestige and credibility of these two world-renowned institutions provide the NSRC with access to research, scientific expertise, and resources to inform our work. They provide the NSRC with the unique opportunity to catalyze the reform of science education with leaders representing school districts, academic institutions, businesses, museums, foundations, government agencies, scientific and engineering societies, publishers of education resources, and nonprofit organizations working to improve K–16 science education.

The NSRC advances the missions of its parent institutions by expanding and extending their important work in the following ways:

- Translating their research, resources, and best practices into products and services which are disseminated to leaders working to improve K–16 science education;
- Building leadership capacity, especially within the science and engineering communities, to leverage change at the school district and state levels; and
- Educating a broad constituency of leaders about the important work of both institutions in science education.

The National Academies are composed of three academies—the National Academy of Sciences, the National Academy of Engineering, and the Institute of Medicine—and their operating arm, the National Research Council. These institutions work outside the framework of government to ensure independent advice to the nation on matters of science, technology, and medicine.

The Smithsonian Institution was established in 1846 with a mission of increasing and diffusing knowledge. For more than 160 years, the Smithsonian has used its unique, publicly accessible collections, research, and staff to inform, educate, and inspire a diverse public. In doing this, it has become one of the most widely recognized institutions in the world for both its contributions to science and its unparalleled ability to make its research and collections accessible to people of all ages.

2007 National Science Resources Center National Advisory Board

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Research and Evaluation Committee

Strategic Partnerships Committee

Business Development Committee

Nominations Committee

CONTENTS

Sponsors and Partners . . . . . inside front cover
About the National Science Resources Center 1
2007 National Science Resources Center National Advisory Board 2
Message from the NSRC Advisory Board Chair 4
Message from the NSRC Executive Director 5
National Science Resources Center Guiding Principles 6
2007 Highlights of NSRC Activities to Transform K–12 Science Education 7
Scaling Up and Sustaining Effective Science Education Programs 8
- Catalyzing New Research to Advance the Field 8
- Improving Public Understanding of Research and Best Practices 9
- Transforming Programs in States, Regions, and Districts 10
- The NSRC Blueprint for K–12 Science Education Reform 12
- Improving the Quality of Science Teaching 15
- Developing and Disseminating New Research-Based Teaching Resources 16

Administration and Finance 19
2007 National Science Resources Center Staff and Consultants . . . . . inside back cover

Message from the NSRC Advisory Board Chair

In listening to the announcement of the most recent Nobel laureates in physics, I pondered an age-old question: Who will be the future scientists of America? This important question extends beyond race, culture, or geography. Across Europe and in other developed Pacific Rim countries like Japan, South Korea, and China, high schools have a clear focus on the quality of science and mathematics that is taught in their classrooms. In India, the educational focus is on growing engineers and medical doctors.

In America, there is concern that the general public is satisfied with the depth and quality of scientific and technological education that our children are receiving. Children are natural-born scientists, but somehow, their instinct to ask questions, touch objects, take things apart, and put them back together is suppressed in many of our schools. Although America doesn't have a strategic plan to determine how to produce the next generation of young scientists, a number of scientists and organizations stand ready to help address this issue.

The National Science Resources Center (NSRC) is one such organization. The NSRC has spent the past 20 years serving as a champion for hands-on inquiry-based science learning for all students. The NSRC is committed to establishing effective science programs by employing strategies that are informed by research and based on best practices, and that leverage change through the development of strategic partnerships. These reforms support high-quality science instruction and must be systemic and sustained to be effective. The following NSRC school reform initiatives are taking hold in several states, including Delaware, Florida, Louisiana, North Carolina, and Washington, as well as in a number of countries like Chile, China, and Sweden.

Vision—The NSRC works with education leaders and practitioners to help implement a vision for effective science education by broadening awareness of the need for a more scientifically literate workforce.

Research-Based Instruction—The NSRC develops comprehensive and challenging research-based programs of instruction for pre-K–12 students to benchmark with other exemplary school districts that are achieving extraordinary success with students.

Technical Assistance—The NSRC offers technical assistance to schools and districts by working in partnership with government, industry, the education community, and parents to establish, sustain, and continuously improve the infrastructure needed to support high-quality science instruction for all students.

Evidence—The NSRC is collecting and documenting evidence of student achievement, attitudes, and skills in science. Preliminary data show how inquiry-based science learning produces a net positive effect on a student's ability to read and write.

It is a privilege to work with the NSRC Advisory Board and staff. If you want to help America's children, join the efforts of the NSRC as we work to ensure that all students will have the best science education to better prepare them for the global workforce.

D. Carr Thompson
NSRC Advisory Board Chair

Message from the NSRC Executive Director

The year 2007 marks the 22nd year since the Smithsonian and the National Academies took a bold step to establish the National Science Resources Center (NSRC). We continue to recognize how the leaders of these prestigious institutions had the extraordinary vision to provide us with the platform to leverage their expertise and resources, and the critical role to improve K–12 science education programs for all students in the United States and throughout the world.

During the past year, we improved our comprehensive and long-term leadership development services for states, districts, and other countries. These leadership activities are informed by research, based on the implementation of best practices, and result in the establishment of science education programs that are strategic, systemic, and sustainable. We began to see the results of this long-term leadership development work in states, such as Delaware, Pennsylvania, Alabama, and Washington, as well as in other industrialized and developing countries. Gains in student achievement, the development of leadership capacity for reform, and the establishment of robust infrastructures in these states and other districts attracted the attention of key leaders representing urban communities and states interested in scaling these programs. They recognized that our niche in the landscape of science education activities was both unique and important in transforming science education. This is an important milestone for the NSRC as we evolve into an organization that is more adaptable and sophisticated in an increasingly complex world.

For these reasons, this year marked a new phase for the NSRC. Our work expanded in several areas, including our need to build awareness with new leaders representing business, government, and education about research and exemplary programs that could be scaled in districts and states. As a result, we established a new center of excellence—the NSRC Center for Building Awareness of Science Education. We also initiated a new, long-term reform effort with North Carolina; created new programs with urban communities in New York, Louisiana, and Texas; and expanded our program of science academies for teachers, which incorporates the scientific expertise and resources of the Smithsonian and the National Academies.

During 2007, we also increased and improved our resources for students and teachers. We added new literacy books to our portfolio for elementary students, launched a comprehensive project to revise our curriculum of eight semester-long courses for middle school students, initiated the development of a new high school research curriculum, and identified additional exemplary resources produced by other organizations that we will disseminate to states and districts.

In all of this work, the staff has done an outstanding job in accomplishing ambitious goals and embracing change and new priorities. They are exceptional individuals, committed to excellence and dedicated to our mission. We are indebted to our parent institutions—the National Academies and the Smithsonian—for their continued support. We are also grateful to the members of the NSRC National Advisory Board for their advice and efforts in advancing our goals, and our partners and sponsors for their sustained commitment to this important work. We look forward to another productive and challenging year!

Sally Goetz Shuler
Executive Director

National Science Resources Center Guiding Principles

MISSION—OUR PRIMARY PURPOSE

To improve the learning and teaching of science for all students in the United States and throughout the world

CORE VALUES—OUR ASPIRATIONS

Quality

- Our work is of the highest quality and a standard for excellence.
- We bring discipline, cutting edge knowledge and critical thinking to our work.
- We ensure that our products and services are based on research on how people learn.
- We constantly look for ways to raise the bar and increase our impact.
- Our products and services undergo a rigorous research and development process.

Innovation

- We are self-reliant and provide visionary leadership to achieve results.
- We are forward-looking, resourceful and creative problem-solvers.
- We encourage risk-taking that leads to new ideas and innovative solutions.

