

# Information Technology Experiences for Students and Teachers (ITEST)

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## Program Solicitation

NSF 05-621

*Replaces Document NSF 04-611*



**National Science Foundation**

Directorate for Education and Human Resources

Division of Elementary, Secondary and Informal Education

### Preliminary Proposal Due Date(s) (*required*):

November 02, 2005

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

February 24, 2006

## SUMMARY OF PROGRAM REQUIREMENTS

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### General Information

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#### Program Title:

Information Technology Experiences for Students and Teachers (ITEST)

#### Synopsis of Program:

ITEST is designed to increase the opportunities for students and teachers to learn about, experience, and use information technologies within the context of science, technology, engineering, and mathematics (STEM), including Information Technology (IT) courses. It is in direct response to the concern about shortages of information technology workers in the United States. Supported projects are intended to provide opportunities for both school-age children and for teachers to build the skills and knowledge needed to advance their study, and to function and contribute in a technologically rich society.

ITEST has two components: (a) youth-based projects with strong emphases on career and educational paths; and (b) comprehensive projects for students and teachers.

This solicitation complements and is not intended to overlap with the Advanced Technological Education (ATE) program described in Section IX. Information Technology (IT) is within the scope of the ATE program, so proposals for the development of IT classroom materials for students or teachers, or for professional development of IT teachers in support of technical careers, should be submitted to the ATE program.

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

- 47.076 --- Education and Human Resources

#### Eligibility Information

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- **Organization Limit:**

All organizations with an educational mission are eligible.

Proposals targeting minorities, persons with disabilities and women are especially encouraged.

- **PI Eligibility Limit:** An individual may serve as the Principal Investigator (PI) for no more than one proposal under this solicitation.
- **Limit on Number of Proposals:** None Specified.

#### Award Information

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- **Anticipated Type of Award:** Standard or Continuing Grant
- **Estimated Number of Awards:** 10 to 12 - each for Youth-based and Comprehensive projects
- **Anticipated Funding Amount:** \$20,000,000 pending availability of funds.

#### Proposal Preparation and Submission Instructions

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##### A. Proposal Preparation Instructions

- **Preliminary Proposals:** Submission of Preliminary Proposals is required. Please see the full text of this solicitation for further information.
- **Full Proposal Preparation Instructions:** This solicitation contains information that supplements the standard Grant Proposal Guide (GPG) proposal preparation guidelines. Please see the full text of this solicitation for further information.

##### 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 solicitation for further information.

##### C. Due Dates

- **Preliminary Proposals (required) :**  
November 02, 2005
- **Full Proposal Deadline Date(s)** (due by 5 p.m. submitter's local time):  
February 24, 2006

## Proposal Review Information

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

## Award Administration Information

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- **Award Conditions:** Standard NSF award conditions apply.
- **Reporting Requirements:** Additional reporting requirements apply. Please see the full text of this solicitation for further information.

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## I. INTRODUCTION

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### A. Division of Elementary, Secondary, and Informal Education

**Goals and Objectives:** Science, technology, engineering, and mathematics (STEM) education, pre-Kindergarten through grade 12 (preK-12), lays the foundation of knowledge and skills needed by future researchers, educators, and technologists; students pursuing post-secondary education in other disciplines; and individuals directly entering the technological workforce. The Division of Elementary, Secondary, and Informal Education (ESIE) supports the National Science Foundation's mission of providing leadership and promoting development of the infrastructure and resources needed to improve preK-12 STEM education throughout the United States.

ESIE's comprehensive and coherent, research-based program portfolio develops the nation's capacity to support high-quality STEM education. Innovative instructional materials and student assessments, as well as new models for the delivery of

teacher professional development, contribute to STEM classroom environments that enable all students to achieve their full potential. Moreover, ESIE's informal learning opportunities via media, exhibit, and community-based programs increase scientific and technological literacy, as well as develop life-long learning skills that benefit students of all ages.

## **B. ITEST Program**

**Program Overview.** *Fluency with information technology entails a process of lifelong learning in which individuals continually apply what they know to adapt to change and acquire more knowledge to be more effective in applying information technology to their work and personal lives* (National Academy of Sciences, 1999).

This solicitation seeks to increase the opportunities for students and teachers to learn about, experience, and use information technologies within the context of science, technology, engineering, and mathematics (STEM), including Information Technology (IT) courses. It is in direct response to the concern about shortages of technology workers in the United States. Supported projects are intended to provide opportunities for both school-age children and for teachers to build the skills and knowledge needed to advance their study, and to function and contribute in a technologically rich society.

ITEST has two components: (a) youth-based projects with strong emphases on career and educational paths; and (b) comprehensive projects for students and teachers.

Any proposal submitted for youth-based or comprehensive projects should include the critical workforce skills. These are described by the Secretary's Commission on Achieving Necessary Skills (SCANS) of the U.S. Department of Labor in *What Work Requires of Schools: A SCANS Report for America 2000* (U.S. Department of Labor, 1991) and include skills such as computation and literacy, and the ability to apply this knowledge; working habits, such as the ability to work on teams; solving complex problems in systems; and the understanding and use of technology.

ITEST provides ongoing technical support to each funded project through the ITEST Resource Center, an ongoing grant to the Education Development Center, Inc. This EDC ITEST Resource Center provides evaluative research related to funded projects and has responsibility for national dissemination of program models, materials, and best practices. They provide technical support for grantees, research, and dissemination activities. The Resource Center supports discussions (including an annual ITEST PI meeting), provides supporting materials to projects (both print and electronic), and disseminates ideas and materials from the projects to the field. Finally, the Resource Center has created and maintains the ITEST homepage with links to the homepages of each ITEST-funded project. (To see the currently funded projects, go to <http://www2.edc.org/itestlrc>)

### **1) Youth-Based Projects**

ITEST will support year-round, youth-based projects that include a summer component. Projects should include activities (after-school and/or weekends) that focus on IT or IT-intensive STEM subject areas. Projects may include the creation of new instructional materials or may adopt or adapt existing curriculum materials and tools, including software, for use in an informal science education environment. Creation of innovative and creative models for engaging students in meaningful learning experiences is a priority. For the purposes of ITEST, the definition of informal learning is that it is voluntary, and primarily self-directed and independent learning.

