Instructional Materials Development (IMD)

Instructional Materials for Students

Assessment

Applied Research

Program Solicitation
NSF 04-562
Replaces Document **NSF 03-524**

National Science Foundation
Directorate for Education and Human Resources
Division of Elementary, Secondary and Informal Education

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

May 10, 2004

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

August 26, 2004

REVISIONS AND UPDATES

Changes in this solicitation include: shortening the introductory section on the Division, an increased emphasis on Applied Research with suggestions of specific research questions, changes in **AREAS FOR INVESTIGATION**, and a new paragraph related to achieving divisional goals. Additionally, the solicitation reflects the NSB policy on cost sharing.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Instructional Materials Development (IMD)

Instructional Materials for Students

Assessment

Applied Research

Synopsis of Program:

The Instructional Materials Development (IMD) program includes three components:

- Instructional Materials for Students -- supports the creation and substantial revision of

comprehensive curricula and supplemental instructional materials that are research-based; enhance classroom instruction, preK-12; and reflect standards for science, mathematics, and technology education developed by national professional organizations.

- Assessment -- supports the creation of tools for assessing student learning that are tied to nationally developed standards and reflect the most current thinking on how students learn mathematics and science. Projects can also focus on assistance to schools and districts in implementing new assessments.

- Applied Research -- supports the research for development of the IMD program and projects; provides evidence for the effectiveness of materials and feedback for strengthening the portfolio; and identifies possible new directions in instructional materials and assessment.

Proposals may be submitted for projects in any field of science, technology, or mathematics (STM) education typically supported by NSF.

Cognizant Program Officer(s):

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

47.076 --- Education and Human Resources

Eligibility Information

Organization Limit: None Specified.

PI Eligibility Limit:

- **Organization Limit:** None Specified.

- **PI Eligibility Limit:**

  An individual may serve as the Principal Investigator (PI) for no more than one proposal per round of competition; any exceptions must obtain prior approval, in writing, from the IMD Section Head.

- **Limit on Number of Proposals:** None Specified.

Limit on Number of Proposals: None Specified.

Award Information

Anticipated Type of Award: Standard or Continuing Grant

Estimated Number of Awards: 10 to 15

- **Anticipated Funding Amount:** $10,000,000

pending availability of funds, including up to $5,000,000 for Applied Research. For information on Duration and Funding levels, see **Section IV, Award Information**

Proposal Preparation and Submission Instructions

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 Specialized. Please see the full text of this solicitation for further information.

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)* :

- May 10, 2004

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

- August 26, 2004

Proposal Review Information

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

Award Conditions: Standard NSF award conditions apply.

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

TABLE OF CONTENTS

I. INTRODUCTION

A. **THE DIVISION OF ELEMENTARY, SECONDARY, AND INFORMAL EDUCATION**

The comprehensive programming of the Division of Elementary, Secondary, and Informal Education (ESIE) develops research-based models and high-quality, innovative resources designed to strategically impact the learning and teaching of science, technology, and mathematics (STM) education, grades preK-12. Instructional materials and student assessments that promote active investigation, together with new models for teacher education, contribute to STM classroom environments that serve all students well. Moreover, ESIE media, exhibit, and community-based efforts increase scientific and technological literacy and develop life-long skills for learners of all ages. ESIE programs create a solid educational foundation for the future research, instructional, and technological workforce, as well as for students pursuing post-secondary education in other disciplines. All ESIE efforts incorporate innovations that promote high standards in content, pedagogy, and assessment; and through collaborations, capitalize on the strengths of formal and informal education, research and practitioner communities, and major stakeholders (e.g., higher education, school districts, state education agencies).

Program Overviews. Programs administered by ESIE in FY 2004 include: **Instructional Materials Development (IMD); Teacher Professional Continuum (TPC); Centers for Learning and Teaching**

(CLT); Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST); Informal Science Education (ISE); Information Technology Experiences for Students and Teachers (ITEST); and **Advanced Technological Education (ATE)**. The TPC and ATE programs are managed jointly with the Division of Undergraduate Education.

B. **INSTRUCTIONAL MATERIALS DEVELOPMENT (IMD)**

There are three components in the IMD program. These are **Instructional Materials for Students, Assessment**, and **Applied Research**. In order to obtain a better understanding of the impact of funding decisions over the last decade, the IMD program is placing increased emphasis on Applied Research in FY 2005. This will have an impact on the number of awards and/or award amounts in the other components of the IMD program.

OVERVIEW OF IMD COMPONENTS

The goal of the IMD program is to enhance science, technology, and mathematics (STM) content knowledge, as well as the thinking skills and problem solving abilities, of all students, pre-Kindergarten through grade 12 (preK-12), regardless of background, ability, or plans for future education. The IMD program encourages learning by all students through promotion of positive dispositions toward science and technology and of themselves as learners. In addition, it seeks to encourage a broader cross section of students to pursue education in scientific and technological disciplines through the use of real-world contexts. These goals are implemented through support of the development, revision, evaluation, and dissemination of materials and assessments that guide instructional decisions and provide information on depth of student learning of concepts and ideas. In pursuing enhanced student learning of STM content with depth and understanding, IMD recognizes the need to align teacher content knowledge and pedagogical strategies, and assessment with these materials and assessments. To document this relationship, IMD therefore encourages applied research that increases understanding of how teachers, materials, and assessments support student learning.