Impact

- We deliver relevant, valuable products and services to our customers.
- We are passionate about our mission.
- We commit to delivering tangible, measurable results that matter to the world.

VISION—OUR PICTURE OF THE IDEAL FUTURE

Our schools are preparing today's students to be effective citizens tomorrow.

- Students everywhere are engaged in exciting, relevant experiences that are advancing their understanding of science and helping them to become life-long learners and informed citizens.
- The United States is recognized as a world leader in developing and using effective, research-based science education—we have the best teachers using the best materials delivering the best science education to students at all levels.
- The public, the education community, and local and national policy makers recognize and take action to address the ongoing need for exemplary science education reform.

The NSRC is a high-performing organization.

- Our Leadership and Assistance for Science Education Reform (LASER) Center is working with all states to support science education reform.
- Our Professional Development Center is recognized as a valuable national resource.
- We are delivering innovative, relevant products and services to our customers.
- Our curricula are interactive and readily available to people worldwide.
- We are a vital contributor in science education to the worldwide learning community.

The NSRC has and/or leverages the resources it needs to be effective.

- We are fully staffed with a team of dedicated experts and have the right resources to get the job done.
- We have successful partnerships with federal, state and international public and private organizations.
- We have streamlined, effective processes and have a state-of-the-art infrastructure.
- We have strong, stable funding from diverse sources to sustain the work of the organization.
- We have extensive data to prove that what we do works.

2007 Highlights of NSRC Activities to Transform K–12 Science Education

- Catalyzing New Research to Advance the Field 8
- Identifying and Disseminating Evidence of Impact of this Work 8
- Improving Public Understanding of Research and Best Practices 9
- Transforming Programs in States, Regions, and Districts 10
- Improving the Quality of Science Teaching 15
- Developing and Disseminating New Research-Based Teaching Resources 16
- Advancing Our Financial and Administrative Operations and Health 19

Scaling Up and Sustaining Effective Science Education Programs

The NSRC is an intermediary organization that bridges research and practice to help school districts, states, and regions build and maintain effective science programs. By working to strengthen local capacity, the NSRC is instrumental in laying the foundation for sustainable progress in science education. Accomplishments from NSRC 2007 activities follow.

CATALYZING NEW RESEARCH TO ADVANCE THE FIELD

The NSRC bases its work on rigorous research about how children learn and on theories of organizational change. The NSRC applies research and best practices to the development and continuous improvement of all of its programs and services, from its theory of action for systemic science education reform (displayed on pages 12–13 of this report), to its award-winning professional development offerings, to its exemplary science curriculum.

Identified and Disseminated Evidence of Impact of This Work

Recent research has confirmed the need for sound experimental studies to establish the effectiveness of inquiry-based instruction on students' learning of science. For example, research by Vanosdall et al.[1] indicates that science achievement can improve by using contextualized guided inquiry in conjunction with kit-based materials (as compared to using textbook instruction or kits alone). The NSRC is dedicated to contributing to further investigation of the efficacy of the NSRC's Science and Technology for Children® (STC) program and other inquiry-based materials.

The NSRC has embraced the strategy of continually increasing its partnerships and collaborations with organizations with similar educational goals in both the public and the private sectors. Through partnerships, grants and gifts, the NSRC expects to begin developing several large proposals in 2008. One of the important proposals would fund a randomized control study of the efficacy of the NSRC's STC program materials. The expertise of the faculty will also contribute to the design of more in-depth studies of the role of epistemic factors (such as argumentation in the classroom) in the learning of science.

Collaborated on Model-Based Reasoning Study

In 2007, the NSRC collaborated with education leaders at Vanderbilt University in the first phase of the project "Development of Model-Based Reasoning," which is funded by the National Science Foundation. Three STC elementary life science units were selected as pilot material for revision to better incorporate modeling progressions. Upon completion of the revisions, the modified curriculum units will serve as the experimental material for testing how students build a conceptual understanding of biology.

[1] Vanosdall, Rick; Klentschy, Michael; Hedges, Larry; and Weisbaum, Kathryn Sloane. 2007. "A Randomized Study of the Effects of Scaffolded Guided-Inquiry Instruction on Student Achievement in Science." Paper presented at the annual meeting of the American Educational Research Association. Available at: www.nsrconline.org/pdf/Klentschy_07.pdf.

In addition, one unit was selected for a more extensive revision toward creating the first STC open-inquiry unit. The goal is to provide a follow-on supplement for highly competent teachers who welcome the additional challenge of facilitating student development of experiments, including hypotheses, metrics, and data analysis. Field tests are expected to begin in 2009 at school sites in Walla Walla, Washington, and Nashville, Tennessee. The NSRC will continue to support this effort by providing staff expertise, instructional materials, professional development of teachers, and dissemination of results.

IMPROVING PUBLIC UNDERSTANDING OF RESEARCH AND BEST PRACTICES

The NSRC seeks to increase public understanding of science education by engaging wide-ranging communities of stakeholders about the importance of science education, and involving them in active reform movements that will change the course of science education.

Engaged Key Stakeholders in Science Education Reform

During 2007, the NSRC expanded its capacity to improve public understanding of science education by establishing a new center of excellence—the Center for Building Awareness of Science Education (BASE). Through the programs of this new center, the NSRC increased its impact on the values of leaders in key stakeholder groups.

The NSRC conducted national symposia under the theme "Changing the Course of Science Education," and played a leadership role in regional conferences aimed at building awareness with specific leadership groups. These conferences engaged leaders from business, foundations, government, higher education, and K–12 education. Approximately 700 state, regional, and community leaders attended these meetings.

One of the national symposia in 2007 was hosted in partnership with the Council of Chief State School Officers (CCSSO) and the James B. Hunt, Jr., Institute for Educational Policy and Leadership. This

"Changing the Course of Science Education" Meetings

Date	Event	Number of Attendees
National Meetings		
October 2006	Symposium for Key Stakeholders in America's Future: Changing the Course of Science Education, Washington, DC	90
April 2007	2007 National Symposium for Scientists and Engineers, Santa Fe, NM	120
July 2007	Presentation to the Council of Engineering and Scientific Society Executives annual meeting, Halifax, Nova Scotia	20
September 2007	2007 National Leadership Development and Strategic Planning Symposium on K–16 Science Education for State Teams, Washington, DC	90
October 2007	2007 National Leadership Development Symposium, Washington, DC	90
Regional Meetings		
May 2007	Building Awareness Symposium for Key Leaders in the Gulf Coast Region, New Orleans, LA	50
May 2007	North Carolina Science Summit, Raleigh, NC	150
September 2007	Van Andel Institute Science Education Forum, Grand Rapids, MI	70

symposium represented the first step of the leadership development component of the Smithsonian's strategic partnership with the CCSSO, and attracted 18 state leadership teams to Washington, D.C., in September 2007.

Highlighted Resources on the Web

The NSRC **www.nsrconline.org** home page and events page continue to evolve. The new presentation of these pages more closely aligns with the NSRC's Theory of Action—allowing users to match NSRC services to their specific needs by showing where NSRC leadership development, teacher training, and other service events fall in the reform continuum (see pages 12–13). The Web site incorporated Google search, allowing full site indexing and improving content access, and began offering online registration with its fall events schedule.

Work continued on testing the Electronic Literacy Supplement to the NSRC's *Properties of Matter* module. The middle-school-focused Web site was supplemented with quizzes that allow students to independently test their concept knowledge and receive feedback as they work through the material online. This experience will help inform our major site overhaul planned in 2009.

Engaged Educators by Exhibiting at Conferences

The NSRC's Communications and Publications Division exhibited at the March 2007 National Science Teachers Association National Conference on Science Education in St. Louis, Missouri, and at the November 2007 Smithsonian Teacher's Night at the National Air and Space Museum on the National Mall. The exhibits engaged more than 1,000 teachers and school administrators.

