

NSF Academies for Young Scientists (NSFAYS)

Program Solicitation

NSF 06-560



National Science Foundation

Directorate for Education & Human Resources

Division of Elementary Secondary & Informal Education

Letter of Intent Due Date(s) (required):

May 31, 2006

(due by 5 p.m. submitter's local time):

Full Proposal Deadline(s) (due by 5 p.m. proposer's local time):

June 30, 2006

REVISION NOTES

In furtherance of the President's Management Agenda, in Fiscal Year 2006, NSF has identified programs that will offer proposers the option to utilize Grants.gov to prepare and submit proposals, or will require that proposers utilize Grants.gov to prepare and submit proposals. Grants.gov provides a single Government-wide portal for finding and applying for Federal grants online.

In response to this program solicitation, proposers may opt to submit proposals via Grants.gov or via the NSF FastLane system. In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

NSF Academies for Young Scientists (NSFAYS)

Synopsis of Program:

NSF seeks to support NSFAYS Projects that will create, implement, evaluate, and disseminate effective models to attract K-8 students to, prepare them for, and retain them in science, technology, engineering, and mathematics (STEM) disciplines, leading to an increase in the pool of students continuing in STEM coursework in high school and considering careers in STEM fields. Models must be built on sustainable partnerships of formal and informal education providers, business/industry, and Colleges of Education. The Foundation solicits highly innovative projects that expose students to innovative out-of-school time (OST) learning experiences that demonstrate effective synergies with in-school curricula, and take full advantage of the special attributes of each educational setting in synergistic ways. Projects should structure highly motivational experiences for students while providing essential STEM preparation. Professional development for classroom teachers and OST education providers will be critical to the success of NSFAYS Projects. The portfolio of NSFAYS Projects is intended to explore a variety of implementation models in urban, rural and suburban settings representing diverse student populations. This portfolio of projects, taken as a whole, should inform NSF and the broader educational community of what works and what does not, for whom, in what settings. One NSFAYS Research and Evaluation Center will be funded to provide research and evaluation support for the NSFAYS program. It is anticipated that the Center will synthesize research emerging from the funded NSFAYS Projects and have responsibility for national dissemination of program models, findings, and best practices.

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Applicable Catalog of Federal Domestic Assistance (CFDA) Number(s):

- 47.076 --- Education and Human Resources

Award Information

Anticipated Type of Award: Other Grant NSFAYS Projects will be awarded as Standard Grants; one NSFAYS Research and Evaluation Center will be awarded as a Cooperative Agreement.

Estimated Number of Awards: 17 to 19 including 16 to 18 NSFAYS Projects (maximum funding \$800,000 each) and one NSFAYS Research and Evaluation Center (maximum funding of \$1,400,000).

Anticipated Funding Amount: \$14,000,000 pending availability of funds.

Eligibility Information

Organization Limit:

Proposals may only be submitted by the following:

- Four required partners for Project proposals include: (1) a school district, a consortium of schools within a district, or a consortium of districts; (2) business(es)/industry(ies) within the community; (3) a College of Education that prepares and/or certifies teachers; and (4) an informal science education organization (see Section II of this solicitation for further information).

There are no organizational limits for Center proposals.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is required. Please see the full text of this solicitation for further information.
- Full proposals submitted via FastLane:
 - Grant Proposal Guide (GPG) Guidelines apply
- Full proposals submitted via Grants.gov:
 - NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov Guidelines apply (Note: The NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: <http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf/>) To obtain copies of the Application Guide and Application Forms Package: click on the Apply tab on the Grants.gov website, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button.

B. Budgetary Information

- **Cost Sharing Requirements:** Cost Sharing is not required by NSF.
- **Indirect Cost (F&A) Limitations:** Not Applicable
- **Other Budgetary Limitations:** Other budgetary limitations apply. Please see the full text of this announcement for further information.

C. Due Dates

- **Letter of Intent Due Date(s) (required):**

May 31, 2006

(due by 5 p.m. submitter's local time):

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

June 30, 2006

Proposal Review Information Criteria

Merit Review Criteria: National Science Board approved criteria. Additional merit review considerations apply. Please see the full text of this announcement for further information.

Award Administration Information

Award Conditions: Additional award conditions apply. Please see the full text of this announcement for further information.

Reporting Requirements: Additional reporting requirements apply. Please see the full text of this announcement for further information.

TABLE OF CONTENTS

Summary of Program Requirements

- I. [Introduction](#)
- II. [Program Description](#)
- III. [Award Information](#)
- IV. [Eligibility Information](#)
- V. [Proposal Preparation and Submission Instructions](#)
 - A. [Proposal Preparation Instructions](#)
 - B. [Budgetary Information](#)
 - C. [Due Dates](#)
 - D. [FastLane/Grants.gov Requirements](#)
- VI. [NSF Proposal Processing and Review Procedures](#)
 - A. [NSF Merit Review Criteria](#)
 - B. [Review and Selection Process](#)
- VII. [Award Administration Information](#)
 - A. [Notification of the Award](#)
 - B. [Award Conditions](#)
 - C. [Reporting Requirements](#)
- VIII. [Agency Contacts](#)
- IX. [Other Information](#)

I. INTRODUCTION

Recognizing the importance of K-12 education as essential to the pathway to STEM careers, in November 2005, Congress required NSF to initiate a K-8 demonstration program “... to provide seed money for new projects with the goal of increasing the pool of individuals pursuing science, technology, engineering, and mathematics careers through programs that catalyze

and maintain interest of K-8 students in math[ematics] and science.” It asked that the projects stimulate interest and provide exciting, but challenging education experiences in mathematics and science that are continuous and seamless from initial contact and throughout high school, and that each project involve sustainable coalitions of industry/business, colleges of education, and educational agencies.” (House Report 109-272.) The National Science Foundation is directly responding to House Report 109-272 through the development of this solicitation, NSF Academies for Young Scientists (NSFAYS).

All too often, U.S. students become disengaged from science and mathematics at the elementary level, long before they have an opportunity to enroll in courses that lay the foundation for continued study in high school and pathways to STEM careers (National Science Resource Center, 1996). The NSFAYS program seeks to create innovative strategies that show promise for increasing the number of students continuing the study of STEM disciplines in high school and beyond through the development, evaluation, and dissemination of models that link students, teachers, educational agencies, and community partners. By providing a trajectory of experiences that capitalizes on the synergy of out-of-school time (OST) and classroom experiences and stimulates interest in mathematics and science, it may be possible to increase participation in study of these disciplines and hence the potential pool of workers in the STEM pipeline (Congressional Commission on the Advancement of Women and Minorities in Science, Engineering, and Technology, 2000).

Ideally, students should have access to a series of incremental STEM opportunities that begin at the elementary level and continue seamlessly as they progress through their secondary academic careers. Complementary enrichment activities that are supportive of school-based STEM curricula and standards offer opportunities for in-depth learning and engagement beyond the school day through participation in after-school, weekend, and summer programs. NSFAYS is intended to lay the foundation for such programs by providing funding for innovative OST experiences for students and teachers, grades K-8, that forge significant connections with and enhancements to in-school STEM programs.

Studies reveal that the longer student involvement in OST program activities, the greater the improvement in their academic performance, attitudes toward school, academic motivation, competence, educational aspirations, and college attendance (Little & Harris, 2003). OST programs can also offset a lack of school and community resources that limit student achievement by providing them access to enrichment activities, supplemental classroom experiences, and workforce skills (Miller, 2003). Even more encouraging is that middle school students are often highly engaged in their formal school programs if they participate in robust OST programs. The reports emphasize, however, the importance of well-run, high-quality OST programs and the importance of high attendance rates and multi-year participation levels in achieving positive outcomes (Chaput, Little, & Weiss, 2004; James Irvine Foundation, 2005; Miller, 2003). Academic enrichment programs, such as the ones called for by NSF Academies for Young Scientists, can thus become effective interventions for increasing the number of students in the STEM pipeline.