Projects must use well-designed strategies (e.g., recruitment, learning experiences, contact hours) and high-quality materials to engage middle- and high-school students (grades 7-12). Single-event, short-term workshops and camps alone are not sufficient; rather, projects of two-or-more year duration are sought that address the developmental needs of youth, while exposing participants to the workplace and workplace skills. Parental involvement and college preparatory support are also essential (*Raising Minority Academic Achievement: A Compendium of Education Programs and Practices, American Youth Policy Forum, 2001*).

### **2) Comprehensive Projects for Students and Teachers**

ITEST will support projects that infuse appropriate information technologies into STEM courses so as to expand IT experiences that are commonly available in schools. Development of teacher materials on information technologies is encouraged, whether linked to core STEM courses or providing a broader range of resources and applications. Provision of opportunities for teachers to put into practice what they have learned via summer laboratory experiences with students, grades 7-12, is expected.

For schools to support growing competence in information technology among students, teachers themselves must become fluent with technical tools and resources that could support their teaching priorities. Because it is unlikely that many schools would introduce additional courses to the already crowded list of existing offerings, the focus of this component is on technologies that would support learning and teaching within the context of the core curriculum.

**Rationale.** Information Technology (IT) -- defined to include computer hardware, software, and communications networks, as well as technology interfaces and human-computer interfaces -- is the fastest growing occupational sector in the country. The U.S. Department of Labor predicts that despite the recent decline in the IT industry, computer software engineers and computer systems designers will be among the fastest growing occupations in 2002-2012, while computer systems analysts, database administrators, computer scientists, and computers and information systems managers are projected to grow much faster than average. The employment outlook for programmers will be about average, while hardware engineers will face more competition and jobs will grow more slowly than usual (Bureau of Labor Statistics, U.S. Department of Labor, 2004). During this period, it is anticipated that Internet services, data processing, and other information services; computer systems design and related services; and software publishing will see the highest annual increases in growth, more than all other professions. For example, internet services are projected to experience a 10.3% annual growth rate until 2012, which translates into a 46.2% increase in employment (Horrigan, 2004). Most of these professions require a bachelor's degree or higher (Bureau of Labor Statistics, U.S. Department of Labor, 2004).

The ability to meet the demand for individuals with the IT skills necessary to enter the IT workforce is aggravated by the limited involvement of segments of the population that are severely underrepresented and underserved in IT occupations. The number of minorities and women pursuing computer science degrees has declined considerably in the last twenty years (*Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development, September 2000*). Black and Hispanic Americans represent less than 10% of the computer systems analysts and scientists, and less than 10% of computer programmers (*U.S. Department of Commerce, Office of Technology Policy, 1998*). The demand for IT workers as a whole can be met only if the needs to diversify the IT workforce and encourage underrepresented groups to pursue careers in IT and IT-intensive fields are addressed.

Because of the proven success enrichment programs have in increasing student interest, the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development recommends that these programs be made available to all students. Increasing interest alone is not sufficient, however, because many other factors are needed to *sustain* interest and aid youth in making often-difficult transitions from middle school to high school, and high school to college. It is anticipated that the ITEST program will not only increase interest in IT through the creation of effective student education programs, but also maintain interest through supportive activities that include parental involvement, career exploration, externships, research, and multi-year programs.

Teachers are also a key factor in providing IT fluency for all. Teachers consistently report that they have difficulty finding appropriate uses and applications for the Internet, which has penetrated every aspect of society--school, home, and workplace, and which has fueled current interest in IT. How teachers use these technologies has been described in a number of recent reports. For instance, a recent study indicates that approximately 85% of middle- and high-school students report that they use a computer in school (*National Telecommunication and Information Administration, 2002*). Home use, however, drops precipitously, from 83% to 28%, as household income drops. Ethnic differences are also pronounced. For example, home use by Hispanic and Black Americans is just over one-half of what it is for Asian, Pacific Islander, and White Americans.

Symptomatic of how technology is used, recent reports show that approximately one-half of the public school teachers who have computers or Internet access report that they use them for classroom instruction. The National Center for Education Statistics reports that these technologies are used more often in schools with small minority populations and low levels of poverty, and that this does not depend on the availability of the technology in the schools. Among those teachers with access at home, those with *less* classroom experience are *more* inclined to use the Internet for planning lessons, creating instructional materials, and accessing model lesson plans. Teacher preparation to use computers comes from (in descending order) independent learning, professional development, and colleagues. Over a three-year period, three-fourths of the surveyed teachers participated in 32 hours or more of training on computers or the Internet (*National Center for Education Statistics, September 2000*). Clearly, there is a need to increase opportunities for teachers and students to build on their knowledge of IT, as well as the many applications of this discipline, both inside and outside of the classroom.

The shortage of underrepresented Americans in the technological workforce contributes to the overall shortage of information technology workers. Current structures and approaches have resulted in a well-documented digital divide, illustrated by how computers are used in schools and their availability in the home. "Although computing is integrally linked to critical investigations in medicine, environmental science, famine control, art, and music, computer science textbooks focus primarily on technical detail, with little attention paid to the application and impact of the technology in meaningful interdisciplinary problem-solving assignment" (*Margolis, 2002*). In order to address the long-term need for Information Technology workers, programming for both youth-based and teacher projects is needed.

## II. PROGRAM DESCRIPTION

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### A. Youth-Based Projects

## 1) Project Goals

The goal of ITEST youth-based programming is to provide middle- and high-school students, particularly those from disadvantaged urban and rural communities, access to year-round IT enrichment experiences and opportunities to explore related education and career paths. Projects should create high-quality learning strategies and curriculum models for use in after school, weekend, and/or summer settings. Youth-based projects should include hands-on, inquiry-based activities with a strong emphasis on non-traditional approaches to learning. Cooperative learning and socially relevant problem solving are alternatives to consider.

Successful ITEST proposals for youth-based projects would include all of the following:

Intensive, year-round enrichment experiences that emphasize IT or IT-intensive STEM subject areas for middle- and high-school students (grades 7-12). Projects should offer a minimum of 120 contact hours per year, with summers being used for participation in research institutes, externships, or other field-based experiences.

The creation of a student-based model tailored to meet the needs of informal learners. Projects should provide in-depth learning opportunities for students in IT or an IT-intensive subject area. Proposals may include the development of new materials or the modification of existing instructional materials for use in informal settings.