Each IMD program component reflects the Division's vision for implementing the Directorate's goals in STM education. This vision is characterized by innovation, collaboration, and strategic impact. IMD supports innovation through projects that incorporate results of up-to-date research on cognition and learning, exploit appropriate and current learning technologies, and reflect forward-looking and age-appropriate integration of advances in the STM disciplines. Collaboration is manifested in the composition of development teams in funded projects, as well as the cooperation among developers, publishers, schools, parents, and other stakeholders needed to realize the intended impact of the "deliverables" of funded projects. Strategic impact refers to the various ways the products developed with IMD support improve student outcomes (including learning and persistence in pursuing education in STM fields) and influence other aspects of the system, such as policy making related to standards and assessment at state and district levels and commercial publishing.

II. PROGRAM DESCRIPTION

A. ***INSTRUCTIONAL MATERIALS FOR STUDENTS***

PROJECT CHARACTERISTICS

Proposed instructional materials must exhibit a coherent content framework that is aligned with standards developed by national professional organizations (American Association for the Advancement of Science, 1993; International Technology Education Association, 2000; National Research Council, 1996; National Council of Teachers of Mathematics, 2000); foster inquiry, including critical thinking, problem solving, decision-making, and communication at increasing levels of complexity; and focus on appropriate and important topics at each grade level. Projects should be grounded in recent research on teaching and learning (e.g., Bransford, Brown, & Cocking, 1999; Wiggins & McTighe, 2001) and further an understanding of the connections among science, technology, engineering, and mathematics disciplines. Projects should be planned and implemented by teams consisting of appropriate combinations of practicing scientists, mathematicians, and engineers, STEM educators, classroom teachers, professional curriculum developers, assessment experts, and instructional technology experts. Projects should include research designed to understand better the effectiveness of the materials in increasing student learning and changing teacher practice. (Pelligrino, Chudowski, & Glaser, 2001)

Projects are supported that are national in scope and significance. These projects should have the potential to enhance student learning and make a significant and noticeable impact on the national market for

instructional materials. Projects range from the creation of new materials to the substantial revision of effective materials; from development of comprehensive curricula for several school years to the development of a single module for one grade level; from the development of materials with general application to the creation of materials targeted at a specific population (students with a particular cultural background, students with a particular physical or mental challenge, students at the extreme high or low level of the achievement curve); and from the integration of several disciplines to addressing a single topic.

Incorporation of instructional technologies should be considered, especially when those technologies are used to provide learning experiences that enhance student understanding. Digital libraries, computational tools, modeling and visualization, virtual environments, connectivity, and communication are among a growing catalog of capabilities that change what and how students can learn. All IMD-funded projects should use instructional technology in appropriate ways, anticipating a future in which these technologies are used widely to enhance education.

The IMD program will support the major revision of instructional materials to increase their effectiveness and impact by incorporating significant advances in research on teaching and learning, assessment, use of instructional technologies or in content emphasis. The proposals for the substantial revision of successful IMD-funded materials must provide data on classroom use of the earlier materials. Data such as market share, total number of copies sold or in use, or other pertinent measures, should be cited. Evidence of positive student outcomes, in terms of student achievement, persistence in course taking beyond school, district, or state requirements, and/or other measures must be provided. Documented changes in teacher practice should also be presented. Portions of the materials to be revised (e.g., units, modules) must be identified and a description of the nature of the changes must be given. Proposals must provide a clear rationale for the changes being proposed, based on research/studies of the implementation of the materials. Finally, evidence of strong support of the publisher, including substantial financial contributions to the revision process, must be included (see cost sharing requirements).

Particularly encouraged are projects that develop and implement research-based instructional materials that ameliorate achievement gaps between students and lead to improved understanding of and participation in STM by members of underrepresented groups. Strategies for ensuring equity and accessibility in materials use and in student learning should be part of the development and implementation process. Proposals should describe specific research-based strategies for engaging target groups and for the rigorous assessment of gains in student achievement.

In addition, when appropriate, the projects should include products designed to help parents understand, and teachers implement, the materials. It is important that projects include strategies and tools to assess the impact of the instructional materials, particularly on student learning. These data should be based upon credible evidence and be presented in ways that help stakeholders, including teachers, administrators, and parents, make informed decisions about curriculum adoptions.

Most IMD projects have extensive research efforts to carry out tasks associated with the development process. Projects often use carefully developed methods to identify learning needs, attune materials to learners, add and adjust support to meet the varied needs of students and teachers, build and support communities of practice, and so forth. These methods and findings could benefit from more rigorous research methodologies thereby having the potential to inform a much larger community concerned with the development and implementation of instructional materials. IMD seeks to support the projects in their efforts to conduct research on development and implementation and thus encourages projects to provide research questions and methodologies as part of their proposal to develop materials. It is anticipated that the accumulation of these research efforts across projects will provide a foundation of evidence for NSF's materials development initiatives.

AREAS OF SPECIAL INTEREST

High School Science. IMD invites proposals for projects to reconceptualize and reform high school science courses and laboratory experiences to better address the national standards and provide students with a coherent vision of science and how it is done in a modern, technological world. The IMD program could fund a small number of projects to develop models for new approaches to teaching high school science (e.g., integrated, multidisciplinary courses, different course sequences, the integration of in school and out-of-school learning experiences, or incorporating new technologies). New technologies have changed how, where and what children can learn in science. Educationally rich environments that preserve hands-on experiences and include access to data, remote field experiences, virtual environments, and desktop tools are replacing the science laboratory. The intention is to support the creation of innovative curriculum models that encompass multiple years and disciplines, reduce redundancy between courses, improve relevance, are based on current learning theory, incorporate modern methods and technologies, and provide all children with the foundation needed to apply basic scientific thinking to their lives. Research on the efficacy of these models must also be included.