A primary goal of NSFAYS is to engage students in STEM learning while helping teachers develop and adopt strategies that effectively retain students’ interests in science and mathematics and help them prepare for secondary level coursework. Research has shown that a number of factors contribute to effective learning, including engagement, motivation, social interactions, and context. Recent STEM education studies highlight the importance of teachers drawing on combinations of traditional and more innovative instructional strategies to increase student learning. These strategies include instruction that directly addresses student preconceptions and/or misconceptions; ensures that learners have a repertoire of organized factual knowledge; engages students in hands-on, activity-based learning; incorporates metacognitive strategies; allows students to experience discrepant events or cognitive dissonance; and engages students in content specific discourse (Bransford, Brown, & Cocking, 2000; Minstrell & van Zee, 2000). Implementation of these instructional strategies may promote transfer of STEM knowledge from OST learning to the classroom and vice versa.

Through a well-selected portfolio of demonstrations projects, NSFAYS seeks to develop strategies that respond to local contexts that are representative of the nation. Several key variables must be addressed to ensure that appropriate strategies are incorporated to support underserved and underrepresented students. For example, demographic and sociocultural factors contribute to student learning and academic achievement, particularly in science and mathematics (Barton, 2000, 2001; Tobin, Roth, and Zimmerman, 2001; Oakes, 1990 a,b). Understanding the sociocultural contexts of schools is critically important and especially relevant to teaching and learning in STEM (Kozaitis, 1997, 2000; Lemke, 2001). Also, developing teachers’ cultural competency is important, although it is rarely incorporated into teacher professional development programs (Brown, 2004; Westby and Torres-Velasquez, 2000). NSFAYS encourages models that incorporate teacher cultural competency as a means to improve STEM interest, learning, and achievement.

Parental involvement is also critical to students’ academic success. Parents can be powerful mechanisms for sustaining a project if they are effectively engaged and believe the learning opportunities afforded their children to be valuable (Barton, Drake, Perez, St. Louis, & George, 2004; Silver, Berman, & Wilson, 2005). Parent-teacher interactions in ethno-culturally diverse school settings are often problematic due to lack of communication between the project staff and minority parents; misunderstandings regarding differences in goals; and negative views of minority parenting practices on the part of teachers (Bernhard, Lefebvre, Murphy, Kilbride, Chvd, & Lange, 1998). NSFAYS Projects should encourage participatory activities that support high-quality STEM teaching for parents and their children.

NSFAYS requires that communities augment school resources by extending STEM programming through sustained partnerships among schools, business, higher education, and institutions offering informal learning opportunities.

Partnerships with museums, science centers, and community-based organizations have been shown to be crucial to the success of a number of exemplary OST programs (e.g., ASTC, 2001; YouthALIVE!). Direct linkages between OST programs, school curricula, school administration, teachers, and parents also promote student success formally and informally. By incorporating proven elements such as parental involvement, teacher cultural competency, leveraging of resources, community partnerships, attention to demographic factors, and opportunities for teachers and students to participate in intensive out-of-school time STEM learning, NSFAYS should provide sustainable models that will continue to bring quality education experiences to participating youth well-after NSF funding ceases.

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II. PROGRAM DESCRIPTION

Program Goals and Objectives

The NSF Academies for Young Scientists (NSFAYS) program seeks to create, implement, evaluate, and disseminate effective and sustainable model projects for students and teachers. NSFAYS Projects should focus on contiguous grade bands, and simultaneously address the following three goals:

1. Increase student interest to pursue further study and potential careers in STEM disciplines through OST programs that stimulate motivation and provide rigorous learning experiences in out-of-school settings that complement school STEM programs. The synergy between OST and in-school learning environments should lead to increased conceptual understanding and appreciation of the role that the STEM disciplines play in the world.
2. Develop and/or deepen lasting partnerships that draw on financial and intellectual resources available to communities and that demonstrate the potential to sustain the project when NSF funding terminates. Partnerships of school districts, Colleges of Education, business/industry, and an informal science agency are required.
3. Involve STEM teachers within relevant K-8 grade bands who can serve as the bridge between OST and classroom learning in STEM disciplines. The NSFAYS experience should expose teachers to new and varied instructional strategies, as well as strengthen their understanding of STEM content and processes in ways that have positive impacts on the learning of their students.

The portfolio of funded projects is intended to represent varied student populations and community environments to inform the design of similar efforts in localities nationwide. From the portfolio of projects, NSF expects to answer the following questions:

- What models and strategies are most effective at helping K-8 students learn STEM disciplinary content in preparation for high school?
- What models and strategies are most effective at developing and retaining K-8 students' interests in learning STEM disciplines, and in encouraging them to consider or select STEM careers?
- What models and strategies are most effective in improving teachers' abilities to attract, prepare, and retain students in STEM, both in OST and formal classroom settings?

- What components and strategies show promise to make the supported models scalable to larger audiences and sustainable without NSF funds?

A. NSFAYS Projects

Project Characteristics

1. Rationale/Theoretical Framework/Logic Model

The proposal should provide a clear rationale for the goals and objectives and the project design. This should include the current research base on how students learn, how to implement effective professional development, how to structure effective partnerships, and how to attract students and motivate their interest.

Every project should be based on a theoretical framework, which is composed of a set of principles and relationships. The theoretical framework should be based on familiarity with the literature on strategies for in-school and OST education and how these can be combined in synergistic ways, with consideration of what has worked and what has not worked in the past. The project design should follow logically from the theoretical framework, and should reflect the strategies to be utilized to achieve these goals. In turn, the project activities should follow logically from those strategies. **The tight alignment of goals, theoretical framework, project design/strategies, activities and evaluation constitute the logic model of the project.** Proposals should reference the literature used to inform the project, but the inclusion of general bibliographies is discouraged.

2. Goals and Objectives

The proposal should list a manageable number of well-defined, measurable goals and objectives. These should address both achievement in and attitudes about STEM for the target audience.

3. Project Design

Each NSFAYS Project must include the following four partners:

- A school district, a consortium of schools within a district, or a consortium of districts whose teachers participate in the program and whose formal STEM curriculum at selected grade bands provides the foundation for OST learning activities. Key personnel from districts might also include administrators and academic/career counselors.
- Business(es)/industry(ies), within the community, capable of bringing substantial STEM capacity and other resources from outside of the school system(s).
- A College of Education that prepares and/or certifies teachers. Communities without a four-year college could partner with a community college that has programs articulating with four-year, pre-service teacher education programs. College/university departments in STEM disciplines are encouraged to collaborate with their Colleges of Education to contribute professionals with needed expertise in STEM content. NSF considers the inclusion of STEM content experts and educators critical to the success of NSFAYS Projects. NSF funding for stipends for participating pre-service teachers can be requested by NSFAYS Projects.
- An informal science education organization that, broadly defined, includes (1) science museums, zoos, aquaria, botanical gardens, wildlife reserves, and planetariums; (2) youth, community, and other OST organizations that have a STEM component, such as 4-H, Future Farmers of America, Scouts, YMCA/YWCA, and girls/boys clubs that can place STEM experiences in a social context; (3) federal, state, and local government agencies and major laboratory facilities; and (4) educational support organizations, such as Parent Teachers Association or organizations of STEM teachers and professionals (National Science Teachers Association, American Association of Physics Teachers, National Council for Teachers of Mathematics, etc.).