A focus on IT or on IT-intensive science, technology, engineering, or mathematics subject areas. Proposals should include a description of how the content will be aligned with appropriate national or state standards. Examples include, but are not limited to, computer information systems, cryptography, robotics, astronomy, biotechnology, Web site design, computer-aided instruction, and human-computer interface design.

Evidence of public/private partnerships to enhance resources and exposure to careers in science and technology. Collaborations and partnerships between informal science education organizations, business/industry, community organizations, community colleges, and universities are encouraged to enhance the overall project scope and/or the ability to serve participants effectively. Such partnerships should provide participants with opportunities to work directly with IT and STEM professionals and to see examples of workplace applications.

## 2) Project Characteristics

Current IT standards for schools focus primarily on the use of computers and the associated software as tools. Such projects generally include the basics associated with computer hardware, software, and popular applications such as word processing, database design and management, spreadsheets, desktop publishing, presentation software, and various Internet functions such as e-mail and information retrieval. ITEST projects must go beyond these basics and introduce fundamental concepts of IT, such as algorithms, data organization, modeling, and abstraction, as well as some of the more exciting applications of IT that might be inaccessible to students in a home or school environment. For example, Web page design, 2-D animation, and multimedia authoring are all specialized skill areas in IT. Cryptography and astronomy are examples of IT-intensive applications drawn from the mathematical and physical sciences. The goal is not to duplicate or extend formal education classes, but to capitalize on the strength of voluntary, self-directed, and exploratory learning, while introducing content in a novel manner that will engage participants.

a. *Focus.* All projects should focus specifically on IT or IT-intensive STEM subject areas and clearly show the relevance of the proposed work to learning and acquiring IT concepts and skills. If the project is focused on one technology, such as robotics, the proposal should show how, through this focus, participants would learn IT skills and STEM concepts. These activities should be informal education, and not replace or supplement formal education courses.

b. *Project Design.* ITEST will support year-round projects that take place after school and on weekends. All projects must include a substantial summer component. The project design should allow for in-depth exploration of content and provide participants with an opportunity to meet and work with scientists and professionals in IT/STEM fields, preferably in externships or intensive summer institutes allowing for hands-on experiences. Activities should be designed to meet the needs of the target audience of middle- and/or high-school students, currently in or entering grades 7-12. Guidance on preparation for college, school-to-work training, and parental involvement are all key elements of the ITEST project design. Proposals should describe a recruitment plan, which outlines strategies for recruiting and retaining participating youth. Each project is expected to develop an informative Web site that represents the work of the project and will be compatible with the ITEST homepage created by the Resource Center (see the ITEST Resource Center Web site at <http://www2.edc.org/itestrc/>).

c. *Lead Organization.* Although Youth-Based Projects are closely aligned with informal science education, all organizations with an educational mission are eligible. Such organizations include, but are not limited to, two- and four-year colleges and universities, businesses, informal science education organizations, professional societies, middle and secondary schools, and community agencies. Additionally, the ITEST program emphasizes the role that informal learning can have in influencing

and nurturing interest in IT. Informal science education organizations include museums, science and technology centers, botanical gardens, zoos, and aquariums. These organizations already provide creative examples of IT applications in exhibitions, programs, research, and administration. They are expected to be excellent resources for program design and management, and often have longstanding relationships with schools and community-based organizations.

d. *Partners and Collaborative Relationships.* Because considerable emphasis is placed on providing students with guidance on academics, as well as college preparation and school-to-work transitions, it is also expected that the lead organization and/or partners will include two-year colleges, universities, businesses, industry, or community-based organizations, as appropriate, to provide content expertise, externships, and research experiences for participants.

e. *Impact.* Projects may have a local or regional focus (either a community or metropolitan area), and should provide a plan for year-round activities in which content is introduced in an engaging manner.

f. *Evaluation Plan.* The proposal must include plans for formative and summative evaluation of the project to assess the impact of the project's activities, progress, and success in meeting goals. An external evaluator who handles at least the summative evaluation should be identified in the proposal. Evaluations must develop indicators of impact on students and how well the project promotes diversity among participants. The evaluation plan must describe how the data will be collected, indicators that will be measured, methods of analysis, and the timeline for the evaluation process. If materials are developed, appropriate plans for evaluation and field-testing of materials should be included. Each project should commit to cooperating with the evaluative research of the impact of the ITEST program that will be conducted by the ITEST Resource Center. As part of this evaluation study, Youth-Based Projects will be responsible for providing requested data to the ITEST Resource Center.

g. *Sustainability.* Proposals should include plans for ensuring continuation of critical aspects of the project after the period of NSF support.

## **B. Comprehensive Projects for Students and Teachers**

### **1) Project Goals**

The goal of Comprehensive Projects for Students and Teachers is to provide intensive teacher professional development in IT concepts, skills, and applications; pedagogical strategies that promote student investigation and inquiry; and awareness of IT career and educational paths for students. The inclusion of guidance counselors to assist with the development and dissemination of IT-related career materials is encouraged. This component will create opportunities for teachers to put into practice what they have learned via summer laboratory experiences with students in grades 7-12. Additionally, projects should provide visible and transferable models of the effective use of IT by teachers in classrooms.

Information technology addresses how information is acquired and modeled, as well as how understanding can emerge. Understanding IT concepts and mastering IT skills are just part of what is needed to enhance intellectual capabilities. Successful ITEST proposals for teacher projects should include the following:

A minimum of 120 contact hours per participant, which must include substantial summer activities as well as school year activities. For example, teachers might participate in workshops during two consecutive summers and have supporting activities during the intervening school year. Whenever possible, continuing education or graduate credit should be arranged for participating teachers.

A description of the fundamental components (concepts and skills), as well as the intellectual capabilities, that the project intends to enable in participants.

A clear description of the end goals (what participants will know or be able to do as a result of the project) within the broader goals of the program (more people competent in IT and pursuing careers that include IT components). The strategies used, such as workshops, supporting materials, collaborations, and so forth, should be logically tied to the project goals.

Pedagogical strategies that promote inclusion so all participants will learn "to apply information technology in sophisticated ways to solve problems across disciplines and subject areas..." (American Association of University Women, 2000). Successful projects should embrace approaches and methodologies that attract, encourage, and support those students and classrooms (through their teachers) that have benefited least from the advent of information technologies. Attention must be given to recruitment, content, and context when designing strategies to reach those teachers.