Emerging Technologies. IMD also seeks to support a small number of innovative, high-risk projects that develop and test prototypes of instructional materials using state-of-the-art technologies, such as hybrid course materials that combine text with dynamic elements; assessment tools embedded in student materials to provide timely feedback; adaptive and flexible guides that provide support for teaching; and others. Proposals for such high-risk projects must demonstrate promise for advancing and testing the limits of instructional and assessment materials to promote student understanding of STM concepts and processes. Project support will be provided at levels sufficient to test the efficacy of the innovation.

Proposals to be considered for these areas should be clearly defined as such in the project summary.

PROJECT DESCRIPTION

Exemplary proposals will contain the following elements, which should be addressed in the Project Description section. Proposal reviewers will examine the extent to which these elements are effectively incorporated in the overall project plan.

Goals and Objectives. Describe the major goals for the project, as well as the anticipated outcomes for the students and for the teachers.

Project Evaluation. First describe the evidence that will be accepted to determine the extent to which goals are achieved. Then describe the evaluation strategies that will be used to obtain that evidence. Each major aspect of the project should be evaluated -- the development process, implementation, student learning, change in teacher practice, etc. Formative evaluation, designed to affect development efforts, may be conducted by an internal evaluator. An external evaluator should be used to provide evidence of the effectiveness of the materials developed. The proposal should provide evidence of the qualifications of the evaluators. In addition, all materials should undergo independent review by qualified experts to ensure accuracy of the content, appropriateness of the pedagogy, and suitability of the contexts, language, etc., for the intended audience. For materials that span one or more years of instruction, reviewers external to the project who are selected in consultation with the cognizant NSF Program Officer will conduct a review.

Anticipated Products. Describe the materials to be produced (e.g., print, software, videos, CD-ROMs, scholarly publications, monographs), including the specific learning activities to be developed (experiments, student projects, assessments, etc.).

Rationale. Describe how the proposed materials will broaden the range or improve the quality of materials that address learning goals for students and teachers throughout the nation. The proposer should describe how the instructional materials relate to and build upon previous and ongoing efforts in the field. Relevant literature should be referenced to indicate knowledge of disciplinary and pedagogical issues. Searches of the ESIE website (see http://www.ehr.nsf.gov/esie/programs/imd/imd.asp) and the Eisenhower National Clearinghouse (ENC) database (see: http://www.enc.org/professional/federalresources/federalspotlight/) are recommended.

Content and Pedagogical Strategies. Describe how the materials' content and pedagogical strategies are aligned with standards developed by national professional organizations; how the materials will prepare and motivate students to continue to study STM at higher grade levels; and how the materials will account for potential differences in students' prior knowledge. Availability of resources (e.g., computers, computer expertise) that will be needed at the school level for implementation of the materials also must be specified. If the materials are supplemental in nature, they must have a clear and limited content focus; utilize scientific, computational, and instructional technologies where appropriate; and demonstrate connections to comprehensive curricula

Work Plan. Explain how the materials will be created (or revised), reviewed, pilot-tested, field-tested, evaluated, and published. A detailed plan, including a complete timeline that indicates who is responsible for each facet, helps reviewers understand the flow of work. Draft materials must be pilot-tested with master teachers, and field-tests must include a broad range of teachers with diverse backgrounds who teach the targeted student population. It is expected that results of these trials will be used to inform revisions of the materials, and that both the results of the trials and the revisions will be submitted to NSF.

Assessment. Describe tools and strategies for student assessment that will be included in the instructional materials. It is critical that student assessments be clearly aligned with the desired student learning outcomes and be informed by the nationally developed standards in mathematics, science, and/or technology. Assessments should address both formative and summative aspects of learning. That is, assessments should include strategies for teachers to use during instruction as a guide for making instructional decisions, as well as to determine what students are learning. Development and validation of

assessment tools should occur in both the pilot- and field-testing of the materials. To the extent possible, there should be a variety of assessment strategies that are responsive to the different ways that students communicate understanding of content.

Professional Development. Describe the products to be produced (e.g., print, CD-ROM, web-based) that will support teachers and administrators in effectively implementing the materials with fidelity to the developer's intent. This element should include teaching guides to accompany the student materials, but may also include other products. If the instructional materials span one or more years of instruction, there must be separate professional development materials to help teachers acquire a deep understanding about the content and pedagogy of the materials. There should be plans for sustaining the use of the professional development materials after the end of the project and for informing teacher educators about the new materials to facilitate incorporation into pre-service teacher education programs. The creation of the professional development materials must meet the guidelines for Teacher Professional Continuum (TPC) program's professional development materials (see www.ehr.nsf.gov/esie).

Caregiver and Community Involvement. Describe ways to communicate to the community, including school boards and administrators, how the materials are designed to enhance learning of significant subject matter content and to increase student interest in science, mathematics, and technology. Attention should be given to communicating how the materials may differ from those with which community members may be familiar. Further, parent/community materials should assist parents and caregivers in helping their children in STM education.

Dissemination and Implementation. Explain how information about the materials will be shared with professionals and practitioners in STM education communities both during and after the project. Instructional materials typically will be published and distributed commercially, although in some instances "free" distribution (e.g., through a refereed and highly visible Web Site) might be an appropriate outlet. Proposals should provide a timeline for securing a publisher (or identifying another distribution outlet). This step typically should occur within the first two years of multi-year projects, with distribution outlets firmly established (e.g., through a contract with a publisher or distributor) by the end of the third year of the project. Dissemination plans that project potential sales income during the duration of the grant should specify how that income will be used to support the implementation, revision, or continued development of materials.