NSFAYS Projects must be **local in scope**, and that scope should be reflected in the project goals and objectives, in the target audience, and in the project design. While the impacts must be local, this does not preclude projects from reaching outside the local community to secure essential resources. NSFAYS Projects may be small, with a **minimum of 100 students**, but must demonstrate the potential to be **scaled up** to larger audiences. Participating students should receive a minimum of **150 contact hours of OST experiences** during the project. Some of the elements of the project should be generalizable, so that other communities with comparable resources could implement the major features of a project.

The proposal should clearly identify the **target audience** of students that will benefit from the project. It should also identify

the target audience of teachers who will receive resources and training, and other categories of personnel (e.g., pre-service teachers, STEM professionals, informal science educators, counselors, school administrators, parents) who might also serve meaningful instructional and/or support roles in the effort. For each audience, the proposal should articulate recruitment strategies and program activities focused on STEM learning objectives specific to that audience. Projects must select students in a **multi-year set of contiguous grades, for example, grades 5-8**. NSF requires that all projects provide **professional development** sessions that include personnel involved with planning and delivering student activities: participating teachers, informal educators, participating pre-service teachers, parents, and STEM professionals.

The STEM disciplines that will be the **content focus** of the project should be specified. These could be any of the science disciplines, technology, engineering design, mathematics, or some combination of these disciplines that would be mutually supportive. NSF especially encourages projects that integrate mathematics with other STEM disciplines.

Each NSFAYS Project should propose an **implementation model** that will be the basis for achieving the stated goals and objectives of the program. The elements of the model should include a full description of the partnership, the resources that each partner will contribute, and the unique role each partner will play. The NSFAYS program seeks true partnerships, with each member deeply involved in planning and operating the project, while making significant contributions to the project and receiving meaningful benefits. The history of established partnerships and their state of readiness to run the project should be documented. The project context should be described, including relevant characteristics of the community, existing community resources, and diversity of the relevant student population. A clear description should be presented on how the elements of the model are designed to work synergistically to achieve the goals and objectives.

In-School and OST Experiences

The development of synergies between OST activities and classroom-based STEM programs offered by the school system is considered central to every project. The OST activities must complement, extend, and supplement the in-school STEM curricula. These two types of activities should inform and improve one another. Knowledge and ideas generated by the NSF funded Center for Informal Learning and Schools (<http://www.exploratorium.edu/cils/>) and other efforts working at the interface of in-school and OST education should inform program design. In this regard, NSF directs proposers to the Centers for Learning and Teaching website at (<http://www.clnet.org>). It is expected that projects will include OST experiences during the academic year and summer.

The in-school programs of participating districts must be fully described, including the curriculum used, weekly time allotted to teaching the programs, and the professional development teachers have undergone in preparation to teach the curriculum. The curriculum should incorporate the elements of effective teaching and learning discussed in the introduction of this solicitation and the attached references, and its effectiveness at meeting national and state standards should be documented. The NSFAYS program will not support the purchase of curriculum materials for school use.

The OST activities are expected to be highly motivating experiences that will attract students to participate. Such events as team design activities, career exploration, STEM-related internet activities, student robotics clubs, visits to STEM professionals and their work environments, visits to colleges, student/parent activities, meaningful job shadowing, mentored research projects, and mock professional conferences can provide students with community and social contexts for learning STEM disciplines. Activities on environmental issues in the community could have students working side-by-side with STEM professionals to investigate and present findings through public forums or student newscasts. Involvement of high school students or undergraduate STEM majors and pre-service teachers to assist in activities can be a powerful tool to motivate younger students. This small set of examples illustrates some of the innovative possibilities sought in the NSFAYS program. The connections between the school curriculum and the OST activities should be clearly described. The NSFAYS program will contribute to the purchase of instructional materials for OST experiences.

Materials Development

While NSFAYS is not an instructional materials development program, it may be necessary to modify existing materials or to create new activities to support the level of innovation desired. Proposals should anticipate these needs and describe them clearly. Modest allocations for materials development can be requested as part of the full proposal request from NSF. Projects are strongly encouraged to seek out existing instructional materials, developed and tested in collaboration with STEM professionals and STEM educators. The Appendix at the end of this section provides a short list that illustrates the types of materials that might be used or modified for student activities.

Sustainability

Sustainability is another essential feature of NSFAYS Projects. NSF seeks knowledge about which project components can be sustained after the period of NSF funding. Such knowledge will help other communities initiate similar projects without NSF funding. NSF funds should be used to catalyze effective, long-term initiatives and/or broaden and deepen existing community efforts. The proposal should describe the specific components that might be sustained and how that might be

achieved. The ability of projects to sustain is believed to be related to the following features:

- Project activities are clearly shown to impact student interest and achievement in STEM, as well as strengthen STEM instruction.
- The creation of true partnerships in which all partners play a significant role in planning and running the project.
- All partners receive significant benefits from the project, so that it would be in their best interests to continue the project.
- All partners commit resources to the project at the highest levels of their organization and write letters of commitment.
- Leadership is broadly distributed throughout the partnership and within the individual partners so that the loss of a few key individuals will not cripple the project.
- Parents can be a powerful mechanism for sustaining a project if the parents have been involved and believe it is valuable for their children.

Transition to High School

The proposal should describe how the project will prepare students for a smooth transition to high school courses in STEM, preparing them academically and socially for high school expectations. NSFAYS experiences should be developed in light of a careful analysis of these expectations. For example, K-8 students might have experiences working with teams of high school students on laboratory experiments or design projects by visiting high school classrooms. While NSFAYS cannot support students beyond grade 8, it can support planning by high school teachers, academic/career counselors and administrators to facilitate the transition of students to grades 9-12. Furthermore, projects may need access to high school students who have participated in project OST activities in order for the projects to conduct evaluation and research on the impacts of the students' participation.

4. Recruitment

NSF is committed to increasing the participation of all students in STEM disciplines, especially from those populations underrepresented in STEM. While NSFAYS seeks to fund a variety of projects that, to the extent possible, represent the full diversity of our country, the participants for each NSFAYS Project should broadly reflect the diversity **within their community**. Proposals should clearly identify the diversity of the population to be served and document how special needs will be met. Recruitment plans for students will be especially important. NSFAYS Projects must reach out to girls, minorities, and persons with disabilities that are traditionally underrepresented in STEM educational pathways and professions, presenting plans with special, creative efforts for recruiting and retaining these populations.

Projects will need to recruit other populations, such as teachers, counselors, scientists, parents and others. Recruitment and retention plans for these groups should be described in the proposal. It is desirable for the personnel participating in the project to reflect the diversity of the community.

5. Work Plan

Each proposal should present an action plan with a timeline that clearly addresses the project goals and objectives and organizes the major activities of the project. As part of the overall work plan, proposals should also include a plan to manage the partnership, including meeting schedules, the decision-making and sharing processes, and plans for regular communication among and within the partners.

NSF expects to make awards with start dates in Fall 2006. Projects could use the next several months for start-up activities but should begin full implementation with student activities no later than January 2007. Start-up activities might include initial professional development, recruiting, gathering baseline student data for research and evaluation, team building, and focus sessions for students and parents to inform the project development. Student activities should continue through 2008. Evaluation and research should continue through the end of the projects in Fall 2009. The NSFAYS Research and Evaluation Center will continue for another six months to provide time and opportunity to aggregate the final data, complete the analysis, and present findings.

6. Research

Research and project evaluation should be separate components of each proposal, but they should be coordinated whenever possible. The budget for these two components combined should be 10 to 15% of the total project budget.