A summer youth component (minimum one week) where the participating teachers must pilot new ideas and strategies.

An evaluation that measures how well the goals were met and provides opportunity for appropriate assessment and adjustment as the project progresses.

## 2) Project Characteristics

Proposed projects should include summer institutes that provide intensive teacher professional development in information technology and related STEM content domains. They should emphasize pedagogical strategies that address the needs of students, as well as diverse learning styles and facility within IT and increased student investigation and inquiry. Part of the experience should make teachers aware of related career and educational paths for students through direct interactions with practitioners. Projects should also provide opportunities for teachers to put into practice what they have learned with grades 7-12 students in summer institutes and in their STEM courses. Thus, projects should include both teacher enhancement and a summer institute for students. The student summer activities should be led by participating teachers with support from faculty or partner mentors. Although all of the proposed projects will include summer activities, the total programming experience is expected to be year-round in nature.

a. *Focus.* Appropriate themes are those that will directly lead to teaching that focuses on IT and incorporates it into STEM courses. Examples of IT supporting content domains include computation science or computational mathematics, cryptography, Geographical Information System/Global Positioning System, bioinformatics, robotics, and computer graphics. Because it is expected that teachers will use what they learn when they return to their schools or informal institutions, projects must demonstrate the need for, and curricular relevance of, what is proposed. For school-based projects, this should include ties to national or state standards.

b. *Project Design.* The activities, both for teachers and students, should use methodologies that are consistent with the intent of the project, to move more students to consider technology-intensive career paths. Consequently, such workshops should support and use investigation, collaboration, technical resources, and other techniques that are part of the accepted way workers use technology. Moreover, IT should be an integral part of the methodology and delivery of the summer and year-round activities of the project.

A necessary part of the project is to continue to support teachers after they return to their classrooms. The method of this support is left to the project, but might include using mentors; providing collaborative groups for reflection, visits, and follow-up meetings; online sharing; access to expanding teacher collections of activities and comments; and so forth. The full potential of IT should be exploited as a method of providing long-term support. Each project is expected to develop an informative Web site that represents the work of the project and will be compatible with the ITEST homepage created by the Resource Center(see the ITEST Resource Center Web site at <http://www2.edc.org/itestlrc/>).

c. *Recruitment.* Recruiting should be consistent with the project goals. For instance, if the project focuses on computational chemistry, the need in terms of helping students understand key chemistry concepts should be substantiated and the recruitment and ongoing support for the teachers and classrooms should be appropriate. Projects that propose to reach communities that have fewer opportunities, or that have a clear plan to increase the diversity of the IT workforce are particularly encouraged.

d. *Evaluation Plan.* The proposal must include plans for formative and summative evaluation of the project to assess the impact of the project's activities. An external evaluator who handles at least the summative evaluation responsibilities should be included in the proposal. For teachers, it is expected that both what they teach (the infusion of IT in STEM courses) and how they teach (access resources, supporting models, etc.) will change. The evaluation plan must therefore be multidimensional. In addition to determining the immediate results of the in-service activity or student workshops, the evaluation should determine if teaching practice in the school or informal institution has changed in ways that are promoted by the project. If curriculum materials or modules are developed, appropriate evaluation and field-testing of prototypes should be included.

Each project should commit to cooperating with the Resource Center's evaluative research of the impact of the ITEST program that is funded independently by NSF. As part of this evaluation study, Comprehensive Projects for Students and Teachers will be responsible for providing requested data to the ITEST Resource Center.

e. *Other.* Projects can also support the development of appropriate instructional modules and other materials for use by students, including those that promote an awareness of IT-careers, and/or professional development materials for use by teachers. Given the modest size of the ITEST program, these materials will be limited to small modules used to augment STEM courses.

## C. ITEST Proposal Elements

Competitive ITEST proposals should include the following:



**Statement of Need:** This should be stated in terms of the educational need, not the organization's need.

**Target Audience and Impact:** Specify the intended primary audience and if the impact will be local or regional.

**Project Goals:** State the project goals in terms of the intended impact on the target audience.

**Focus:** See *Characteristics* under Youth-Based Projects and Comprehensive Projects for Students and Teachers.

**Project Design:** Describe the overall approach and components of the project. Discuss the scope and depth of the science, and the manner and style in which it will be presented. What is the target audience's expected experience as they participate in the project? What are the project deliverables?

**Recruitment:** Provide an appropriate recruitment strategy for the target audience; also see *Characteristics* under Youth-Based Projects and Comprehensive Projects for Students and Teachers.

**Key Staff, Consultants, and Advisors:** Provide a description of the responsibilities, qualifications, and level of effort of the key personnel involved in the project, including the role of consultants and advisors at each stage of the project.

**Partners:** Provide documentation of collaborative relationships and partnerships that are essential to the project.

**Ancillary Material.** Describe any ancillary material that will be produced.

**Evaluation:** It is expected that ITEST projects will include, at a minimum, two stages of evaluation at a level commensurate with the nature and scope of the propose project. Elements to be addressed in the Evaluation Section of a Proposal:

- Name, credentials, and responsibilities of the evaluator/s.
- Strategies used for the various phases of the project.
- General information about the evaluation processes including sample sizes, instruments used, nature of the data (quantitative and qualitative), and analytical methods.
- Timeline: When, during the various phases of the project, will the evaluation work take place? Be sure to allot adequate time for all phases including an adequate and thorough summative evaluation.
- Budget: The budget should be adequate to enable the evaluator to conduct a thorough project evaluation.

**Dissemination:** Describe, as appropriate, how information about the project and any knowledge gained in developing the project will be conveyed to the field.

**Timeline:** Provide a month-by-month schedule for each year of the project that indicates the major developmental steps for all the aspects of the project.

**Sustainability:** Describe the plans to sustain the project efforts beyond the period of the grant, as appropriate.

## D. REFERENCES

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Bureau of Labor Statistics, U.S. Department of Labor, *Career Guide to Industries, 2004-05 Edition*. [Available at: <http://bls.gov/oco/home.htm>]

Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (September 2000). *Land of Plenty, Diversity as America's Competitive Edge in Science, Engineering and Technology*. Washington, DC.