Personnel. Describe the expertise and experience of the key personnel. It is expected that the development team will include as active participants, practicing scientists, mathematicians, and engineers; cognitive scientists; STM educators; classroom teachers; assessment, evaluation and research experts; technology experts; instructional technologists; and professional developers. The proposal should include a detailed description of the role and commitment level of each of the key personnel.

Results of Prior NSF Support. Describe results of prior NSF support, including evidence of effectiveness and impact, for educational projects in which senior personnel have been involved.

B. ***ASSESSMENT***

PROJECT CHARACTERISTICS

Credible assessment of student learning is critical for determining the effects of education reforms, providing feedback on the instructional materials development process, and for understanding the effects and impact of new curricula on student learning and achievement. New assessment tools must be developed that align with accepted standards, measure specific desirable outcomes of reform, and differentiate the quality of curricula, materials and instruction. Similarly, schools and districts need support for new types of assessment to document the quality of new instructional materials, to evaluate their effective use, and to assess teacher professional development needs in content knowledge and practice. IMD encourages the development and implementation of new directions in assessing student learning. Assessments may range from those embedded in instructional materials to the creation of items for general use by districts and states.

Assessment projects: (1) are based on current research and include a model of cognition and learning as the cornerstone of the assessment design process (Pelligrino, Chudowski, & Glaser, 2001); (2) provide reliable and valid information that leads to a better understanding of how student learning can be enhanced and how instructional practice can be improved; (3) are developed in collaborative teams with appropriate expertise in the content area, in cognition and learning theory, in assessment development and psychometrics, and that include teachers at the appropriate grade level; and (4) are regional or national in scope.

Assessment projects should address one or more of the following areas:

Student Learning. Assessment focuses on measuring student learning and achievement. Assessment development that focuses both on classroom learning and comprehensive tests is needed. These tests should be consistent with standards developed by national professional organizations. Critical areas of need among others include: (a) assessment instruments that focus on key concepts or strands in middle grades mathematics; (b) projects that develop various tools to assess and guide student learning and instruction (e.g., embedded assessments); (c) comprehensive science (e.g., middle school science); and (d) assessment in technology education and concept acquisition through project-based learning.

Technology-Based. Effective applications of technologies for assessment purposes and studies examining unique contributions of various technologies to assessment are encouraged.

Communication Assistance. Materials and strategies may be developed to help schools and districts communicate effectively with teachers, administrators, school board members, parents, and the general community about the role of assessment. Materials and strategies that help the public to be critical consumers of available assessments and assessment results are also welcome.

PROJECT DESCRIPTION

Exemplary proposals will contain the elements listed below, which should be addressed in the Project Description section. Proposal reviewers will examine the extent to which these elements are effectively incorporated in the overall project plan.

Goals and Objectives. Provide a description of the major goals for the project and for targeted audiences (e.g., students, teachers, general public).

Project Evaluation. Describe the evidence that will be accepted to determine the extent to which the goals are achieved and the activities that will be used to obtain that evidence. An advisory board or external review team with expertise in the content area, STM education, assessment development, and measurement is recommended to oversee the project. The proposal should provide evidence of the qualifications of the advisory board or review team members.

Anticipated Products. Describe the assessment materials to be produced (e.g., type of assessments, monographs for helping teachers to implement assessments).

Rationale. Provide evidence that the proposed assessment materials meet the needs of students and teachers better than the existing ones. The project should be based on clear theoretical foundations and include a thorough overview of relevant research and literature to indicate knowledge of content, learning, cognition, and assessment issues. The proposal must describe how the assessment materials build on, and relate to, previous and on-going efforts in the field, and the contribution they will make to the field of assessment. A search of the Eisenhower National Clearinghouse (ENC) database is recommended (see: http://www.enc.org/professional/federalresources/federalspotlight/).

Work Plan. Explain how the assessments or materials will be created, reviewed, pilot-tested, field-tested, evaluated, and disseminated. The use of appropriate assessment development methodologies and psychometrically sound evaluations is expected. The proposal should contain a detailed plan of work, including a complete timeline.

Dissemination. Explain how information about the assessments and materials will be shared with professionals and practitioners in STM education communities both during and after the project. A dissemination plan that projects potential sales income should specify how that income will be used to support the implementation, revision, or continued development of assessment materials.

Personnel. Describe the expertise and experience of the key personnel. It is expected that the assessment development team will include, as appropriate, practicing scientists, mathematicians, and experts in technology; STM educators; classroom teachers; curriculum developers; and assessment and psychometric-experts. The proposal should include a detailed description of the role and commitment level of each of the key personnel.

Results of Prior NSF Support. Describe results of prior NSF support for educational projects in which senior personnel have been involved. Proposers who have developed assessments and materials related to the proposed work should include a summary of the past project evaluation that provides compelling evidence of the quality and effectiveness of the materials developed.

C. ***APPLIED RESEARCH***

PROJECT CHARACTERISTICS

ESIE has a strong commitment to applied research that studies the effectiveness and impact of efforts to enhance teachers' and students' STM learning. In order to build a "culture of evidence" in the IMD program, it is critical that a strong research component, which builds the knowledge base about important issues in instructional materials development, be associated with it. (National Research Council, 2002). The purpose of applied research projects is to ensure that IMD components are firmly grounded in research and that the projects and the field benefit from this knowledge. Applied research initiatives should be solidly informed and guided by the wisdom of practice. The insights of teachers or building administrators should provide central guidance to researchers in framing their hypotheses, in choosing their tools and methods, and in testing their theories against the realities of the classroom. Applied research is an important link in the cycle of Discovery, Innovation and Application as described by the RAND Mathematics Study Panel (RAND 2003) and provides important feedback for strengthening the portfolio and for identifying new programmatic directions. Research studies are separate efforts that grow out of a group of completed projects or from questions that arise through analysis of an issue of priority to IMD.