Each NSFAYS Project must carry out a modest research program to validate the theoretical framework on which the project model is based. While evaluation should measure the outcomes of the project, research should go deeper to determine the reasons those outcomes were achieved and validate or reject the principles of the theoretical framework. The proposal must list the research questions, and describe the methods, instruments, and analyses to be used to answer them. The individuals executing the research must be identified, along with their qualifications. NSFAYS Projects must agree to coordinate their research through, and share their results with, the NSFAYS Research and Evaluation Center (see Section II.B).

7. Project Evaluation

The plan for project evaluation should include formative (internal) and summative evaluation (external). It should include evaluation of student attitudes and beliefs about STEM as well as measures of achievement in STEM content in comparison to similar populations not impacted by the project. The plan should define the project's success, that is, the specific numerical outcomes that would document success in recruiting, preparing and retaining students in pursuing STEM careers and meeting the project goals. It should identify the measures, instruments, processes and analyses to be used to evaluate those outcomes. The evaluator should be identified in the proposal, and the evaluator's qualifications presented. It is desirable that evaluation be an integral part of the project plan from the start.

Projects must agree to cooperate with the NSFAYS Research and Evaluation Center (see Section II.B) that will aggregate data from the projects and form a learning community across projects.

8. Key Personnel

The proposal should list the key personnel, at least one from each partner, and their roles and responsibilities in the project. Each proposal should include all individuals that bring the requisite expertise needed to operate the project.

Biographical sketches: Biographical information (no more than two pages) must be provided for each senior person listed on the budget forms, including consultants and advisors. Include career and academic credentials, as well as e-mail and mailing address.

Each project must have an Advisory Board of major community stakeholders, STEM professionals, and educators to monitor and give guidance to the project, and to connect the project deeply within the community. Knowledge of, support for, and participation in the project should be broadly spread throughout the community. The proposal should identify the composition of the Board and its role in the project.

9. Dissemination

The national dissemination of NSFAYS program results will be the responsibility of the NSFAYS Research and Evaluation Center. Each NSFAYS Project should provide plans to publicize its activities widely within its community. In addition, any plans to present project results in professional journals or meetings should be included.

10. Prior NSF Support

Project personnel must provide a list of their previous NSF supported projects that pertain to the current proposal, provide evidence of the success of those projects, and explain how lessons learned inform the current proposal. Proposals may also include discussion of projects funded by other agencies that support the current project.

B. NSFAYS Research and Evaluation Center

Center Characteristics

NSF anticipates funding one award (as a cooperative agreement) for a Center to support the goals of this solicitation. The Center will advance the research and evaluation efforts of the projects, help projects align their goals and anticipated outcomes with the program goals, aggregate data and findings from the projects, synthesize those results, and promote national awareness of the models, methods, and research findings that result in students acquiring deeper understanding and more sustained interest in STEM fields. Although each project is local in nature and answers unique questions relevant to that local educational environment, the NSFAYS program, through the Center, will provide a more complete set of findings with national relevance.

It is expected that the lead organization for the NSFAYS Center will be an educational research and development organization or an institution of higher education. The successful proposer must have demonstrated capacity to conduct site-based research, synthesize findings, disseminate to multiple audiences, and manage a national center. It is expected that the lead institution will provide expert knowledge of K-8 STEM education, teacher education, classroom research, and OST education.

1. Goals and Objectives

The primary task of the Center is to synthesize the project outcomes and provide models, context for those models, and suggestions for addressing broader national goals. The Center will assist projects in disseminating models and findings, and report on program outcomes and approaches in appropriate forums. It will support dialog among Principal Investigators (PIs) by fostering activities such as web conferences, teleconferences, and other appropriate sessions and events, and have responsibility for national dissemination of program models, findings, and best practices.

2. Center Design

A Center proposal is expected to include a description of how it will work with NSFAYS PIs to identify effective strategies and successful models for stimulating K-8 students' interest in STEM and sustaining excitement and growth in STEM knowledge subsequent to the projects' activities. As part of its core mission, the Center should support research, evaluation, and dissemination activities. A national advisory panel should be formed to help guide this work.

- **Evaluation/Data Collection Support.** The NSFAYS Center is expected to provide information and data on the degree to which the NSFAYS program is meeting its goals: (1) to determine to what extent students learn more as a result of the interventions and (2) to measure increased interest and persistence in STEM learning. The Center should collect information and data from each project on the model it is developing and the effectiveness of its various elements. To this end, it is expected that the Center will provide technical support on evaluation, research, and data collection for the NSFAYS Projects. Its activities may include, but are not limited to, organizing and holding meetings and identifying resources (including print and electronic) and professionals in the field that may augment or enhance projects in meeting their goals. During the third year of the program, the Center should plan and organize a summit that would bring the project staffs and program stakeholders together to share and formalize findings and models. In addition, the NSFAYS Center is expected to support discussions, provide supporting materials to projects, and disseminate ideas and materials from the projects and the program to the field.
- **Research and Evaluation.** As part of the proposal, the NSFAYS Center must develop a conceptual framework for the research and evaluation of the program. This includes explicating the theories on which the program is built, providing the relevant reviews of the literature, and presenting a clear statement of the questions that drive the data collection and analysis. Although each project will have its own individual evaluation and research plans, the project goals will be closely aligned with the program goals. Consequently, it is anticipated that the project data and findings will be integral to the work of the NSFAYS Center. Projects will be required, as a condition of their award, to cooperate with the NSFAYS Center. As part of the proposal, the PI should explain how the Center proposes to work with NSFAYS Projects to gather data and findings while minimizing intrusions by the Center into the work of the projects. It might be appropriate for the Center to raise additional research questions. If so, these should be tied to the goals of the program.

3. Work Plan

Each project should present an action plan with a timeline that clearly addresses the center goals and objectives and organizes the major activities of the center.

4. Key Personnel

The proposal should list the key personnel as well as their roles and responsibilities in the Center. Include all individuals that bring the requisite expertise needed to execute Center responsibilities.

5. Dissemination

The NSFAYS Center is expected to have major responsibility for the dissemination of project findings to the field and the general public. In addition to submitting a comprehensive report to NSF, the Center should include a plan for disseminating findings to both the formal and informal STEM education communities and other professionals and stakeholders as deemed appropriate. This should include but not be limited to publication of articles, reports and a monograph, conference presentations, and an exposition of project outcomes.

APPENDIX

Illustrative Examples of Available K-8 Science, Technology, Engineering, and Mathematics (STEM) Materials

Astronomy Resources for Intercurricular Elementary Science (ARIES). Project ARIES brings the excitement of hands-on discovery to elementary and middle school students, using astronomy as the central focus for physical science. Students use innovative, simple, and affordable materials to carry out a range of indoor and outdoor discovery-based activities. Each of [eight self-contained modules](#) encourages students to learn and master a limited number of powerful physical science concepts. ARIES modules are available from [Charlesbridge Publishing Company](#). Web site: <http://cfa-www.harvard.edu/cfa/sed/aries.html>.

Classroom FeederWatch (CFW). CFW is a research and interdisciplinary curriculum, grades 5-8, developed by the Cornell Laboratory of Ornithology. By teaching students how science and scientists work, it helps them become scientists themselves. Information collected for this project is used by ornithologists to track annual changes in the abundance and distribution of bird species that use feeders in winter. In addition, the project gives teachers a chance to integrate science with language arts, visual arts, social studies, mathematics, and technology. Students are encouraged to submit materials and publish their findings materials in a newsletter, as well as describe their thoughts about the project. This gives them the opportunity to communicate electronically and discuss questions with students in classrooms all over the country. Web site: <http://www.birds.cornell.edu/cfw/>.