Looking Ahead

During 2008, the NSRC plans to build leadership awareness and capacity in regions and states that are beginning to implement strategic plans for reform. The NSRC BASE Center will host targeted conferences to deepen state and regional leaders' understanding of research-based science education practices. In addition, the NSRC will continue to build leadership capacity nationwide with national "Changing the Course of Science Education" conferences during 2008, including one targeted to leaders from scientific and engineering fields.

TRANSFORMING PROGRAMS IN STATES, REGIONS, AND DISTRICTS

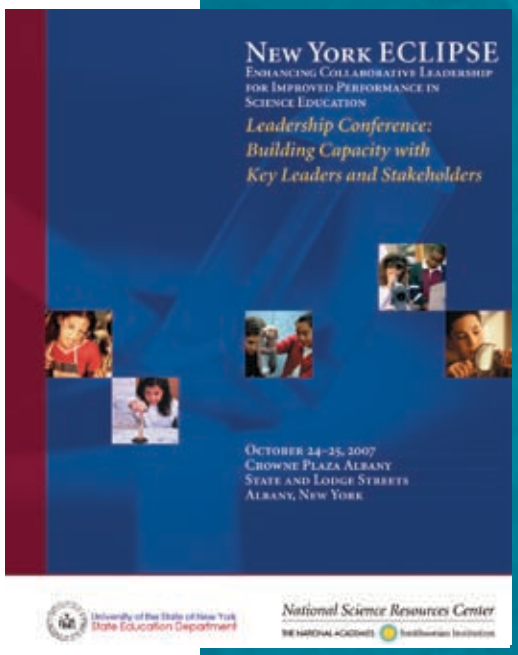
The NSRC helps school district leaders develop the expertise and support structures they will need to establish comprehensive and challenging K–12 science programs for all students. The NSRC assists in initiation of science education reform through strategic planning with district leadership teams. The next step in the process includes providing follow-up technical assistance in partnership with government, industry, the education community, and parents to help those districts establish, sustain, and continuously improve the infrastructure needed to support high-quality instruction for all students.

Continued NSRC LASER Center Initiatives

In 2007, the Leadership and Assistance for Science Education Reform (LASER) Center continued working on several national, state, and urban initiatives. It continued initiatives in the five largest urban school districts in New York, in New Orleans, in Houston, and throughout North Carolina to provide research-based products and services to assist their school districts in initiating, implementing, and sustaining effective science programs for all students and to build leadership capacity and sustainability. The LASER Center also continued its national programs aimed at school districts from across the United States and in some foreign countries to guide school district leadership teams through the process of developing tailored strategic plans for initiating research-based science programs.

Produced New York ECLIPSE and BOCES Events

On March 21, 2007, the LASER Center organized and produced a day-long New York Enhancing Collaborative Leadership for Improved Performance in Science Education (ECLIPSE) Science Curriculum Showcase 2007 in Albany, for school districts' leadership teams representing Buffalo, Rochester, Syracuse, Yonkers, and New York City. The event also included the Capital Region Board of Cooperative Educational Services (BOCES), the Onondaga-Cortland-Madison BOCES, the Washington-Saratoga-Warren-Hamilton-Essex BOCES, and the Western Suffolk BOCES. Leadership teams learned about research, the nature of inquiry, and the characteristics of effective research-based instructional materials that can be used to develop a comprehensive K–12 science education program in their communities. The LASER Center also developed and delivered a New York ECLIPSE Science Curriculum Toolkit for assisting district leaders in selecting and effectively pilot testing research-based curriculum materials.



The LASER Center also organized and delivered an institute and a conference in Albany during 2007 for leadership teams representing the same school districts and BOCES as the March 21 event. At the New York ECLIPSE Strategic Planning Institute: Developing a Tailored Science Education Strategic Plan, held from June 25 to 29, leadership teams learned about research and best practices for establishing a systemic approach needed to effectively implement and sustain research-based science programs for all K–12 students. The LASER Center provided assistance and expertise that resulted in each New York leadership team developing a five-year strategic plan for reforming their districts' K–12 science education program.

And on October 24–25, at the New York ECLIPSE Leadership Conference: Building Capacity with Key Leaders and Stakeholders, leadership teams examined the progress they were making in implementing their strategic plans; exchanged effective resources and expertise for advancing their work; and discussed strategies for building partnerships with organizations representing education, government, and business. The LASER Center also provided products and services for building the leadership capacity to sustain the effective implementation of research-based science education programs.

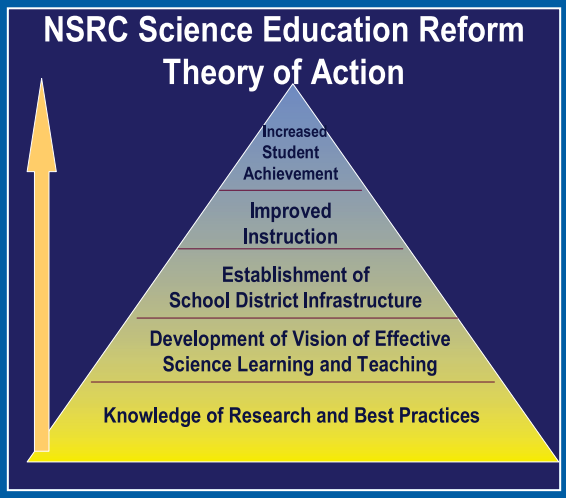
THE NSRC BLUEPRINT FOR K-12

NSRC Theory of Action

The NSRC's Theory of Action, depicted below, advocates that the foundation of all reform is knowledge of research and best practices that should be used to develop a shared vision and an infrastructure for reforming science education programs for all students in districts and states.

The design of the theory and the associated work conducted by informed leaders to implement it should reflect research in the following areas:

- Development of science concepts
- Learning and teaching
- Assessment of learning
- Evaluation of programs
- Systems thinking
- Accountability structures
- Introduction of interventions and the process of change
- Scaling-up principles
- Incentives
- Methods for ensuring sustainability



NSRC Stage

Systemic reform requires leaders with technical knowledge of the fiv
Science Education Systemic Reform Model at right), as well as acces
the various stages of reform. During the past two decades, the NSR
organizations and individuals to assist districts, regions, states, and
these stages becomes increasingly more complex, requiring more tir
Stages of Reform and related work is provided below.

Increasing Time, Resources, and Complexity

Stages	Goals
Assessing Strengths, Opportunities, and Challenges	Assess the landscape to understand the context of work.
Building Awareness for Reform	Develop a shared vision of the importance of an effective science and technology education needed to prepare informed citizens and a scientifically literate workforce.
Initiating Reform	Provide leaders with the expertise and support needed to develop a five-year strategic plan for establishing a comprehensive and challenging K–12 science program of instruction for all students in their districts. The plan will benchmark with exemplary U.S. districts that have significantly improved student achievement, attitudes, and skills in science.
Implementing Reform **Beginning** **Middle** **Advanced**	Provide a system of technical assistance to schools and districts in partnership with government, industry, the education community, and parents. This ongoing assistance will help school districts to establish, sustain, and continuously improve the infrastructure needed to support high-quality instruction for all students for a decade and longer.
Building Leadership Capacity	Develop a corps of informed leaders representing the scientific and education communities who have knowledge and expertise
Evaluation	Establish and monitor performance measures. Report progress and impact data
Dissemination	Provide the public and other stakeholders with information about the program and its impact