In order to obtain a better understanding of the impact of funding decisions over the last decade, the IMD program is placing increased **emphasis** on **Applied Research in FY 2005.** Studies that are highly focused and could provide results in eight-to-ten months are sought, as well as more comprehensive efforts that would extend over several years. **It is expected that approximately $5 million of the available funds will be directed to this emphasis, provided that high quality proposals are received.**

Three broad Areas of Special Interest are described below, along with examples of questions that might be addressed under each. A proposal should focus on only **one** of these areas.

AREAS OF SPECIAL INTEREST

Impact Assessments. Proposals based upon explicit research designs are encouraged for studies of the effectiveness and impact of instructional materials developed with NSF support. Research can range from meta-analyses of existing studies to large-scale studies involving the design and administration of new evaluation tools. External investigators, who have not participated in the development of the individual materials whose implementation is being studied, should conduct studies. Investigators contemplating such studies should discuss their ideas with an IMD Program Officer prior to writing a preliminary proposal.

Examples of questions that might be addressed include:

In what ways and under what circumstances is enhanced student learning an outcome of using NSF-funded instructional materials?

In what ways do NSF-funded instructional materials enhance other desirable student outcomes (e.g., increased enrollments in upper level STM courses, language acquisition, increased reading scores, etc.)?

In what ways have materials developed with NSF support had an impact in the broader area of materials development, particularly on texts developed by the large publishing houses?

What are the most influential factors for increasing the impact of NSF supported materials on the textbooks produced by the large publishing houses?

What are the relative impacts on students' understanding of SMT content and processes in an inquiry-based mode and in traditional modes of instruction? Is the evidence consistent across grade bands (e.g., primary vs. middle school)?

What are the attributes of assessments that provide the best information on various aspects of student learning?

How do state standards, frameworks, and assessments influence the SMT content of NSF-supported and commercially developed instructional materials?

How do state standards, frameworks, and assessments influence efforts to integrate disciplinary content, such as literacy and science in the early grades; the use of engineering design at the middle and high school levels; or mathematics and science at all levels?

Studies of Learning Structures. The degree of innovation possible may depend on the extent to which the curriculum sequences and organizational structures in a school can be changed. Re-sequenced courses such as seen in the physics-first movement and integrated cross-disciplinary courses represent two such changes. Double period classes and integration of online and face-to-face instruction are other examples. Others might use staff in non-traditional ways, better capitalizing on their skills and knowledge and responding more accurately to students' needs. Proposals that study design and implementation of such changes are encouraged. The environment in which they are tested should be generalizable, and the results should show both the effectiveness of the change on STM learning and the conditions under which it can be of value. Research and development initiatives should be solidly informed and guided by the wisdom of practice.

Examples of questions that might be addressed include:

What learning outcomes result from innovative curriculum structures, such as “physics-first”, or multidisciplinary courses, and what are the barriers to implementing such structures?

What is the impact of current efforts to integrate science and literacy at the primary grades on students' understanding of science and reading comprehension?

What learning outcomes result from the use of instructional technologies?

What learning outcomes result from the use and study of engineering design as an essential feature of instructional materials?

Research-to-Practice. Proposals are encouraged for projects that synthesize, organize, package appropriately, and disseminate to schools and other appropriate education agencies research related to the effective use of instructional materials in classrooms. There are currently few, if any, avenues for getting the results of research into the hands of school administrators, teachers, or other practitioners in a form that can influence practice. Project outcomes should include dissemination strategies and products based on well-developed plans and field-testing with potential end users, such as schools and teacher education programs. Projects’ evaluation plans should include methods for documenting strategies and approaches that are effective in advancing practice through the use of research findings. Evaluation efforts should also identify additional research questions of potential use in the field of practice.

Examples of questions that might be addressed include:

What levels of fidelity of implementation of innovative instructional materials are critical in changing student achievement and how can one evaluate the fidelity of implementation?

What are the critical issues that lead to successful adoption, or to unsuccessful adoption efforts?

What are the configurations and combinations in which the materials are used?

What is the nature and amount of teacher professional development required for effective use of the NSF funded materials?

What are the forces and motivations that are currently driving curriculum change at state and district levels? In particular, what influences are the increased accountability demands in states and districts having on the selection of materials?

Proposals intended to address one of these areas should clearly indicate this in the project summary.

PROJECT DESCRIPTION

Exemplary proposals will contain the following elements listed below, which should be addressed in the Project Description section of the proposal. Proposal reviewers will examine the extent to which these

elements are effectively incorporated in the overall project plan.

Goals and Objectives. Provide clear research questions that address areas of interest fundamental to IMD's mission and goals. Describe how the research methods are appropriate to the question(s) posed.

External Review of Project . Describe how the research will contribute to the knowledge base in the relevant field. An advisory board or external review team with expertise in the content area, STM education, methodologies (qualitative or quantitative), and measurement is recommended to oversee large, comprehensive projects. The proposal should provide evidence of the qualifications of the advisory board or review team members and describe their role in the project.

Anticipated Products. Describe the materials to be produced (e.g., scholarly publications, monographs, etc.). The proposal must provide evidence that the research project has a high likelihood of generating data that will contribute to the cycle of design, research, and redesign of IMD and its project portfolios. A search of the Eisenhower National Clearinghouse (ENC) database is recommended (see: http://www.enc.org/professional/federalresources/federalspotlight/).