Bringing Technology Education Into K-8 Classrooms: A Guide to Curricular Resources About the Designed World (2004), Corwin Press. This practical guide identifies technology textbooks and integrated resources (including technology and supplementary resources) and describes more than 100 informal resources. Web site: <http://www.corwinpress.com/book.aspx?pid=10588>

Engineering is Elementary (EiE): Engineering & Technology Lessons for Children! Developed by the Museum of Science in Boston, EiE units integrate an elementary school science topic with a specific engineering field and targets specific learning goals from the National Standards for Technological Literacy. Units connect to widely used science programs (e.g., FOSS, STC, GEMS, Insights) and include suggestions for enhancing cross-curricula connections. Child characters from varied racial/ethnic backgrounds narrate storybooks that highlight related science and engineering content and present activities; support materials for teachers include lesson plans, duplication masters, as well as background information and additional resources. Web site: <http://www.mos.org/doc/1545>.

Hands-On Universe™ (HOU). HOU is an educational program developed by University of California at Berkeley. HOU enables students to investigate the Universe while applying tools and concepts from science, math, and technology. Using the Internet, HOU participants around the world request observations from an automated telescope, download images from a large image archive, and analyze them with the aid of user-friendly image processing software. Web site: <http://www.handsonuniverse.org/>.

Math in the Garden. Created for underserved urban youth and rural communities, Math in the Garden promotes inquiry, language arts, and nutrition through activities that bring adults and children together to learn mathematics inherent in the nature of gardening. Materials and activities teach mathematical concepts and skills, feature plants, flowers, and fruits as mathematical manipulatives, promote active learning, and support standards. Math in the Garden is being published by the National Gardening Association. Web sites: <http://botanicalgarden.berkeley.edu/education/eduMIG.shtml> and <http://www.garden.org/>

Object Lessons: Inquiries in Natural History for Elementary Schools. Object Lessons, a natural history-based approach to teaching science, introduces authentic objects and specimens into the classroom and provides a framework for extensive outdoor and indoor investigations. It fosters collaboration across grade levels in order to facilitate long-term investigations, exploring seasonal comparisons and building a database of information that supports continuing schoolyard inquiries. Accurate models, scientific drawings, photographs and written materials for children, along with suggested lessons and background materials for teachers supplement real objects. Web site: http://www.firsthandlearning.org/catalog/catalog_frameset.html.

Private Eye. Private Eye, promoting wonder through looking closely at the world, helps "regular", gifted, bilingual, special education, and at-risk students to think by analogy, changing scale and theorizing. It is designed to develop higher order thinking, communication, concentration, and problem-solving skills, as well as creativity and scientific literacy across subjects. Through use of everyday objects, a jeweler's loupe, and simple questions, it accelerates science, writing, art, mathematics and social studies, as well as vocational and technological education. Web site: <http://www.the-private-eye.com/html/home.htm>.

The Jason Project. JASON Expeditions™ take students and teachers, grades 4-9, from tropical rainforests to active volcanoes and from the remote ocean depths to far reaches of the solar system, without leaving the classroom. All JASON Expeditions™ - [Mysteries of Earth and Mars](#), [Disappearing Wetlands](#), and [Rainforests at the Crossroads](#) provide a themed, interdisciplinary (science, mathematics, history, language arts, and technology), or single-subject approach with hands-on, multimedia components to fully engage students and improve learning outcomes. Satellite and Internet technologies bring students and teachers in classrooms around the world into real-time contact with these scientists and researchers to model their work. Web site: http://www.jasonproject.org/jason_home/home.htm.

WhaleNet. The interdisciplinary WhaleNet program enhances science education and environmental awareness using telecommunications. Project-established Internet communication between researchers and students from around the world allows them to collect and compile research data on the WhaleNet server, as well as engage in collaborative learning, and personal field experiences to enhance learning and interest in science. The data is then shared with schools for interdisciplinary curricular activities and student research in classrooms worldwide. WhaleNet also provides curriculum resources and support, a source of data for interdisciplinary classroom activities, and interactive informational support. Web site: <http://whale.wheelock.edu/Welcome.html>

Figure This! Figure This! provides a series of fun, engaging, and high-quality mathematics challenges for families of middle-school students that can be enjoyed outside school. The program emphasizes the importance of high-quality mathematics education for all students. The Figure This! challenges are designed to support learning in the classroom. Web site: http://www.figurethis.org/about_ft.htm

III. AWARD INFORMATION

Anticipated funding is \$14,000,000 pending availability of funds.

NSFAYS Projects NSFAYS Projects must have a **duration of three years**. Projects are limited to a **total budget of \$800,000**. Approximately 16-18 NSFAYS Projects will be awarded as Standard Grants.

The NSFAYS Research and Evaluation Center must have a **duration of 4 years**, with a **maximum budget of \$1,400,000**. It will be awarded as a Cooperative Agreement.

IV. ELIGIBILITY INFORMATION

Organization Limit:

Proposals may only be submitted by the following:

- Four required partners for Project proposals include: (1) a school district, a consortium of schools within a district, or a consortium of districts; (2) business(es)/industry(ies) within the community; (3) a College of Education that prepares and/or certifies teachers; and (4) an informal science education organization (see Section II of this solicitation for further information).

There are no organizational limits for Center proposals.

PI Limit:

None Specified

Limit on Number of Proposals per Organization:

None Specified

Limit on Number of Proposals per PI:

None Specified

Additional Eligibility Info:

Organization Limit: Four required partners for Project proposals include: (1) a school district, a consortium of schools within a district, or a consortium of districts; (2) business(es)/industry(ies) within the community; (3) a College of Education that prepares and/or certifies teachers; and (4) an informal science education organization (see Section II of this solicitation for further information).

There are no organizational limits for Center proposals.

PI Eligibility Limit: None Specified

Limit on Number of Proposals: None Specified

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent (*required*):

A Letter of Intent (LOI) is required for all proposals to be submitted under this competition. Letters of Intent are not preliminary proposals. Their purpose is to help NSF program staff gauge the size and range of the competition in order to facilitate selection and management of reviewers and panelists, as well as to avoid potential conflicts of interest that might arise during the merit review process. PIs should not expect feedback on their LOIs beyond acknowledgement of their receipt. Letters of Intent must be submitted via FastLane (www.fastlane.nsf.gov) by 5:00 PM, local time, May 31, 2006.

1. NSFAYS Project. The LOI should contain a brief narrative that provides the following information: (1) the project title (2) clear identification that the proposal will be an **NSFAYS Project**; (3) a list of proposed Principal Investigators (PIs) and co-PIs, including organizational affiliations and departments (as appropriate); (4) a list of proposed major organizational partners; (5) STEM disciplines represented; (6) contiguous grade bands covered (e.g., grades 6-8); and (7) project setting (e.g., rural, urban, suburban).

2. NSFAYS Research and Evaluation Center. The LOI should contain a brief narrative that provides the following information: (1) the project title (2) clear identification that the proposal will be an **NSFAYS Research and Evaluation Center**; (3) a list of proposed Principal Investigators (PIs) and co-PIs, including organizational affiliations and departments (as appropriate).

Letter of Intent Management Conditions:

When submitting a Letter of Intent through FastLane in response to this Program Solicitation please note the conditions outlined below:

- SPO Submission is Not Required when submitting Letters of Intent
- Submission of multiple Letters of Intent are Not allowed

Full Proposal Instructions: Proposers may opt to submit proposals in response to this Program Solicitation via Grants.gov or via the NSF FastLane system.