2 SCIENCE EDUCATION REFORM

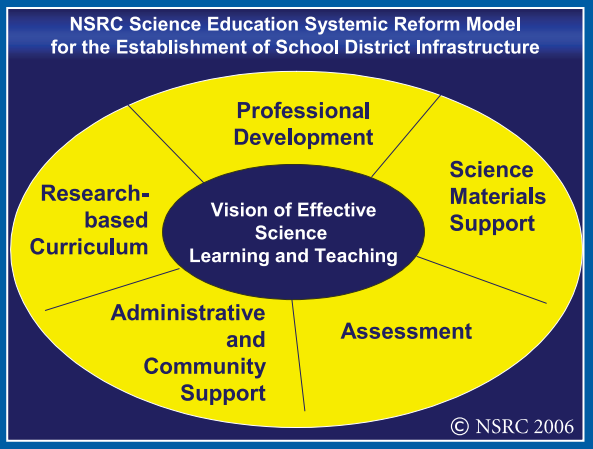
es of Reform

ve essential components of science education reform (see the NSRC ss to products and services that can be used to move leaders through C has developed differentiated products and services with many countries in moving through these stages. The work for each of me, resources, and technical expertise. A general outline of the

General Description of Work	
Analyze the strengths, weaknesses, opportunities, and threats (SWOT). Monitor and document needs, challenges, and development of assets annually.	
Plan and conduct annual awareness events for school, university, and business and other community leaders, including parents. The events are designed to help leaders with a stake in science education develop a vision of effective science learning and teaching and to understand the system that is needed to support this vision.	
Annually identify and recruit of school district leadership teams to attend the NSRC Leadership Development and Science Education Strategic Planning Institutes. The institutes will prepare the teams to take leadership in establishing systemic reform programs based on research and promising practices.	6 Months
Develop and implement academies and other events and services needed to provide school district administrators and teachers with the technical assistance required to implement research-based programs. Areas of assistance needed include the following: • Pilot testing and development of curriculum frameworks; • Differentiated professional development programs for moving teachers from being novice to developing competency; • Strategies for assessing student learning in science; • Cost effective and efficient materials support systems to supply teachers with equipment and supplies needed to teach science; • Strategies for integrating mathematics, reading, and writing within the context of learning and teaching science; • Programs for educating administrators and community leaders to establish, continuously improve, and sustain effective science programs in their communities, including NSRC Advanced Leadership Development Institutes; • Ongoing technical assistance services that regions and states need to provide districts to help them sustain their efforts.	1 Year
Design annual program activities that will systematically cultivate a corps of 100 or more teachers, school administrators, scientists, and other community officials to become leaders who can conduct institutes, academies, and workshops as well as become advocates for reform.	
Develop a formative and summative evaluation program to assess the quality of program activities, progress being made in accomplishing goals, and assessing impact on student achievement.	
Disseminate information to leadership groups and interested stakeholders.	5–7 Years and Longer

NSRC Science Education Systemic Reform Model

One critical aspect of the NSRC Theory of Action is the establishment of an infrastructure needed to support learning. To establish an effective infrastructure, leaders need to have a shared vision of effective science learning and teaching and implement five essential components simultaneously. The NSRC has defined this system as the NSRC Science Education Systemic Reform Model, which is illustrated below.



Components of the system include:

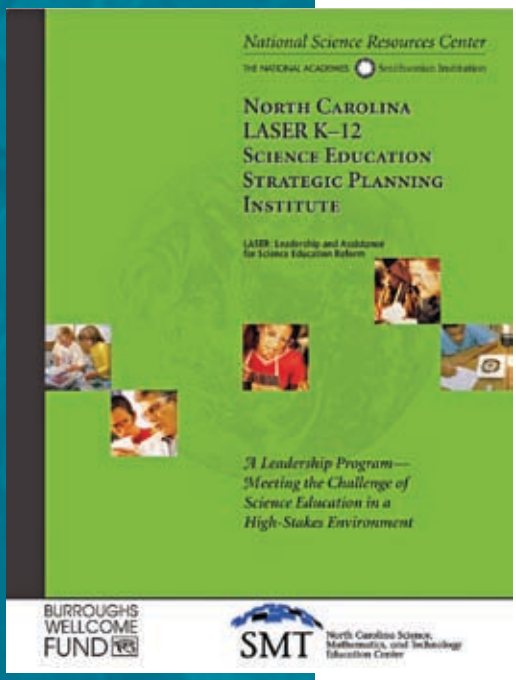
1 A curriculum framework and comprehensive research-based K–16 science instructional program based upon research findings.

2 Teachers participating in professional development programs that are aligned with current research about adult learning and designed to move teachers from novice to expertise.

3 Assessments that are aligned with research about how students learn and that elicit meaningful feedback about student learning.

4 Cost-effective and efficient systems that supply resources and materials to teachers.

5 Administrative and community leaders providing long-term support for research-based science learning and teaching.



Launched Statewide Science and Mathematics Education Initiative

In 2007, the LASER Center launched a statewide initiative to assist North Carolina school districts in initiating, implementing, and sustaining effective K–12 science programs for all students. During the first year of this initiative, the NSRC accomplished several major goals outlined in its plan. Working with the North Carolina Science, Mathematics, and Technology Education Center (NCSMT), the NSRC planned and produced the first of five strategic planning institutes for 18 North Carolina school district leadership teams. This process included statewide and school district needs assessments, which assisted the partners in determining strategies and short- and long-term action plans. In addition, the NSRC supported efforts to build awareness of this initiative, to pursue deeper relationships with stakeholders in North Carolina, such as the James B. Hunt, Jr., Institute for Educational Leadership and Policy, and to identify ways in which it could provide technical assistance to NCSMT in the future.

Supported Greater New Orleans Science Education Initiatives

To strengthen the New Orleans Regional K–12 Science, Technology, Engineering, and Mathematics (STEM) Education Initiative, the LASER Center began working on the development of a New Orleans Regional STEM Advisory Board. In January 2007, the first Advisory Board Meeting was held in New Orleans, and two more meetings were held in May and September. As further support, the Center held Building Awareness for Science Education events in the Gulf Coast Region in January and May 2007, which approximately 80 community leaders, business leaders, educators, and school administrators attended.

The NSRC and New Orleans Public Schools (NOPS) joined forces to produce a Curriculum Showcase in New Orleans for teachers and administrators in February 2007 and a Summer Science Institute for teachers and principals in June. Also in 2007 the NSRC distributed approximately $60,000 of science instructional units to NOPS teachers and principals, and hosted 18 NOPS teachers at the July 2007 Smithsonian/NSRC Professional Development Academies held in Washington, D.C.

Held Houston Science Education Leadership Meetings

In November 2007, the NSRC and Houston Independent School District (HISD) held a Principals Networking Meeting: Building Awareness for Science Education Symposium for Key Stakeholders. The meeting was attended by 77 principals, school administrators, and community leaders, 70 percent of whom were principals. The NSRC and HISD also held a Leadership Planning Meeting in October 2007 to inform 33 community members, educators, and school administrators of the HISD's strategic plan for science education reform.