Rationale. Provide evidence that the project is based on clear theoretical foundations, and include a thorough overview of relevant research and literature to indicate knowledge of disciplinary, pedagogical, and methodological issues. The proposal *must* describe how the research endeavor builds on, and relates to, previous and on-going efforts in the field.

Work Plan. Explain clearly the research design and the methodology to be applied. Explain how the research design provides answers to the research questions. Issues related to internal validity (drawing correct conclusions about the effects of treatment) and external validity (the possibility of generalizing the research findings) of the data generated should be considered. An explanation of how data will be collected and analyzed and the appropriateness of the methods used should be included.

Dissemination. Explain how research results will be communicated to professionals and practitioners in STM education communities both during and after the project.

Personnel. Describe the expertise and experience of key personnel. The proposal should include a detailed description of the role and commitment level of each of the key personnel. Project teams should be collaborative in nature, involving those conversant with the relevant research as well as those with experience with developing and implementing instructional materials, with teacher professional development, and with knowledge of the school workplace.

Results of prior NSF support. Describe how the results of prior NSF support for educational projects in which senior personnel have been involved ground and demonstrate the need for the proposed work. In cases where previous projects have resulted in materials related to the proposed work, include a summary of the past project evaluation that provides compelling evidence of the quality and effectiveness of the materials developed.

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III. ELIGIBILITY INFORMATION

The categories of proposers identified in the Grant Proposal Guide are eligible to submit proposals under this program announcement/solicitation.

Organization Limit: None Specified.

PI Eligibility Limit:

An individual may serve as the Principal Investigator (PI) for no more than one proposal per round of competition; any exceptions must obtain prior approval, in writing, from the IMD Section Head.

Limit on Number of Proposals: None Specified.

IV. AWARD INFORMATION

Duration and Funding Level .

*Anticipated Type of Award***:** Standard or Continuing Grant

*Estimated Number of Awards***:** 10 to 15

*Anticipated Funding Amount***:** $10,000,000, pending availability of funds, including up to $5,000,000 for Applied Research.

Except for highly focused, short-term, applied research projects, which are expected to last eight-to-ten months, the duration of a project is expected to be from two to five years. The level of funding for grants for **Instructional Materials for Students** depends upon the scope of the project. Amounts range from up to $300,000 for the development of a module to several million dollars for development of multiple-year, comprehensive materials. For **Assessment** projects, the maximum total request of any project may not exceed $1,000,000 per year. For **Applied Research**, projects will normally be funded at less than $500,000 per year. There are expected to be up to 4 awards for Instructional Materials for Students; up to 3 awards for Assessment; and up to 8 awards for Applied Research.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Preliminary Proposals *(required):*

All components of the IMD program listed in this program solicitation require a preliminary proposal for submission of a full

proposal. Preliminary proposals must be submitted via FastLane by the specified deadline. Submission of preliminary proposals via FastLane requires completion of the following FastLane forms:

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

Project Summary. The abstract should be no longer than 250 words and describe the disciplinary content, the grade level of the audience for the project, the pedagogical strategies to be used, and the IMD component under which the proposal is to be considered. The abstract is used to assign proposals to reviewers. **NOTE**: Proposals in which the Project Summary does not address the two National Science Board merit review criteria, **intellectual merit** and **broader impacts**, in separate, clearly marked statements will be returned without review.

Project Description. This section is limited to six pages. The project narrative should address the following topics: (a) goals or objectives of the project, (b) evidence to be accepted to demonstrate the extent to which the project achieves its goals, (c) anticipated products, (d) need for the project and relevant research, (e) essential features of the project and a work plan that describes how the project will be accomplished, (f) content and pedagogical strategies used, (g) evaluation plans (both formative to inform project development and summative to assess the effectiveness of the project with the target audience), and (h) dissemination plans. Page formats should be single-spaced with a clear and legible type size no smaller than 12-point type and with no less than 2.5 cm margins on all sides.

Budgets. Preliminary proposals should provide an estimated budget for the total amount of money being requested from NSF with information on salaries, equipment (where allowable), participant costs, consultant costs, travel, and indirect costs. The cumulative budget should be entered as the Year 1 budget in FastLane; FastLane automatically creates the cumulative budget. A one-page narrative budget explanation should be included in the Budget Justification section.

Biographical Sketches. Preliminary proposals should provide a brief narrative description of the expertise relevant to the proposed project of key personnel (e.g., educators, researchers, and evaluators) to be involved. Biographical sketches should be complete enough to show that the expertise necessary to conduct the project is available. Sketches should be put in the section of the preliminary proposal for CVs and thus do not become part of the six-page project description.

Supplementary Documents: Appendices and letters of support are **NOT** permitted for preliminary proposals.

Preliminary proposals are reviewed by carefully selected reviewers and NSF staff. Submission of a full proposal is encouraged or discouraged based upon the reviewers' perceptions of likelihood that a proposal, based on the ideas presented, would be successful in the merit review process for full proposals. *This is an advisory opinion and full proposals may be submitted in either event*. The written response provides information to the proposer to strengthen the proposal. Reviews are returned as expeditiously as possible, but no later than one month prior to the date for submission of a full proposal.

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. 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.

The following instructions supplement the *Grant Proposal Guide:*

Cover Sheet. (See GPG, Chapter II, Section C.2a) Enter the Preliminary Proposal number.