Horrigan, M.W. (2004). Employment projections to 2012: Concepts and context. *Monthly Labor Review Online*, 127, 3-22. [Available at: <http://bls.gov/opub/mlr/2004/02/art1full.pdf>]

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U. S. Department of Commerce, National Telecommunication and Information Administration (2002). *How Americans Are Expanding Their Use of the Internet*. Washington, DC.

U.S. Department of Commerce, Office of Technology Policy (1998). *Update: America's New Deficit*. Washington, DC.

U.S. Department of Labor (1991). *What Work Requires of Schools: A SCANS Report for America 2000*. Washington, DC: The Secretary's Commission on Achieving Necessary Skills. Further information is available at: <http://www.scans.jhu.edu/NS/HTML/AboutCom.htm>

#### Related Resources:

Bohan-Baker, M. (Ed.) (2003). *Evaluating Community-based Initiatives*. The Evaluation Exchange, 9(3). Cambridge, MA: Harvard Family Research Project. [Available at: <http://www.gse.harvard.edu/~hfrp/eval/issue23/index.html>]

Bruce, B. C. (Ed.) (2003). *Literacy in the information age: Inquiries into making making with new technologies*. Newark, DE: International Reading Association [ISBN 0-87207-003-4; 364 pp.; Available at <http://www.reading.org/>]

Caspe, M., Traub, F., & Little, P. (2002). *Beyond the head count: Evaluating family involvement in out-of school time*. Cambridge, MA: Harvard Family Research Project. [Available at [www.gse.harvard.edu/hfrp/projects/afterschool/resources/issuebrief4.html](http://www.gse.harvard.edu/hfrp/projects/afterschool/resources/issuebrief4.html) <http://www.gse.harvard.edu/~hfrp/projects/afterschool/resources/issuebrief4.html>]

Harvard Graduate School of Education. (2003). *Youth Participation: Improving Institutions and Communities: New Directions for Youth Development*, No. 96.

Lawrenz, F. & Huffman, D. (2003). How Can Multi-Site Evaluations be Participatory? *American Journal of Evaluation*, 24(4), 471-482.

Loucks-Horsley, S., Love, N., Stiles, K., Mundry, S. & Hewson, P. (2003) (2nd Edition). *Designing Professional Development for Teachers of Science and Mathematics*. Thousand Oaks, CA: Corwin Press ISBN: 0761946861

National Institute for Out-of-School Time. (2004). *Making the Case: A Fact Sheet on Children and Youth in Out-of-School Time*. Wellesley, MA: Center for Research on Women, Wellesley College. [Available at <http://www.niost.org/>]

National Research Council. (2002). *Community Programs to Promote Youth Development*. J.Eccles & J. Gootman (Eds.), Washington, DC: National Academy Press.

#### Proposal Writing Tips:

NSF 04-016 - [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf04016](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf04016): A Guide for Proposal Writing

NSF 02-057 - [http://www.nsf.gov/publications/pub\\_summ.jsp?ods\\_key=nsf02057](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=nsf02057): The 2002 User-Friendly Handbook for Project Evaluation

### III. ELIGIBILITY INFORMATION

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Proposals targeting minorities, persons with disabilities and women are especially encouraged.

- **Organization Limit:** All organizations with an educational mission are eligible.
- **PI Eligibility Limit:** An individual may serve as the Lead Principal Investigator (PI) for no more than one proposal under this solicitation.
- **Limit on Number of Proposals:** None Specified.

### IV. AWARD INFORMATION

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#### Duration and Funding Level.

Project duration for both Youth-Based Projects and Comprehensive Projects for Students and Teachers is expected to be three years. The funding level for Youth-Based Projects is up to an annual average of \$300,000, while Comprehensive Projects for Students and Teachers will be funded up to an annual average of \$400,000.

- **Anticipated Type of Award:** Standard or Continuing Grant.
- **Estimated Number of Awards:** 10 to 12 each for Youth-based and Comprehensive projects.
- **Anticipated Funding Amount:** \$20,000,000 pending availability of funds.

### V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

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#### A. Proposal Preparation Instructions

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##### Preliminary Proposals (*required*):

Preliminary 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](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](mailto:pubs@nsf.gov).

The instructions below are specific to ITEST, and supplement the GPG instructions:

A preliminary proposal and an ITEST program staff response are required prior to the submission of a full proposal for a project grant. **Preliminary proposals are required for Youth Based projects and Comprehensive Projects for Students and Teachers.** A PI should submit a preliminary proposal as early as possible in order to ensure adequate time to obtain staff reviews that will provide input for developing a full proposal. Preliminary proposals must be submitted in FastLane. (In FastLane the preliminary proposal is termed preproposal.)

A full proposal will be "encouraged" or "discouraged" based on the review of the preliminary proposal. It is recommended that only those preliminary proposals encouraged by ITEST staff be prepared as full ITEST proposals unless the PI is certain that the weaknesses cited can be fully addressed.

**Cover Sheet:** Be sure to check the preliminary proposal box.

**Project Summary:** An abstract should provide a clear overview of the project succinctly describing its major features. It **must** specifically summarize the project's *intellectual merit* and *broader impacts* in separate statements. If the Summary does **not** specifically address *intellectual merit* and *broader impacts*, the proposal **will be returned without review**. This Project Summary is limited to one single-spaced page.

**Project Description:** The narrative is limited to six pages in length. It should sketch, in broad strokes, the essential features of the project including:

**Need:** Describe the need being met (the educational, not organizational, need), the target population, and the plan to reach that population.

**Goals:** Describe the major goal(s) of the project, anticipated outcomes, and their alignment with ITEST program goals.

**Description of the Activity:** Describe the design of the project, identifying major components and including a timeline. What is the proposed life span of the project/activity? Provide general information on the content area, target population, and number of students and/or teachers to be impacted. When appropriate, indicate how the activity will be sustained following the NSF-funded period.

**Evaluation:** Plans for evaluation, including formative and summative, as appropriate.

**Key Personnel:** Identify each key staff member, consultant, and/or advisor involved in the project, and provide a one-sentence description of the qualifications for each and the percentage of time that person will devote to the project.

**Dissemination & Supplemental Materials:** Describe plans for the broad dissemination of the products of the project, as appropriate. Describe any planned ancillary materials that are to be made available to the general public.