Conducted National Strategic Planning Institute

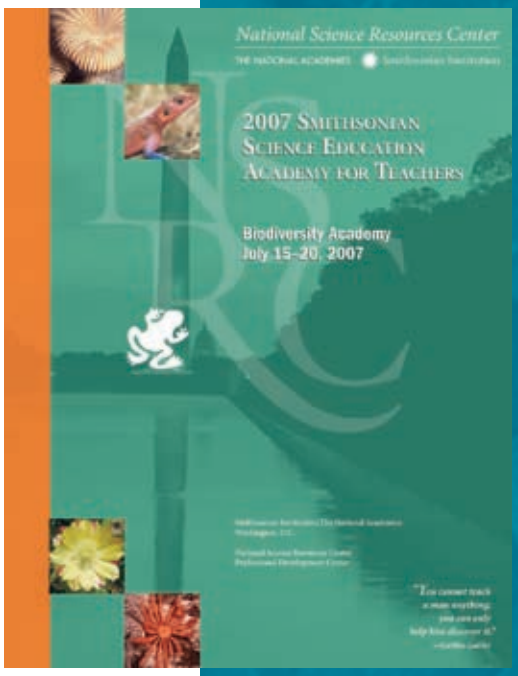
On July 15–20, 2007, the NSRC conducted a National K–8 LASER Science Education Leadership Development and Strategic Planning Institute, where nine district leadership teams from seven states and two teams from Argentina and Germany developed strategic plans to reform their science education programs.

IMPROVING THE QUALITY OF SCIENCE TEACHING

Principally through its Professional Development Center (PDC), the NSRC continues to provide opportunities for the professional growth of science teachers and teacher-leaders.

Expanded the Smithsonian Science Education Academies for Teachers

During 2007, two new academies were added to the Smithsonian Science Education Academies for Teachers (SSEATs). The PDC added the *Electricity and Magnetism* and *Ecological Field Studies* academies to the original *Energy and Motion* and *Biodiversity* academies. Support from Baltimore Gas and Electric (BGE), Shell Exploration & Production Company, and Dow Chemical enabled 94 teachers from 23 states, Canada, Mexico, and Korea to attend these award-winning events, which leverage the resources of the Smithsonian in the support of science teacher professional development. Eighteen of the participants were from New Orleans.



The SSEAT academies demonstrate important cooperation among Smithsonian units. The PDC's Smithsonian partners in 2007 were the National Museum of American History; the National Museum of Natural History; the National Air and Space Museum on the National Mall; the National Air and Space Museum's Steven F. Udvar-Hazy Center in Chantilly, Virginia; the Smithsonian Environmental Research Center in Edgewater, Maryland; the National Zoological Park in Washington, D.C.; and the Zoo's Conservation and Research Center in Front Royal, Virginia. As the academies grew in size and scope, the PDC also developed cooperative relationships with organizations outside of the Smithsonian, including the National Institute of Standards and Technology, BGE, the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center, BP Solar, and the Historical Electronics Museum.

Worked with Instructors in the District of Columbia

The NSRC's work with the DC Children and Youth Investment Trust Corporation's summer science program entered its third year in 2007. The PDC provided its instructors with training in the use of the Science and Technology for Children® curriculum materials, which form the core of this program.

Continued Support of University-Based In-Service Teacher Programs

The PDC's support of teachers adopting the inquiry-based approach to teaching science entered its third year through its cooperation with Bristol-Myers Squibb Centers for Science Teaching and Learning at Rider and Montclair State universities in New Jersey. In 2007, the PDC provided in-depth professional development workshops to more than 70 elementary and middle school science teachers at no cost to the teachers. Support for the PDC's program of workshops for middle school science teachers using the Science and Technology Concepts for Middle Schools™ curriculum and additional events promoting inquiry-based science was provided by Bristol-Myers Squibb.

Hosted Workshops for Pre-Service Science Teachers

For the third consecutive year, the PDC partnered with the NASA Langley Research Center's Office of Education and Norfolk State University's School of Science and Technology to provide practical hands-on workshops using lessons from the NSRC's curriculum for pre-service science and technology teachers. The audience at this conference was composed of approximately 750 undergraduate students and faculty members from historically black colleges and universities, Hispanic-serving institutions, and tribal colleges and universities.

Held First Geneticist-Educator Network of Alliances (GENA) Workshop

The GENA network is a National Science Foundation (NSF)-funded partnership among the American Society of Human Genetics, the Genetics Society of America, the National Association of Biology Teachers, and the NSRC. The partnership uses the broad theme of genetics to form long-term collaborations between educators and scientists and a sustainable infrastructure to support meaningful outreach by scientists in the high school science classroom.

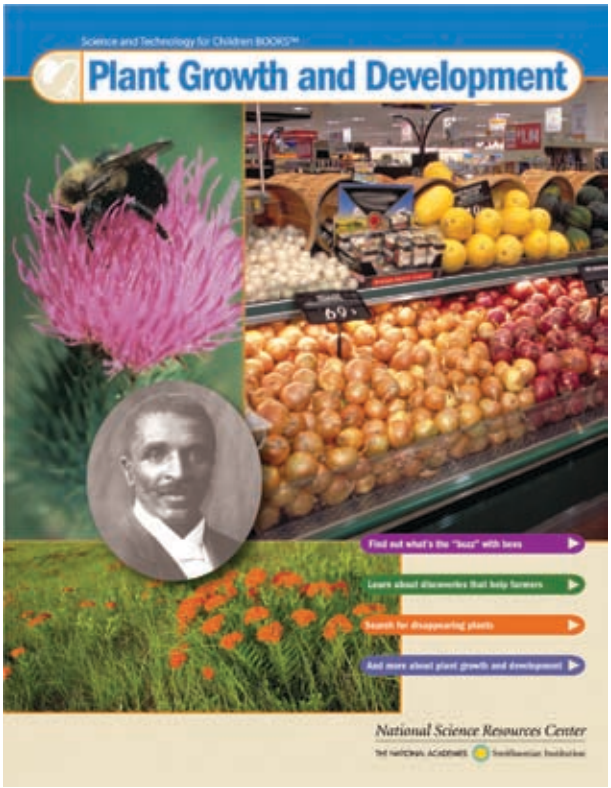
The GENA project provides the partnering scientific societies involved with tools to instruct, facilitate, and measure the meaningful engagement of STEM faculty members in secondary science education. In August 2007, the project conducted its first workshop, which brought together 13 pairs of teachers and university faculty from eight states, and exposed them to three days of pedagogical training contextualized to teaching genetics in the high school environment.

DEVELOPING AND DISSEMINATING NEW RESEARCH-BASED TEACHING RESOURCES

Research-based science instructional materials are the foundation of effective science programs. The NSRC has spent nearly two decades developing and updating a comprehensive science program for K–9 schoolchildren (the STC program). Additionally, the NSRC disseminates other exemplary science curricula that meet the highest standards of research and development.

Released New Children's Books

The NSRC has reprinted 11 of the 12 children's books for fourth through sixth graders originally published in 2004. These books provide a strong nonfiction literacy complement to the NSRC's upper elementary curriculum units. All were developed in close consultation with a nationally respected reading specialist. All are unique in that many of the articles in each book feature Smithsonian scientists, research, and collections. Use of these books in the classroom links science reading selections with other areas of the curriculum, especially history, social studies, and language arts.



Two of the four titles for third-graders, *Rocks and Minerals* and *Plant Growth and Development,* were released during 2007 with two others, *Sound* and *Chemical Tests,* in final stages of preparation at the end of the year. Plans are moving ahead for production of books for K–2 students, as well as four middle-grade books during the next three to five years.