- Full proposals submitted via FastLane: Proposals submitted in response to this program solicitation should be prepared and submitted in accordance with the general guidelines contained in the NSF Grant Proposal Guide (GPG). The complete text of the GPG is available electronically on the NSF website at: http://www.nsf.gov/publications/pub_summ.jsp?ods_key=gpg. Paper copies of the GPG may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov. Proposers are reminded to identify this program solicitation number in the program solicitation block on the NSF Cover Sheet For Proposal to the National Science Foundation. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

- Full proposals submitted via Grants.gov: Proposals submitted in response to this program solicitation via Grants.gov should be prepared and submitted in accordance with the NSF Grants.gov Application Guide: A Guide for the Preparation and Submission of NSF Applications via Grants.gov. The complete text of the NSF Grants.gov Application Guide is available on the Grants.gov website and on the NSF website at: (<http://www.nsf.gov/bfa/dias/policy/docs/grantsgovguide.pdf>). To obtain copies of the Application Guide and Application Forms Package, click on the Apply tab on the Grants.gov site, then click on the Apply Step 1: Download a Grant Application Package and Application Instructions link and enter the funding opportunity number, (the program solicitation number without the NSF prefix) and press the Download Package button. Paper copies of the Grants.gov Application Guide also may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

In determining which method to utilize in the electronic preparation and submission of the proposal, please note the following:

Collaborative Proposals. All collaborative proposals submitted as separate submissions from multiple organizations must be submitted via the NSF FastLane system. Chapter II, Section D.3 of the Grant Proposal Guide provides additional information on collaborative proposals.

The following instructions supplement the GPG guidelines.

1. Proposals for NSFAYS Projects are required to have the following elements.

Cover Sheet: Since NSFAYS Projects will conduct research on student subjects, IRB certification must be obtained for all awards.

Project Summary: A one-page summary of the project that must contain separate statements that address the NSB Criteria: What is the Intellectual Merit of the Activity? What are the Broader Impacts of the Activity?

Project Description: This section must describe the project, addressing the required elements described in the Project Characteristics above for an NSFAYS project. It is limited to 15 pages, single-spaced. It must include the following sections:

1. *Rationale:* This section should describe the characteristics of the project, the need, and its importance to the community. It should provide the theoretical basis for the model developed in the project design.
2. *Goals and Objectives:* The proposal should list a manageable number of well-defined, measurable goals and objectives that align with those of the program. Both achievement in and attitudes about STEM for the target audiences must be addressed.
3. *Project Design:* Please refer to the Project Design section in this solicitation.
4. *Recruitment Plan:* Please refer to the Recruitment section in this solicitation.
5. *Work Plan:* Each proposal should present an action plan with a timeline that clearly addresses the project goals and objectives and organizes the major activities of the project. The plan for managing the partnership should be included.
6. *Research Plan:* Please refer to the Research section in this solicitation.
7. *Evaluation Plan:* Please refer to the Evaluation section in this solicitation.
8. *Key Personnel:* The proposal should list the key personnel, at least one from each partner, and their roles and responsibilities in the project. Each proposal should include all individuals that bring the requisite expertise needed to operate the project. Two-page biographical sketches of senior personnel should be entered in the appropriate section in FastLane. The Advisory Board should be identified and its role discussed.
9. *Dissemination:* Each NSFAYS Project should provide plans to publicize its activities widely within its community. In addition, any plans to present project results in professional journals or meetings should be included. The national dissemination of NSFAYS program results will be the responsibility of the NSFAYS Research and Evaluation Center.
10. *Prior NSF Support:* Project personnel must provide a list of their previous NSF supported projects that pertain to the

current proposal, provide evidence of the success of those projects, and explain how lessons learned from them inform the current proposal. Proposals may also include discussion of projects funded by other agencies that support the current project.

Supplementary Documents: Letters of commitment from required partner institutions must be presented. Letters should acknowledge the intended role of the partner, and the level of commitment to the implementation of the project.

2. Proposals for the NSFAYS Research and Evaluation Center are required to have the following elements.

Cover Sheet: The NSFAYS Research and Evaluation Center will likely conduct research on student subjects, so the IRB certification must be obtained.

Project Summary: A one-page summary of the project must contain separate statements that address the NSB Criteria: What is the Intellectual Merit of the Activity? What are the Broader Impacts of the Activity?

Project Description: This section must describe the project, addressing the required elements described in the Center Characteristics above for an NSFAYS Research and Evaluation Center. It is limited to 15 pages, single-spaced. It must include the following sections:

1. *Goals and Objectives:* The proposal should list a manageable number of well-defined, measurable goals and objectives.
2. *Center Design:* Includes the plan to support the data collection and conduct the research and evaluation components in cooperation with the NSFAYS Projects.
3. *Work plan:* Each proposal should present an action plan with a timeline that clearly addresses the center goals and objectives and organizes the major activities of the center.
4. *Key Personnel:* The proposal should list the key personnel and their roles and responsibilities in the Center. Include all individuals that bring the requisite expertise needed to execute Center responsibilities. Two-page biographical sketches of senior personnel should be entered in the appropriate section in FastLane.
5. *Dissemination:* The national dissemination of the results of NSFAYS program will be undertaken by the NSFAYS Research and Evaluation Center. A plan for this process should be presented.
6. *Prior NSF Support:* Project personnel must provide a list of their previous NSF supported projects that pertain to the current proposal, provide evidence of the success of those projects, and explain how lessons learned from them inform the current proposal. Proposals may also include discussion of projects funded by other agencies that support the current project.

B. Budgetary Information

Cost Sharing: Cost sharing is not required by NSF in proposals submitted under this Program Solicitation.

Other Budgetary Limitations:

NSFAYS Projects are limited to a **maximum budget of \$800,000**.

- Funding for instructional materials and supplies will be supported for OST experiences, but support for in-school instructional materials cannot be requested.
- Equipment will not be supported.
- Stipends for professional development of teachers, counselors, administrators, informal educators, and other participating STEM professionals are appropriate.
- Travel is appropriate as required to meet the project goals. Each project should budget for a PI meeting in Washington, DC toward the end of the project period for up to four people, including two students, to share results.

- Stipends for pre-service teachers participating in the project are allowed.

The NSFAYS Center proposal is limited to a **maximum budget of \$1,400,000**.

- Equipment will not be supported.
- Travel is appropriate as required to meet the project goals.
- The Center should budget funds to design the agenda and support the PI meeting in Washington, DC toward the end of the project period (see above). Note: NSFAYS Projects will support travel and lodging of their participants.

C. Due Dates

- **Letter of Intent Due Date(s) (required):**

May 31, 2006

(due by 5 p.m. submitter's local time):

- **Full Proposal Deadline(s)** (due by 5 p.m. proposer's local time):

June 30, 2006

D. FastLane/Grants.gov Requirements

- **For Proposals Submitted Via FastLane:**

Detailed technical instructions for proposal preparation and submission via FastLane are available at: <https://www.fastlane.nsf.gov/a1/newstan.htm>. For FastLane user support, call the FastLane Help Desk at 1-800-673-6188 or e-mail fastlane@nsf.gov. The FastLane Help Desk answers general technical questions related to the use of the FastLane system. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submission of Electronically Signed Cover Sheets. The Authorized Organizational Representative (AOR) must electronically sign the proposal Cover Sheet to submit the required proposal certifications (see Chapter II, Section C of the Grant Proposal Guide for a listing of the certifications). The AOR must provide the required electronic certifications within five working days following the electronic submission of the proposal. Proposers are no longer required to provide a paper copy of the signed Proposal Cover Sheet to NSF. Further instructions regarding this process are available on the FastLane Website at: <http://www.fastlane.nsf.gov/>

- **For Proposals Submitted Via Grants.gov:**

Before using Grants.gov for the first time, each organization must register to create an institutional profile. Once registered, the applicant's organization can then apply for any federal grant on the Grants.gov website. The Grants.gov's Grant Community User Guide is a comprehensive reference document that provides technical information about Grants.gov. Proposers can download the User Guide as a Microsoft Word document or as a PDF document. The Grants.gov User Guide is available at: <http://www.grants.gov/CustomerSupport>. In addition, the NSF Grants.gov Application Guide provides additional technical guidance regarding preparation of proposals via Grants.gov. For Grants.gov user support, contact the Grants.gov Contact Center at 1-800-518-4726 or by email: support@grants.gov. The Grants.gov Contact Center answers general technical questions related to the use of Grants.gov. Specific questions related to this program solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this solicitation.