**Budget:** The total budget should be entered as the Year 1 budget in FastLane. A one-page narrative budget explanation should be included in the Budget Justification.

**Supplemental Materials:** These are NOT permitted for preliminary proposals.

#### **Full Proposal Instructions:**

Proposals submitted in response to this program announcement/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](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](mailto:pubs@nsf.gov).

The instructions below are specific to ITEST, and supplement the GPG instructions:

**Cover Sheet:** The Cover Sheet must contain all requested information. If project funds are requested from another Federal agency or another NSF program, it must be indicated on the cover sheet. If such funds are requested subsequent to proposal submission, a letter should be sent to the attention of the ITEST program, identifying the proposal by its NSF number. Proposers are reminded to identify the program solicitation number in the program announcement/solicitation block on the *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. The related preliminary proposal number must be entered on the cover sheet as well.

**Project Summary:** A one-page Project Summary should be prepared, suitable for publication, which presents a self-contained description of the activity that would result if the proposal were funded. The initial sentences should describe the ITEST program component to which the proposal is submitted, content area, targeted participant population(s), the number of participants (students and/or teachers), and the number of contact hours for each group. The summary should be written in the third person, the present tense, and include an indication of the need being addressed, a statement of objectives, methods to be employed, potential contribution to the public understanding of STEM or the outcomes resulting from the project. The Summary **must** specifically address the project's *intellectual merit* and *broader impacts* in separate statements. If the Summary does **not** specifically address *intellectual merit* and *broader impacts*, in separate statements, the proposal **will be returned without review**.

**Project Description:** (including results from prior NSF support and data sheet). Most of the information that determines whether or not a grant will be awarded is included in the Project Description. Competitive ITEST proposals will include all information listed in Section II C. Reviewers will use this information in judging the merit of the proposal as described in this document. The maximum number of pages allowable for the *Project Description* is 15 pages. Page format should be single-spaced with a clear and legible type size of not smaller than 12-point type and with no less than 2.5 cm margins on all sides.

The narrative section of a competitive ITEST project proposal should include a project overview, goals and objectives,

general project description, qualifications of key personnel who will be coordinating the project, anticipated results, and evaluation and dissemination plans. Substantive information essential to understanding the details of complex projects should be placed in appendices with explicit references in the narrative.

**Results from Prior Support:** If the prospective PI or CoPI(s) received support for related NSF activities within the past five years, a description of the project(s) and outcomes must be provided in sufficient detail to enable reviewers to assess the value of results achieved. Past projects should be identified by NSF award number, funding amount, period of support, title, summary of results, and a list of publications and formal presentations that acknowledge the NSF award (do not submit copies of the latter). Evaluation data should be clearly described. Details regarding evaluation data should be put into an appendix. PIs and CoPIs with overdue Final Reports on previous NSF awards (i.e., Final Reports not submitted within 90 days after those previous NSF awards expired) may not receive any new grants until those Final Reports have been submitted to NSF.

**References Cited:** Any literature cited should be specifically related to the proposed project, and the Project Description should make clear how each reference has played a role in the motivation for, or design of, 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.

**Supplementary Documents:** Reviewers are often asked to read and assess a substantial number of competing proposals. For this reason, the project description alone must provide sufficient information so that a reviewer unfamiliar with the context of the project can make an informed judgment. In some cases, it may be critical to convey more detailed information to demonstrate levels of competence or expertise, to document commitment of personnel or other resources, to demonstrate the quality of instructional materials, or to provide other relevant information. Such material can be included in appendices that are clearly referenced in the proposal. Additionally, the proposal may refer to Web sites that contain this type of supplementary material. Presentation of such materials should be thoughtful and concise. Supplementary materials that cannot be submitted electronically must be mailed directly to the ITEST program (ITEST Program; NSF-ESIE; Suite 885; 4201 Wilson Blvd; Arlington, VA 22230.) **NSF does not require reviewers to read appendices or to review information on Web sites.**

Proposers are reminded to identify the program announcement/solicitation number (05-621) in the program announcement/solicitation block on the proposal Cover Sheet. Compliance with this requirement is critical to determining the relevant proposal processing guidelines. Failure to submit this information may delay processing.

## B. Budgetary Information

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### Cost Sharing:

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

### Other Budgetary Limitations:

Additional limitations to consider include the following:

- If materials are developed as part of a project, modest additions of up to 20% can be made to the budget limitations (e.g., up to 20% of \$300,000 per year for Youth-Based projects, up to 20% of \$400,000 per year for Comprehensive Projects for Student and Teacher projects), provided the materials will be field-tested and distributed broadly.
- NSF support for stipends for teachers is permitted up to \$100 per day.
- Equipment purchase is not supported by NSF.
- Modest support within the budget limits will be provided for purchase of teacher materials and supplies in Comprehensive Projects for Student and Teacher projects.

## C. Due Dates

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Proposals must be submitted by the following date(s):

### Preliminary Proposals (*required*):

November 02, 2005

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

February 24, 2006

## **D. FastLane Requirements**

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Proposers are required to prepare and submit all proposals for this announcement/solicitation through the FastLane system. Detailed 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](mailto: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 announcement/solicitation should be referred to the NSF program staff contact(s) listed in Section VIII of this announcement/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>

## **VI. PROPOSAL REVIEW INFORMATION**

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### **A. NSF Proposal Review Process**

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Reviews of proposals submitted to NSF are solicited from peers with expertise in the substantive area of the proposed research or education project. These reviewers are selected by Program Officers charged with the oversight of the review process. NSF invites the proposer to suggest, at the time of submission, the names of appropriate or inappropriate reviewers. Care is taken to ensure that reviewers have no conflicts with the proposer. Special efforts are made to recruit reviewers from non-academic institutions, minority-serving institutions, or adjacent disciplines to that principally addressed in the proposal.

The National Science Board approved revised criteria for evaluating proposals at its meeting on March 28, 1997 ([NSB 97-72](#)). All NSF proposals are evaluated through use of the two merit review criteria. In some instances, however, NSF will employ additional criteria as required to highlight the specific objectives of certain programs and activities.

On July 8, 2002, the NSF Director issued [Important Notice 127](#), Implementation of new Grant Proposal Guide Requirements Related to the Broader Impacts Criterion. This Important Notice reinforces the importance of addressing both criteria in the preparation and review of all proposals submitted to NSF. NSF continues to strengthen its internal processes to ensure that both of the merit review criteria are addressed when making funding decisions.