Project Summary. (See GPG Chapter II, Section C.2b) 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 IMD program component to which the proposal is submitted, the disciplinary content of the project, the grade level of the target audience, and the pedagogical strategies to be used. This information is used to place the proposal in the appropriate review panel. Next, in a paragraph with the heading ***Intellectual Merit****,* include an indication of the need being addressed, a statement of objectives, methods to be employed, potential contribution to the advancement of knowledge. Then in a paragraph with the heading ***Broader Impacts,*** provide a description of the products and outcomes resulting from the project as well as other impacts, such as that on underrepresented groups. The summary should be written in the third person, in the present tense, and should be informative to other persons interested in developing projects or using instructional materials. **NOTE**: Proposals in which the Project Summary does not address the two National Science Board merit review criteria, ***intellectual merit*** and ***broader impacts***, in separate statements will be returned without review,

Project Description (including results from prior NSF support and data sheet). The Project Description presents most

of the information that determines whether or not a grant will be awarded. It should be written to respond to criteria provided in the section on each component. Reviewers will use this information in judging the merit of the proposal as described in this document. In addition, it should communicate potential project impact and general project characteristics. The maximum number of pages allowable for the *Project Description* is 15 pages, with the following exceptions: planning and conference grant proposals should be no longer than 10 pages in length, including visual materials (e.g., charts, graphs, maps, photographs, and other pictorial presentations); proposals for comprehensive, multi-year curricular materials may be up to 20 pages in length with the **explicit written permission** of an IMD Program Officer. Page formats should be single-spaced with a clear and legible type size of no smaller than 12-point type and with no less than 2.5 cm margins on all sides. See the section *Supplementary Documents* below, and individual program sections for any exceptions to this limitation.

Results from Prior Support. (See GPG, Chapter II, Section C.2d.iii) If the prospective PI or coPI(coPIs) 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 must have submitted a final report for any completed NSF-funded project before a new grant may be awarded.

Project data sheets: A completed project data sheet must accompany the proposal. Data sheets may be downloaded from the ESIE Web Site at: http://www.ehr.nsf.gov/ehr/esie/datasheet.doc. Data sheets should be included in the supplementary document section of FastLane.

References Cited. (See GPG, Chapter II, Section C.2e) 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.

Supplementary Documents. (See GPG, Chapter II, Section C.2j, 2k and Section A) Reviewers are often asked to read and assess a substantial number of competing proposals. For this reason, the *Project Description* alone should provide sufficient information so that a reviewer unfamiliar with the context of the project can make an informed judgment. It may be critical to convey more detailed information to demonstrate levels of competence or expertise, to document commitment of personnel or other resources (i.e., letters of commitment), to demonstrate the quality of instructional materials, or to provide details of the evaluation of previously developed materials. Such material can be included in appendices that are clearly referenced in the proposal. Appendices, except sample materials, are limited to 20 pages and should be uploaded into the *Supplementary Documents* section on FastLane. Additionally, the proposal may refer to Web Sites that contain this type of supplementary material. Presentation of such materials should be thoughtful and concise. Reviewers are not required to read appendices or visit referenced websites.

Proposals for the development of student materials should include examples of the proposed materials and samples of past relevant work. These sample materials should be sent directly to the program, clearly labeled with the proposal number. If the materials are to be sent to the reviewers, at least ten copies are needed. Prospective PIs are encouraged to contact NSF Program Officers if they have questions about submission of appendix materials.

Budgetary Information. (See GPG, Chapter II Section C.2g) Proposals must contain a budget for each year of requested support. The proposal may request funds under any budget category so long as the item is considered necessary to perform the proposed work and is not precluded by program guidelines or applicable cost principles. All budget requests must be documented and justified in the Budget Justification section of no more than three pages. Ordinarily, no funds are made available for equipment or facilities or for continued operational expenses. (See also Section V.B below.) Estimates of calendar months of activity must be reported for categories of key personnel.

Special Proposals:

Small Grants for Exploratory Research (SGER). (See GPG, Chapter II, Section D1) SGER grants are for small-scale exploratory, high-risk research. Investigators are strongly encouraged to contact an NSF Program Officer before submitting the proposal.

Collaborative Proposals. (See GPG Chapter 11, Section D3) These are proposals in which investigators from more than one institution wish to collaborate on a unified project.

Proposals for Conferences, Symposia, and Workshops. (See GPG, Chapter 11, Section D7) IMD may support a few well-focused conferences or workshops whose products inform the community.

Proposers are reminded to identify the program announcement/solicitation number (04-562) 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

Cost Sharing:

Cost sharing of 30% of the requested total amount of NSF funds is required only for proposals submitted under **Instructional Materials for Students** (**Section II.A)** for revision of published materials. Cost sharing in excess of 30% is not allowed for such proposals. No cost sharing is specified for other components in this solicitation and none is allowed.

The proposed cost sharing must be shown on Line M on the proposal budget. Documentation of the availability of cost sharing must be included in the proposal. Only items which would be allowable under the applicable cost principles, if charged to the project, may be included as the awardee's contribution to cost sharing. Contributions may be made from any non-Federal source, including non-Federal grants or contracts, and may be cash or in-kind (see OMB Circular A-110, Section 23). It should be noted that contributions counted as cost-sharing toward projects of another Federal agency may not be counted towards meeting the specific cost-sharing requirements of the NSF award. All cost-sharing amounts are subject to audit. Failure to provide the level of cost-sharing reflected in the approved award budget may result in termination of the NSF award, disallowance of award costs and/or refund of award funds to NSF.

Other Budgetary Limitations:

The majority of IMD project costs support personnel time and personnel-related costs. Modest requests to support acquisition of materials, supplies, equipment, and computing services are allowable. Grantees are expected to have the computing facilities, most of the equipment, and the physical environment to achieve project goals. IMD will not fund the purchase of classroom equipment necessary to pilot, field-test, or implement instructional materials. IMD does not support the publication of student instructional materials for distribution.