Submitting the Proposal: Once all documents have been completed, the Authorized Organizational Representative (AOR) must submit the application to Grants.gov and verify the desired funding opportunity and agency to which the application is submitted. The AOR must then sign and submit the application to

VI. NSF PROPOSAL PROCESSING AND REVIEW PROCEDURES

Proposals received by NSF are assigned to the appropriate NSF program and, if they meet NSF proposal preparation requirements, for review. All proposals are carefully reviewed by a scientist, engineer, or educator serving as an NSF Program Officer, and usually by three to ten other persons outside NSF who are experts in the particular fields represented by the proposal. These reviewers are selected by Program Officers charged with the oversight of the review process. Proposers are invited to suggest names of persons they believe are especially well qualified to review the proposal and/or persons they would prefer not review the proposal. These suggestions may serve as one source in the reviewer selection process at the Program Officer's discretion. Submission of such names, however, is optional. Care is taken to ensure that reviewers have no conflicts with the proposer.

A. NSF Merit Review Criteria

All NSF proposals are evaluated through use of the two National Science Board (NSB)-approved merit review criteria: intellectual merit and the broader impacts of the proposed effort. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

The two NSB-approved merit review criteria are listed below. The criteria include considerations that help define them. These considerations are suggestions and not all will apply to any given proposal. While proposers must address both merit review criteria, reviewers will be asked to address only those considerations that are relevant to the proposal being considered and for which the reviewer is qualified to make judgements.

What is the intellectual merit of the proposed activity?

How important is the proposed activity to advancing knowledge and understanding within its own field or across different fields? How well qualified is the proposer (individual or team) to conduct the project? (If appropriate, the reviewer will comment on the quality of the prior work.) To what extent does the proposed activity suggest and explore creative and original concepts? How well conceived and organized is the proposed activity? Is there sufficient access to resources?

What are the broader impacts of the proposed activity?

How well does the activity advance discovery and understanding while promoting teaching, training, and learning? How well does the proposed activity broaden the participation of underrepresented groups (e.g., gender, ethnicity, disability, geographic, etc.)? To what extent will it enhance the infrastructure for research and education, such as facilities, instrumentation, networks, and partnerships? Will the results be disseminated broadly to enhance scientific and technological understanding? What may be the benefits of the proposed activity to society?

NSF staff will give careful consideration to the following in making funding decisions:

Integration of Research and Education

One of the principal strategies in support of NSF's goals is to foster integration of research and education through the programs, projects, and activities it supports at academic and research institutions. These institutions provide abundant opportunities where individuals may concurrently assume responsibilities as researchers, educators, and students and where all can engage in joint efforts that infuse education with the excitement of discovery and enrich research through the diversity of learning perspectives.

Integrating Diversity into NSF Programs, Projects, and Activities

Broadening opportunities and enabling the participation of all citizens -- women and men, underrepresented minorities, and persons with disabilities -- is essential to the health and vitality of science and engineering. NSF is committed to this principle of diversity and deems it central to the programs, projects, and activities it considers and supports.

Additional Review Criteria:

1. NSFAYS Projects

NSF staff will give careful consideration to the following in making funding decisions for the Academies for Young

Scientists.

The theoretical framework, research, and the implementation model

- Is there a theoretical framework that informs and guides the design?
- Is the project likely to answer what combination of in-school and out-of-school experiences can be most effective at attracting young students to, preparing them for, and retaining them in career paths in STEM disciplines?
- Does the proposal identify measures, instruments and processes for assessing success of the project in student achievement, interest and attitudes?
- Does the proposal describe how the learning for students will ease the transition to high school?
- Is an appropriate level of professional development for education providers included in the model?
- Will it result in an implementation model that is well understood? Is it likely to be transportable or replicable in other communities?

The project design and implementation

- Does it involve a sustainable coalition of the required partners?
- Does the project tie to, build on, and support an in-school component of classroom curricula?
- Are the in-school and out-of-school materials specified?
- Is there an appropriate advisory board of community stakeholders?
- Does the project include at least 100 students for at least 150 hours of out-of-school experiences, and are these activities tied to the in-school curriculum?
- Has an appropriate grade band been identified, and have partnerships with school(s) or school district(s) been established to leverage the activities?
- Does the recruitment and selection plan reflect the needs and diversity of the community?
- Is the project likely to be sustainable?
- Is there a plan to disseminate the project findings?
- Is the project cost effective?

2. NSFAYS Research and Evaluation Center

NSF staff will give careful consideration to the following elements in making funding decisions for the NSFAYS Research and Evaluation Center.

- Are the Center's goals and objectives clearly described and appropriate for the NSFAYS program?
- Are the plans to conduct research and evaluation, in cooperation with the NSFAYS Projects, clearly described and appropriate to support the projects and to document the NSFAYS program? What proposed data collection system and indicators will be used to document program success?
- Is the work plan well developed and presented?

- Are the Center personnel well qualified to carry out the work plan and meet the Center's goals and objectives?
- Will the Center broadly and effectively disseminate the results of the NSFAYS program?

B. Review and Selection Process

Proposals submitted in response to this program solicitation will be reviewed by Panel Review.

Reviewers will be asked to formulate a recommendation to either support or decline each proposal. The Program Officer assigned to manage the proposal's review will consider the advice of reviewers and will formulate a recommendation.

After scientific, technical and programmatic review and consideration of appropriate factors, the NSF Program Officer recommends to the cognizant Division Director whether the proposal should be declined or recommended for award. NSF is striving to be able to tell applicants whether their proposals have been declined or recommended for funding within six months. The time interval begins on the date of receipt. The interval ends when the Division Director accepts the Program Officer's recommendation.

A summary rating and accompanying narrative will be completed and submitted by each reviewer. In all cases, reviews are treated as confidential documents. Verbatim copies of reviews, excluding the names of the reviewers, are sent to the Principal Investigator/Project Director by the Program Officer. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In all cases, after programmatic approval has been obtained, the proposals recommended for funding will be forwarded to the Division of Grants and Agreements for review of business, financial, and policy implications and the processing and issuance of a grant or other agreement. Proposers are cautioned that only a Grants and Agreements Officer may make commitments, obligations or awards on behalf of NSF or authorize the expenditure of funds. No commitment on the part of NSF should be inferred from technical or budgetary discussions with a NSF Program Officer. A Principal Investigator or organization that makes financial or personnel commitments in the absence of a grant or cooperative agreement signed by the NSF Grants and Agreements Officer does so at their own risk.

VII. AWARD ADMINISTRATION INFORMATION

A. Notification of the Award

Notification of the award is made to *the submitting organization* by a Grants Officer in the Division of Grants and Agreements. Organizations whose proposals are declined will be advised as promptly as possible by the cognizant NSF Program Division administering the program. Verbatim copies of reviews, not including the identity of the reviewer, will be provided automatically to the Principal Investigator. (See section VI.A. for additional information on the review process.)