In an effort to increase compliance with these requirements, the January 2002 issuance of the GPG incorporated revised proposal preparation guidelines relating to the development of the Project Summary and Project Description. Chapter II of the GPG specifies that Principal Investigators (PIs) must address both merit review criteria in separate statements within the one-page Project Summary. This chapter also reiterates that broader impacts resulting from the proposed project must be addressed in the Project Description and described as an integral part of the narrative.

Effective October 1, 2002, NSF will return without review proposals that do not separately address both merit review criteria within the Project Summary. It is believed that these changes to NSF proposal preparation and processing guidelines will more clearly articulate the importance of broader impacts to NSF-funded projects.

The two National Science Board approved merit review criteria are listed below (see the [Grant Proposal Guide](#) Chapter III.A for further information). 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 he/she is qualified to make judgments.

#### **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:**

**A. Youth-Based Project proposals:**

Additional review criteria used in evaluating **ITEST Youth-Based Project proposals** include:

- **Content Focus.** Does the content reflect a focus on IT or an IT-intensive STEM subject area? Do the content and instruction reflect the appropriate age and grade level(s) of targeted participants and allow for in-depth exploration of subject areas? Are the specific elements of the content plan presented or developed fully and include a description of how content will be aligned with national standards?
- **Project Design.** Are the participants engaged in meaningful year-round experiences? Will investigations lead to knowledge and understanding of IT or IT-intensive STEM subject areas? Do activities relate to the development of workplace skills and include guidance on college preparation? Is the expected duration of student involvement in the program clearly stated, and appropriate to achieve the stated learning outcomes? Is there an opportunity to work with scientists and/or IT professionals?
- **Impact.** Will the project have significant local or regional impact on the availability of IT experiences for youth? What is the potential for strengthening the IT literacy?
- **Recruitment.** Does the proposal include a plan for identifying potential participants and for encouraging their ongoing participation? Are there mechanisms to facilitate access by students from disadvantaged urban and rural communities? If there are other targeted characteristics (e.g., age range, academic ability, economic status, ethnicity/gender), does the plan identify how those individuals are recruited and selected?
- **Institutional Capacity:** What involvement has the proposing institution and/or its partners had in creating high-quality youth programs? What is the expertise of key staff proposed for this project?
- **Partnerships.** Proposals will be assessed based on the reasonableness of working relationships among partners and clear evidence of collaboration demonstrated in preparing the proposal. What is the likelihood that the project will facilitate greater interactions among professionals in museums, science/technology centers, community organizations, universities, cooperating school systems, and business/industry? Is there evidence that long-term relationships are likely to be forged that can supplement and support IT enrichment programs in a variety of settings?

- **Sustainability.** Does the proposal include plans for continuance of the program beyond NSF funding? What, if any, sustainability strategies will be employed?
- **Parental Involvement.** Are parents or primary caregivers included as partners in order to provide at-home continuity and support for students' learning experiences? Have feasible mechanisms for family involvement, that are sensitive to complexities/limitations of family schedules, been proposed? Is the parental interaction a meaningful part of the program implementation?
- **Research and Evaluation.** Does evaluation of overall project effectiveness include measures of students' learning outcomes and increased interest in pursuit of careers and further study in IT or IT-intensive STEM subject areas? If activity materials are developed, is there adequate testing of draft and prototype materials during the developmental stages?

## B. Comprehensive Projects for Students and Teachers proposals:

Additional criteria used in evaluating proposals for **Comprehensive Projects for Students and Teachers** include:

- **Content Focus.** Does the content focus on IT and have the potential to improve STEM instruction? Are the content and instruction appropriate for the target grade levels? Does it include sufficient IT fundamentals as well as clear links to STEM instruction?
- **Project Design.** Are participating teachers involved in year-round activities? Will they continue to learn, reflect, and share their learning and experiences with project staff, colleagues and other participants? Will investigations lead to knowledge and understanding of IT and its contribution to specific STEM subject areas? Do activities help prepare teachers to use IT-related approaches in their STEM teaching? Is the duration in the program clearly stated and appropriate to achieve the project goals? Is there an opportunity to work with scientists and/or IT professionals?
- **Institutional Capacity:** What involvement has the proposing institution and/or its partners had in the development of teacher professional development programs? What is the expertise of key staff proposed for this project? Does the key staff have demonstrated experience in IT and IT application in STEM courses?
- **Impact.** Will the project have significant impact on classrooms? Will it provide a useful model for others? Are there provisions for dissemination?
- **Recruitment.** Does the proposal include a plan for identifying potential participants and for sustaining their ongoing participation? Are there mechanisms to encourage participation by teachers and students in schools from disadvantaged urban and rural communities? Is the recruitment strategy (population, region, diversity, etc.) consistent with the project goals (content, strategy, support, etc.)?
- **Partnerships.** Does the project include the necessary partners to be successful? Are their roles and contributions clear and appropriate? Will the partners be accessible and have an ongoing role during the school year? Is there evidence that long-term relationships are likely to continue and support IT programs within the project and beyond?
- **Sustainability.** Does the proposal include plans for continuance of the program beyond NSF funding? What sustainability strategies will be employed to continue the project at the grantee institution, in the schools? Are there provisions for disseminating the project models and materials?
- **Research and Evaluation.** Does the project include evaluation of the overall project effectiveness? Is the formative evaluation plan reasonable to support the project development? Is the summative evaluation designed to measure the success in reaching the project goals? If applicable, is the research that emanates from the project likely to be useful and informative? If activity materials are developed, is there adequate testing of draft and prototype materials during the developmental stages?

## B. Review Protocol and Associated Customer Service Standard

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All proposals are carefully reviewed by at least three other persons outside NSF who are experts in the particular field represented by the proposal. Proposals submitted in response to this announcement/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.



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 Director. In addition, the proposer will receive an explanation of the decision to award or decline funding.

In most cases, proposers will be contacted by the Program Officer after his or her recommendation to award or decline funding has been approved by the Division Director. This informal notification is not a guarantee of an eventual award.

NSF is striving to be able to tell proposers whether their proposals have been declined or recommended for funding within six months. The time interval begins on the closing date of an announcement/solicitation, or the date of proposal receipt, whichever is later. The interval ends when the Division Director accepts the Program Officer's recommendation.