C. Due Dates

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

Preliminary Proposals *(required):*

May 10, 2004

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

August 26, 2004

D. FastLane Requirements

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. 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

A. NSF Proposal Review Process

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:

In addition to the Foundation-wide criteria described above, special criteria to be used in evaluating instructional materials, assessment, and applied research proposals are described under the Project Description for each component. Under the criterion of ***intellectual merit***, reviewers will address goals and objectives, project evaluation, anticipated products, rationale, work plan, content and pedagogical strategies, assessment, and personnel. Under the criterion of ***broader impacts***,

reviewers will address strategies for increased participation of underrepresented groups, professional development, caregiver and community involvement, and dissemination and implementation. Some of the goals and products may be addressed under *broader impacts*, as well.

B. Review Protocol and Associated Customer Service Standard

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

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 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.

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. 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

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.

In addition to the standard reporting requirements, PIs will be required to submit regular information regarding the status of their projects. This will include information about participants, activities undertaken, and project outcomes.

Annual Reports. Annual reports should highlight major accomplishments, describe the lessons learned, document alignment with the proposed time line, and describe the status of the development of the materials. Samples of completed materials, or drafts of materials, should be included.

Site Visitor. For Instructional Materials for Students awards and Assessment awards, the PI and the NSF Program Officer may agree on a site visitor who reviews the progress of the project and its evaluation annually and reports to both the Principal Investigator and to the NSF Program Officer.

Final reports/materials submission.

Approximately 30 days before the award expiration, NSF will send a notice to remind the PI of the requirement to file the final project report. Two complete sets of materials must be submitted to IMD at the time of the submission of the final report. If materials are not in the final, published form when the final report is submitted, two published copies must be submitted to IMD as soon as they become available. One published copy must also be submitted to the Eisenhower National Clearinghouse (ENC) (ENC, The Ohio State University, 1929 Kenny Road, Columbus, OH 43210-1079; email: submit@enc.org). At any time, IMD staff may request interim drafts of materials for review.

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

General inquiries regarding this program should be made to:

John (Spud) Bradley, Section Head, IMD, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5091, fax: (703) 292-9044, email: jbradley@nsf.gov

Janice M. Earle, Senior Program Director, Directorate for Education & Human Resources, Division of Research, Evaluation & Communication, 885 S, telephone: (703) 292-5097, fax: (703) 292-9044, email: jearle@nsf.gov

Michael R. Haney, Program Director, 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

Daniel L. Householder, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5112, fax: (703) 292-9044, email: dhouseho@nsf.gov

Gerhard L. Salinger, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5116, fax: (703) 292-9044, email: gsalinge@nsf.gov

Mark Saul, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-5092, fax: (703) 292-9044, email: msaul@nsf.gov

David Hanych, Program Director, Directorate for Education & Human Resources, Division of Elementary, Secondary, & Informal Education, 885 S, telephone: (703) 292-8614, fax: (703) 292-9044, email: dhanych@nsf.gov

For questions related to the use of FastLane, contact:

ESIE FastLane Help, email: ehr-esi-fl@nsf.gov

IX. OTHER PROGRAMS OF INTEREST

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.

The Division of Elementary, Secondary, and Informal Education also has programs in Teacher Professional Continuum (TPC - co-managed with DUE), Informal Science Education (ISE), Centers for Learning and Teaching (CLT), Information Technology Experiences for Students and Teachers (ITEST), Advanced Technological Education (ATE - co-managed with DUE), and Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST). Brief descriptions and solicitations for these programs can be found at www.ehr.nsf.gov/esie.

There are programs in other EHR Divisions that also may be of interest to proposers to IMD:

The Division of Undergraduate Education (DUE) has programs in Advanced Technological Education (ATE), Assessment of Student Achievement in Undergraduate Education (ASA); Course Curriculum and Laboratory Improvement (CCLI); and the National Science, Technology, Engineering, and Mathematics Education Digital Library (NSDL). Brief descriptions and solicitations for these programs can be found at www.ehr.nsf.gov/due.

The Division of Research, Evaluation and Communications has programs in Evaluative Research and Evaluation Capacity Building (EREC), Research on Learning and Education (ROLE), and the Interagency Education Research Initiative (IERI). Brief descriptions and solicitations for these programs can be found at www.ehr.nsf.gov/rec.

The Division of Graduate Education has the program for the Graduate Teaching Fellowships in K-12 Education (GK-12). A brief description and the solicitation for this program can be found at www.ehr.nsf.gov/dge.

Information and the solicitation for the Math and Science Partnership program (MSP) can be found at www.ehr.nsf.gov/msp.

ABOUT THE NATIONAL SCIENCE FOUNDATION

The National Science Foundation (NSF) funds research and education in most fields of science and engineering. Awardees are wholly responsible for conducting their project activities and preparing the results for publication. Thus, the Foundation does not assume responsibility for such findings or their interpretation.

NSF welcomes proposals from all qualified scientists, engineers and educators. The Foundation strongly encourages women, minorities and persons with disabilities to compete fully in its programs. In accordance with Federal statutes, regulations and NSF policies, no person on grounds of race, color, age, sex, national origin or disability shall be excluded from participation in, be denied the benefits of, or be subjected to discrimination under any program or activity receiving financial assistance from NSF, although some programs may have special requirements that limit eligibility.

Facilitation Awards for Scientists and Engineers with Disabilities (FASED) provide funding for special assistance or

equipment to enable persons with disabilities (investigators and other staff, including student research assistants) to work on NSF-supported projects. See the GPG Chapter II, Section D.2 for instructions regarding preparation of these types of proposals.

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
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