B. Award Conditions

An NSF award consists of: (1) the award letter, which includes any special provisions applicable to the award and any numbered amendments thereto; (2) the budget, which indicates the amounts, by categories of expense, on which NSF has based its support (or otherwise communicates any specific approvals or disapprovals of proposed expenditures); (3) the proposal referenced in the award letter; (4) the applicable award conditions, such as Grant General Conditions (NSF-GC-1); * or Federal Demonstration Partnership (FDP) Terms and Conditions * and (5) any announcement or other NSF issuance that may be incorporated by reference in the award letter. Cooperative agreement awards also are administered in accordance with NSF Cooperative Agreement Terms and Conditions (CA-1). Electronic mail notification is the preferred way to transmit NSF awards to organizations that have electronic mail capabilities and have requested such notification from the Division of Grants and Agreements.

*These documents may be accessed electronically on NSF's Website at http://www.nsf.gov/home/grants/grants_gac.htm. Paper copies may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from pubs@nsf.gov.

More comprehensive information on NSF Award Conditions is contained in the NSF *Grant Policy Manual* (GPM) Chapter II, available electronically on the NSF Website at <http://www.nsf.gov/cgi-bin/getpub?gpm>. The GPM is also for sale through the

Superintendent of Documents, Government Printing Office (GPO), Washington, DC 20402. The telephone number at GPO for subscription information is (202) 512-1800. The GPM may be ordered through the GPO Website at <http://www.gpo.gov>.

Special Award Conditions: Additional award conditions apply. NSFAYS Projects must agree to cooperate with the NSFAYS Research and Evaluation Center by: (1) coordinating research; (2) sharing evaluation results; and (3) participating in a learning community across projects (see Section II.B.).

C. Reporting Requirements

For all multi-year grants (including both standard and continuing grants), the Principal Investigator must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period. (Some programs or awards require more frequent project reports). Within 90 days after expiration of a grant, the PI also is required to submit a final project report.

Failure to provide the required annual or final project reports will delay NSF review and processing of any future funding increments as well as any pending proposals for that PI. PIs should examine the formats of the required reports in advance to assure availability of required data.

PIs are required to use NSF's electronic project-reporting system, available through FastLane, for preparation and submission of annual and final project reports. Such reports provide information on activities and findings, project participants (individual and organizational) publications; and, other specific products and contributions. PIs will not be required to re-enter information previously provided, either with a proposal or in earlier updates using the electronic system.

Submission of the report via FastLane constitutes certification by the PI that the contents of the report are accurate and complete.

VIII. AGENCY CONTACTS

General inquiries regarding this program should be made to:

- David B Campbell, Program Director, 885 S, telephone: (703) 292-5093, fax: (703) 292-9044, email: dcampbel@nsf.gov
- Robert E Gibbs, Program Director, 885 S, telephone: (703) 292-5122, fax: (703) 292-9044, email: rgibbs@nsf.gov
- Sylvia M James, Program Director, 885 S, telephone: (703) 292-5333, fax: (703) 292-9044, email: sjames@nsf.gov
- Sharon M Locke, Program Director, 885 S, telephone: (703) 292-7322, email: slocke@nsf.gov
- Mary Ann Steiner, Program Director, 885 S, telephone: (703) 292-5128, fax: (703) 292-9044, email: msteiner@nsf.gov
- Paola Sztajn, Program Director, 885 S, telephone: (703) 292-5105, fax: (703) 292-9044, email: psztajn@nsf.gov
- Angelicque Tucker Blackmon, Associate Program Director, 885 S, telephone: (703) 292-5092, email: atucker@nsf.gov
- Karen Zuga, Program Director, 885 S, telephone: (703) 292-5112, fax: (703) 292-9044, email: kzuga@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: 1-800-673-6188; e-mail: fastlane@nsf.gov.
- Rosalind D Douglas, Program Specialist, 875 S, telephone: (703) 292-8690, fax: (703) 292-9047, email: rdouglas@nsf.gov

- Jeffrey S Harris, Science Education Analyst, 885 S, telephone: (703) 292-5103, fax: (703) 292-9044, email: jsharris@nsf.gov

For questions relating to Grants.gov contact:

- Grants.gov Contact Center: If the Authorized Organizational Representatives (AOR) has not received a confirmation message from Grants.gov within 48 hours of submission of application, please contact via telephone: 1-800-518-4726; e-mail: support@grants.gov.

IX. OTHER INFORMATION

The NSF Website provides the most comprehensive source of information on NSF Directorates (including contact information), programs and funding opportunities. Use of this Website by potential proposers is strongly encouraged. In addition, MyNSF (formerly the Custom News Service) is an information-delivery system designed to keep potential proposers and other interested parties apprised of new NSF funding opportunities and publications, important changes in proposal and award policies and procedures, and upcoming NSF Regional Grants Conferences. Subscribers are informed through e-mail or the user's Web browser each time new publications are issued that match their identified interests. MyNSF also is available on NSF's Website at <http://www.nsf.gov/mynsf/>.

Grants.gov provides an additional electronic capability to search for Federal government-wide grant opportunities. NSF funding opportunities may be accessed via this new mechanism. Further information on Grants.gov may be obtained at <http://www.grants.gov>.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) is an independent Federal agency created by the National Science Foundation Act of 1950, as amended (42 USC 1861-75). The Act states the purpose of the NSF is "to promote the progress of science; [and] to advance the national health, prosperity, and welfare by supporting research and education in all fields of science and engineering."

NSF funds research and education in most fields of science and engineering. It does this through grants and cooperative agreements to more than 2,000 colleges, universities, K-12 school systems, businesses, informal science organizations and other research organizations throughout the US. The Foundation accounts for about one-fourth of Federal support to academic institutions for basic research.

NSF receives approximately 40,000 proposals each year for research, education and training projects, of which approximately 11,000 are funded. In addition, the Foundation receives several thousand applications for graduate and postdoctoral fellowships. The agency operates no laboratories itself but does support National Research Centers, user facilities, certain oceanographic vessels and Antarctic research stations. The Foundation also supports cooperative research between universities and industry, US participation in international scientific and engineering efforts, and educational activities at every academic level.

Facilitation Awards for Scientists and Engineers with Disabilities provide funding for special assistance or equipment to enable persons with disabilities to work on NSF-supported projects. See Grant Proposal Guide Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

The National Science Foundation has Telephonic Device for the Deaf (TDD) and Federal Information Relay Service (FIRS) capabilities that enable individuals with hearing impairments to communicate with the Foundation about NSF programs, employment or general information. TDD may be accessed at (703) 292-5090 and (800) 281-8749, FIRS at (800) 877-8339.

The National Science Foundation Information Center may be reached at (703) 292-5111.

The National Science Foundation promotes and advances scientific progress in the United States by competitively awarding grants and cooperative agreements for research and education in the sciences, mathematics, and engineering.

To get the latest information about program deadlines, to download copies of NSF publications, and to access abstracts of awards, visit the NSF Website at <http://www.nsf.gov>

- **Location:** 4201 Wilson Blvd. Arlington, VA 22230

- **For General Information** (NSF Information Center): (703) 292-5111

- **TDD (for the hearing-impaired):** (703) 292-5090

- **To Order Publications or Forms:**

Send an e-mail to: pubs@nsf.gov

or telephone: (703) 292-7827

- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; and project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to proposer institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies or other entities needing information regarding applicants or nominees as part of a joint application review process, or in order to coordinate programs or policy; and to another Federal agency, court, or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004), and NSF-51, "Reviewer/Proposal File and Associated Records," 69 Federal Register 26410 (May 12, 2004). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to, an information collection unless it displays a valid Office of Management and Budget (OMB) control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding the burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to:

Suzanne H. Plimpton
Reports Clearance Officer
Division of Administrative Services
National Science Foundation
Arlington, VA 22230

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