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

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### A. Notification of the Award

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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

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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 are administered in accordance with NSF Cooperative Agreement Financial and Administrative Terms and Conditions (CA-FATC). 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/awards/managing/>. Paper copies of these documents may be obtained from the NSF Publications Clearinghouse, telephone (703) 292-7827 or by e-mail from [pubs@nsf.gov](mailto: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/publications/pub\\_summ.jsp?ods\\_key=gpm](http://www.nsf.gov/publications/pub_summ.jsp?ods_key=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>.

### C. Reporting Requirements

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For all multi-year grants (including both standard and continuing grants), the PI must submit an annual project report to the cognizant Program Officer at least 90 days before the end of the current budget period.

Additional reporting requirements may be included, e.g., to support program evaluation, as required.

Within 90 days after the expiration of an award, the PI also is required to submit a final project report. Failure to provide final technical reports delays NSF review and processing of pending proposals for the PI and all Co-PIs. 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. This system permits electronic submission and updating of project reports, including information on project participants (individual and organizational), activities and findings, 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.

## VIII. CONTACTS FOR ADDITIONAL INFORMATION

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General inquiries regarding this program should be made to:

- David B. Campbell, Staff Associate for the Environment, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5093, fax: (703) 292-9044, email: [dcampbel@nsf.gov](mailto:dcampbel@nsf.gov)
- Julia V. Clark, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5119, fax: (703) 292-9044, email: [jclark@nsf.gov](mailto:jclark@nsf.gov)
- Michael R. Haney, Program Director, ITEST Co-lead, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5102, fax: (703) 292-9044, email: [mhaney@nsf.gov](mailto:mhaney@nsf.gov)
- Sylvia M. James, Program Director, ITEST Co-lead, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5333, fax: (703) 292-9044, email: [sjames@nsf.gov](mailto:sjames@nsf.gov)
- Michael Piburn, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-7322, fax: (703) 292-9044, email: [mpiburn@nsf.gov](mailto:mpiburn@nsf.gov)
- Robert D. Sherwood, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 N, telephone: (703) 292-5115, fax: (703) 292-9044, email: [rsherwoo@nsf.gov](mailto:rsherwoo@nsf.gov)
- Emmett L. Wright, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5088, fax: (703) 292-9044, email: [elwright@nsf.gov](mailto:elwright@nsf.gov)

For questions related to the use of FastLane, contact:

- email: [ehr-esi@nsf.gov](mailto:ehr-esi@nsf.gov)

## IX. OTHER PROGRAMS OF INTEREST

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The NSF *Guide to Programs* is a compilation of funding for research and education in science, mathematics, and engineering. The NSF *Guide to Programs* is available electronically at <http://www.nsf.gov/cgi-bin/getpub?gp>. General descriptions of NSF programs, research areas, and eligibility information for proposal submission are provided in each chapter.

Many NSF programs offer announcements or solicitations concerning specific proposal requirements. To obtain additional information about these requirements, contact the appropriate NSF program offices. Any changes in NSF's fiscal year programs occurring after press time for the *Guide to Programs* will be announced in the NSF *E-Bulletin*, which is updated daily on the NSF Website at <http://www.nsf.gov/home/ebulletin>, and in individual program announcements/solicitations. Subscribers can also sign up for NSF's *MyNSF News Service* (<http://www.nsf.gov/mynsf/>) to be notified of new funding opportunities that become available.

Programs in the Division of Elementary, Secondary, and Informal Education (ESIE) that may be of interest to proposers of ITEST include:

**Centers for Learning and Teaching (CLT)** - addresses the need to enrich and diversify the national infrastructure for

standards-based science, technology, engineering, and mathematics education. (<http://www.nsf.gov/pubs/2004/nsf04501/nsf04501.htm>).

**Instructional Materials Development (IMD)** - emphasizes the development, dissemination, and implementation of instructional materials and assessments for STEM education. ([http://www.nsf.gov/pubs/ods/getpub.cfm?ods\\_key=nsf04562](http://www.nsf.gov/pubs/ods/getpub.cfm?ods_key=nsf04562)).

**Teacher Professional Continuum (TPC)** - supports the full continuum of professional development from recruitment, preparation, and induction, through the life-long development and retention of K-12 science, technology, engineering, and mathematics (STEM) teachers. ([http://www.nsf.gov/pubs/ods/getpub.cfm?ods\\_key=nsf04568](http://www.nsf.gov/pubs/ods/getpub.cfm?ods_key=nsf04568)).

**Advanced Technological Education (ATE)** - jointly managed by the Division of Undergraduate Education (DUE) and the ESIE, promotes improvement in technological education at the undergraduate and secondary school levels. (<http://www.nsf.gov/pubs/ods/getpub.cfm?nsf04541>).

**The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST)** - identifies outstanding mathematics and science teachers, kindergarten through 12th grade, in each state and the four U.S. jurisdictions. (<http://www.paemst.org/>).

Programs in other EHR Divisions that may be of interest to proposers to ITEST include:

**Graduate Teaching Fellows in K-12 Education (GK-12)** - supports opportunities for graduate and upper division undergraduate students in STEM disciplines to work with mentor teachers in the nation's K-12 schools. (<http://www.ehr.nsf.gov/dge/program/gk12>).

**Interagency Education Research Initiative (IERI)** - supports the establishment of a strong research base for education and learning, particularly in investigating scaling-up of proven interventions and the role of instructional technologies. IERI is a joint research activity between the NSF, the National Institute of Child Health and Development of NIH, and the Department of Education. (<http://www.nsf.gov/cgi-bin/getpub?nsf0192>).

**Math and Science Partnership (MSP)** - addresses the goal of increasing and sustaining the number, quality, and diversity of preK-12 teachers of mathematics and science through development of a professional education continuum that spans pre-service through career long professional growth. ([http://www.nsf.gov/pubs/ods/getpub.cfm?ods\\_key=nsf03605](http://www.nsf.gov/pubs/ods/getpub.cfm?ods_key=nsf03605))

**National Science, Mathematics, Engineering, and Technology Education Digital Library (NSDL)** - supports on-line networks of learning environments and resources for STEM education at all levels. (<http://www.ehr.nsf.gov/EHR/DUE/programs/nsdl/>).

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