Showcased Research-Based Science Instructional Materials

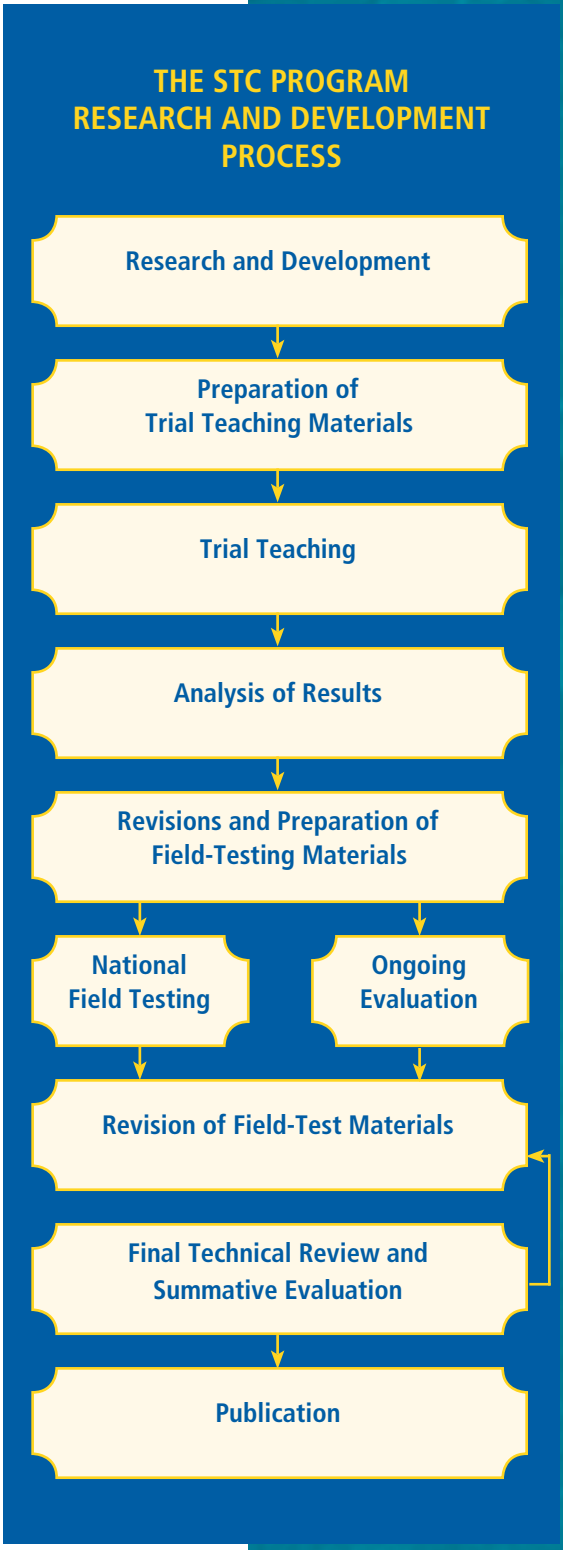
Under its original grant from NSF, the NSRC's LASER Center partnered with other NSF-funded projects and curriculum developers to disseminate curricula that exemplified best practices of learning and teaching. Although the LASER Center is no longer supported by NSF, the NSRC ensures that all materials it showcases meet exacting criteria, as outlined in the table below

Using these criteria, the NSRC held a curriculum showcase in Albany, New York, to help leadership teams from the five largest school districts in New York State (New York City, Buffalo, Rochester, Syracuse, and Yonkers) review and evaluate research-based science instructional materials. Administrators, teachers, and community leaders from all around the state attended the showcase.

The NSRC also hosted—with generous support from the Merck Institute for Science Education—the Ninth Annual Showcase of New Science Education Resources at the March 2007 National Science Teachers Association national conference in St. Louis, Missouri. The showcase introduced some 200 leaders from around the country to new publications produced by leading educational organizations.

NSRC Criteria for Showcasing Science Curriculum Materials

NSRC Criteria for Showcasing Science Curriculum Materials
Does the material address the important goals of elementary and middle school science teaching and learning?
Does the material focus on inquiry and activity as the basis of learning experiences?
Are the modes of instruction developmentally appropriate?
Is the science content accurate and current, and does it lead to an understanding of basic principles?
Is the material interestingly presented, and does it facilitate understanding?
Is the material well organized, and is it easy and safe for both teacher and students to use?
Is the material free of cultural, racial, ethnic, gender, and age bias?



NSF-Supported Curriculum Programs That Meet the NSRC's Criteria

Biological Sciences Curriculum Study of Colorado Springs, Colorado, publishes the K–16 BSCS science curricula.

Lawrence Hall of Science at the University of California, Berkeley, publishes the K–12 Full Option Science System (FOSS) and the K–6 Science Education for Public Understanding Project (SEPUP).

Carolina Biological Supply Company, Burlington, North Carolina, publishes the K–6 Science and Technology for Children (STC®) and the 6–8 Science and Technology Concepts for Middle Schools (STC/MS™) curricula.

Administration and Finance

Transparent management and a stable funding base for NSRC programs and operations continue to be the primary goals of the Finance and Administration Division. These values help the organization maintain and expand its portfolio of products and services for science education. Gifts, grants, fee-for-service revenues, curriculum royalties, publication sales, and contributions from the National Academies and the Smithsonian Institution provide the NSRC's funding. This base and the NSRC's commitment to careful stewardship of all its resources will allow the organization to grow during the years to come.

MANAGEMENT INITIATIVES

Invited to Join Smithsonian Science Executive Committee

Recognizing the important and growing role of science education within the mission of the Smithsonian Institution, the heads of the Smithsonian science unit museums and research facilities asked the NSRC Executive Director, Sally Goetz Shuler, to join the Institution's Science Executive Committee. The invitation gives the NSRC an opportunity to share experiences and provide input during pan-institutional science discussions.

Expanded Internship Program

During fiscal year (FY) 2007, the NSRC provided challenging internships for eight high school and college students. The students received mentoring from the NSRC's professional staff and contributed significantly to the achievement of NSRC goals.

NSRC QUASI-ENDOWMENTS

The NSRC feels strongly that it must ensure its stability and longevity. In 2004, the NSRC established a quasi-endowment at the National Academies to generate funding for core operations and development activities. With a goal of reaching $10 million by 2010, the NSRC deposits $500,000 each year. The growth of this quasi-endowment is shown in Table. 1. FY 2007 brought an additional $726,000 in interest, bringing the year-end value to $6.47 million. Projections at 8% interest show the NSRC reaching its goal early in 2011.

Table 1. Quasi-Endowment at the National Academies

Calendar Year	Beginning Balance	Deposits	Interest Earned	Withdrawals	Ending Balance
Actual					
2004	$0	$3,395,238	$383,843	$0	$3,779,081
2005	3,779,081	584,106	444,294	0	4,807,481
2006	4,807,481	500,000	929,762	0	6,237,243
2007	6,237,243	507,130	726,904	(1,000,000)	6,471,276
Projected					
2008	6,471,276	500,000	557,702	0	7,528,979
2009	7,528,979	500,000	642,318	0	8,671,297
2010	8,671,297	500,000	733,704	0	9,905,001
2011	9,905,001	500,000	792,780	(495,250)	10,702,531
2012	10,702,531	500,000	853,392	(535,127)	11,520,796

The Smithsonian quasi-endowment continues to grow. It is projected to reach $3.7 million at 8% interest by 2012, as shown in Table 2.

FY 2007 saw the opening of a third quasi-endowment at the Smithsonian Institution with a total of $2 million. The Burroughs Wellcome Fund generously provided a gift of $1 million to be matched with NSRC funds from the quasi-endowment at the National Academies. Interest is expected to exceed $100,000 annually and will support an NSRC Science Education Strategic Planning Institute to be held annually in North Carolina. A shortfall in interest less than the required $100,000 will be provided by other NSRC revenues. Earnings from this new account will not only support K–12 program activities in North Carolina public schools over a 10-year span, but will also build a program reserve fund. Table 3 shows projections at 8% interest to $2.7 million in the quasi-endowment's 10th year.

Table 2. Quasi-Endowment at the Smithsonian Institution

Fiscal Year	Beginning Balance	Deposits	Interest Earned	Ending Balance
Actual				
2006	$0	$56,500	$1,899	$58,399
2007	58,399	11,300	2,904	72,604
Projected				
2008	72,604	150,000	17,808	240,412
2009	240,412	300,000	43,233	583,645
2010	583,645	600,000	94,692	1,278,336
2011	1,278,336	1,000,000	182,267	2,460,603
2012	2,460,603	1,000,000	276,848	3,737,452

Table 3. North Carolina Public Schools K–12 Science Education Initiative Quasi-Endowment at the Smithsonian Institution

Fiscal Year	Beginning Balance	Deposits	Withdrawal	Interest Earned	End-of-Year Balance
Actual					
1/2007–9/2007*	$0	$2,000,000	$100,000	$41,598	$2,041,598
Projected					
10/2007–9/2008	2,041,598		$100,000	155,328	2,096,926
10/2008–9/2009	2,096,926		100,000	159,754	2,156,680
10/2009–9/2010	2,156,680		100,000	164,534	2,221,214
10/2010–9/2011	2,221,214		100,000	169,697	2,290,911
10/2011–9/2012	2,290,911		100,000	175,273	2,366,184
10/2012–9/2013	2,366,184		100,000	181,295	2,447,479
10/2013–9/2014	2,447,479		100,000	187,798	2,535,277
10/2014–9/2015	2,535,277		100,000	194,822	2,630,100
10/2015–9/2016	2,630,100		100,000	202,408	2,732,508

*Account was established midway through the fiscal year. Therefore, earnings are less than the 8% projection.

FISCAL YEAR 2007 OPERATIONS

The NSRC received $5.6 million for FY 2007 operations from several sources, as shown in Table 4: the Smithsonian Institution, the National Academies, corporations, private foundations, individuals; fees from school districts; royalties from the sale of its curriculum materials; and revenues from the sale of its children's books.

Operations

The NSRC's 2007 revenue increased by 40%, growing from $3.97 million to $5.56 million to support operations. Figure 1 shows the sources of funding and allocation of resources. This increase in revenue allowed us to place $1.56 million into our quasi-endowments. Administrative oversight and financial operations were supported by $784,000. The Communications and Publications Division was supported with $81,000 from Smithsonian Trust funds and $494,000 from publications revenues. Federal funds no longer support this effort. The Development Division used $75,000 from the royalty fund at the National Academies to support staff salaries and related expenses.

NSRC Centers of Excellence

The NSRC created a new Center of Excellence in 2007 to inform and engage a broad network of leaders in the first steps of establishing exemplary K–16 science education programs throughout the United States. *The NSRC's Center for Building Awareness of Science Education* was supported by $56,000 in gifts and nongovernment grants and $24,000 from the royalty fund at the National Academies.

The LASER Center received a total of $1,707,000 in gifts, grants, and registration fees in FY 2007. Gifts from corporations and foundations included $500,000 from the Shell Exploration & Production Company for use in FY 2006 and FY 2007, $75,000 from Bristol-Myers Squibb, and $30,000 from the Merck Institute for Science Education. The LASER Center continues work on a $70,000 grant from ASSET, Inc., for strategic planning services received in 2006. Finally, the LASER Center started an 18-month, $606,000 contract with the New York State Education Department. The Burroughs Wellcome Fund invested in the LASER Center with a $1 million gift to support program activities in the North Carolina public schools. The gift was placed in a quasi-endowment at the Smithsonian Institution and was matched by funds from the NSRC's quasi-endowment at the National Academies for a total of $2 million. Interest is expected to exceed $100,000 annually and is supporting an annual NSRC Science Education Strategic Planning Institute in North Carolina. Should the interest earned be less than the required $100,000, the NSRC will provide the balance from other NSRC revenues. (Section continues on page 24.)

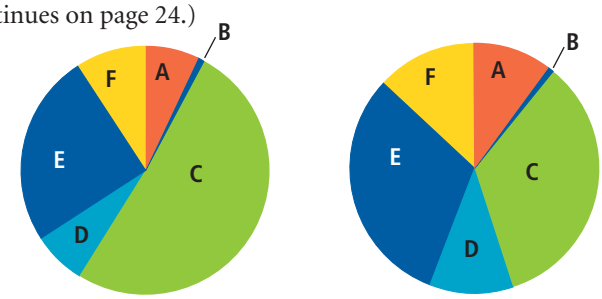


Figure 1. Sources of Funding

	Actual FY 2007		Projected FY 2008	
A. Smithsonian General Trust	$413,793	7%	$570,400	10%
B. Smithsonian Indirect	65,422	1%	66,000	1%
C. Gifts and Grants	2,811,006	51%	1,954,610	34%
D. Event Fees	387,456	7%	661,871	11%
E. Sale of Curricula	1,392,327	25%	1,824,120	31%
F. Sale of Publications	494,294	9%	755,598	13%
Total	**$5,564,298**	**100%**	**$5,832,599**	**100%**

Table 4. NSRC Operations and Programs (in thousands)

NSRC Core Operations	FY03 ACTUAL	FY04 ACTUAL	FY05 ACTUAL	FY06 ACTUAL	FY07 ACTUAL	FY08 PROJECTED
NSRC Savings: Endowment Deposits						
Smithsonian Institution						
Deposits for Smithsonian Institution Endowment	N/A	N/A	N/A	57	14	7
Deposits for Burroughs Wellcome Fund Endowment	N/A	N/A	N/A	N/A	1,042	169
National Academies						
Royalty Fund Deposit for NAS Endowment	N/A	3,395	584	500	507	500
Subtotal	**$ –**	**$3,395**	**$584**	**$557**	**$1,563**	**$676**
Administrative Oversight and Financial Operations						
Smithsonian Institution						
Federal	N/A	N/A	146	N/A	N/A	N/A
General Trust	279	292	305	469	333	477
Indirect Cost Budget	410	466	66	87	65	66
National Academies						
Indirect	81	80	80	80	N/A	N/A
Royalty Fund	20	68	330	431	385	438
Subtotal	**$790**	**$906**	**$927**	**$1,067**	**$783**	**$981**
Communications and Publications Division						
Smithsonian Institution						
Federal	167	171	141	78	N/A	N/A
General Trust	N/A	N/A	N/A	83	81	93
Indirect	59	N/A	N/A	N/A	N/A	N/A
National Academies						
Royalty Fund	162	342	296	N/A	N/A	N/A
Sale of Publications	N/A	N/A	N/A	575	494	756
Science and Technology for Children® Curriculum Revisions						
National Academies						
Royalty Fund	193	110	N/A	N/A	N/A	N/A
Science and Technology for Children BOOKS™ Development Project						
National Academies						
Royalty Fund	500	N/A	N/A	N/A	N/A	N/A
Subtotal	**$1,081**	**$623**	**$437**	**$736**	**$575**	**$849**
Development Division						
National Academies						
Royalty Fund	99	105	110	146	75	164
Subtotal	**$99**	**$105**	**$110**	**$146**	**$75**	**$164**
Total Support	**$1,970**	**$5,029**	**$2,058**	**$2,506**	**$2,996**	**$2,670**

Table 4. NSRC Operations and Programs (in thousands) *continued*

NSRC Centers of Excellence	FY03 ACTUAL	FY04 ACTUAL	FY05 ACTUAL	FY06 ACTUAL	FY07 ACTUAL	FY08 PROJECTED
NSRC Building Awareness for Science Education (BASE) Center						
Smithsonian Institution						
Gifts and Non-Government Grants	N/A	N/A	N/A	N/A	56	100
Event Fees	N/A	N/A	N/A	N/A	N/A	30
National Academies						
Royalty Fund	N/A	N/A	N/A	N/A	24	164
Subtotal	**$ –**	**$ –**	**$ –**	**$ –**	**$80**	**$294**
NSRC Leadership and Assistance for Science Education Reform (LASER) Center						
Smithsonian Institution						
Federal and State Grants	628	774	526	568	465	124
Gifts and Non-Government Grants	647	331	270	144	874	1,109
Event Fees	145	61	85	102	290	340
National Academies						
National Research Council Grant	N/A	N/A	N/A	N/A	N/A	N/A
Royalty Fund	N/A	N/A	N/A	N/A	78	55
Subtotal	**$1,420**	**$1,166**	**$881**	**$814**	**$1,707**	**$1,628**
NSRC Curriculum Development Center						
Science and Technology for Children® Curriculum Revisions						
National Academies						
Royalty Fund	376	199	N/A	N/A	N/A	N/A
Science and Technology for Children BOOKS™ Development Project						
Smithsonian Institution						
Gifts and Non-Government Grants	N/A	30	N/A	N/A	N/A	N/A
National Academies						
Kellogg Grant	N/A	N/A	50	N/A	32	18
Royalty Fund	N/A	360	65	111	117	205
Science and Technology Concepts for Middle Schools™ Curriculum Revisions Project						
National Academies						
Royalty Fund	N/A	N/A	N/A	100	99	193
Subtotal	**$376**	**$589**	**$115**	**$211**	**$248**	**$416**
NSRC Professional Development Center						
Smithsonian Institution						
Federal and State Grants	N/A	N/A	N/A	14	77	197
Gifts and Non-Government Grants	25	80	224	169	247	231
Event Fees	5	45	78	92	98	292
National Academies						
Kellogg Endowment Fund	149	N/A	N/A	N/A	N/A	N/A
Royalty Fund	300	200	100	N/A	107	55
Subtotal	**$479**	**$325**	**$402**	**$275**	**$529**	**$775**

Table 4. NSRC Operations and Programs (in thousands) *continued*

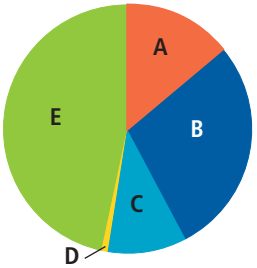
NSRC Centers of Excellence	FY03 ACTUAL	FY04 ACTUAL	FY05 ACTUAL	FY06 ACTUAL	FY07 ACTUAL	FY08 PROJECTED
NSRC International Division						
Smithsonian Institution	N/A	N/A	N/A	N/A	5	N/A
National Academies Gift	N/A	N/A	20	64	N/A	N/A
Subtotal	**$ –**	**$ –**	**$20**	**$64**	**$5**	**$ –**
NSRC Center for Research and Evaluation						
National Academies						
Royalty Fund	N/A	N/A	N/A	100	N/A	50
Subtotal	**$ –**	**$ –**	**$ –**	**$100**	**$ –**	**$50**
Total Program Support	**$2,275**	**$2,080**	**$1,418**	**$1,464**	**$2,569**	**$3,163**
Overall Total	**$4,245**	**$7,109**	**$3,476**	**$3,970**	**$5,565**	**$5,833**

The Professional Development Center received $422,000 in gifts, grants, and registration fees. Gifts from corporations and foundations included $100,000 from Bristol-Myers Squibb; $55,000 from the Dow Chemical Company Foundation; $19,100 from Baltimore Gas and Electric (BGE), a Constellation Energy Company; and $5,000 from the DC Children and Youth Investment Trust. The Center began the Geneticist-Educator Network of Alliances (GENA) grant, which is a $222,593, three-year collaborative project with the American Society of Human Geneticists and the National Association of Biology Teachers.

The Curriculum Development Center withdrew $117,000 from the NSRC royalty fund at the National Academies to support the Science and Technology for Children BOOKS™ development project and revisions to the Science and Technology Concepts for Middle Schools™ curriculum.

LOOKING FORWARD

In 2008, the NSRC projects revenues of $5.8 million for operations, a 4.5% increase over 2007 amounts (see Table 4). This information is presented in Figure 2, along with the projected resource allocation. The NSRC continues toward its long-term financial goals to provide sustainable resources for future support of core operations.



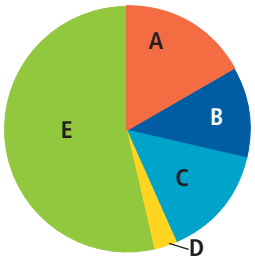


Figure 2. Allocation of Resources

	Actual FY 2007		Projected FY 2008	
A. Administrative Oversight and Financial Operations	$783,854	14%	$981,206	17%
B. Savings Deposit	1,562,802	28%	675,951	12%
C. Communications and Publications	574,846	10%	848,603	15%
D. Development	75,440	1%	163,908	3%
E. Programs	2,567,356	46%	3,162,931	54%
Total	**$5,564,298**	**100%**	**$5,832,599**	**100%**

2007 National Science Resources Center Staff and Consultants

NSRC Core Operations

DEVELOPMENT DIVISION

Staff

Stacy Armstrong
Director

Consultant

Michael Worth
Development Specialist

FINANCE AND ADMINISTRATION DIVISION

Staff

Sally Goetz Shuler
Acting Director
Kimberly Wayman
Procurement and Administrative Specialist

Consultant

Timothy M. Alt, Jr.
Acting Financial and Administrative Specialist

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Sally Goetz Shuler
Executive Director
Thomas Starke
Deputy Director
Yordanka Stefanova
Executive Assistant
Bernadette Pryde Hackley
Administrative Assistant

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Senior Editor/Writer
Heidi Kupke
Graphic Designer
Steven Madewell
Program Assistant
Susan Tannahill
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Jane Martin
Photo Editor

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Consultant

Devin Reese, PhD
Senior Program Officer
Fred A. Volk
Adjunct Professor Georgetown University

NSRC Centers of Excellence

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Staff

Claudia Campbell
Senior Research Associate

Consultants

Ian MacGregor
Senior Scientist
Annemarie S. Palincsar
Science Literacy Specialist
Susanna Hapgood
Science Literacy Specialist
Lynda DeWitt
Children's Science Writer
Toni Eugene
Children's Science Writer
Linda Harteker
Children's Science Writer
Audrey Huang
Children's Science Writer
Terry Jennings
Children's Science Writer
Devin Reese
STC® Revisions Project Director
Kitty Lou Smith
Curriculum Developer
Dane Toler
Curriculum Developer

BUILDING AWARENESS OF SCIENCE EDUCATION (BASE) CENTER

Staff

Jennifer Childress
Director

LEADERSHIP AND ASSISTANCE FOR SCIENCE EDUCATION REFORM (LASER) CENTER

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Mary Raucci
Program Associate

Consultants

Arlene Elrod
Senior Program Officer
Sue Neuen
Senior Program Officer
Brenda H. Terry
Senior Program Officer

PROFESSIONAL DEVELOPMENT CENTER

Staff

David Marsland
Co-Director
Henry Milne
Co-Director
Steven Madewell
Program Assistant

Consultants

Ron DeFronzo
Program Consultant, Science and Technology for Children® Elementary Curriculum
Linda Harteker
Editor
Bob Matthews
Program Consultant, Smithsonian Science Education Academies for Teachers (SSEATs)
Mary Cahill
Program Consultant, SSEATs
Kenna Mills Shaw
Program Consultant, Geneticist-Educator Network of Alliances Project
Kitty Lou Smith
Program Consultant, SSEATs
Sandra Sparkman
Program Consultant, SSEATs
Dane Toler
Program Consultant, SSEATs
Jane Martin
Photo Editor, Bristol-Myers Squibb Foundation Curriculum

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National Science Resources Center
901 D Street, SW, Suite 704B
Washington, DC 20024