Math and Science Partnership (MSP)

Program Solicitation

NSF 06-539
***Replaces Document* NSF 03-605**

National Science Foundation
Directorate for Education and Human Resources

Letter of Intent Due Date(s) ***(optional):***

April 14, 2006

Optional, but strongly encouraged

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

May 17, 2006

REVISIONS AND UPDATES

1. The new solicitation continues the MSP *Institute Partnerships – Teacher Institutes for the 21st Century*. Continuing the MSP focus on its five Key Features, Institute Partnerships are designed especially to meet national needs for teacher leaders/master teachers and school-based intellectual leaders in mathematics and science. The new solicitation also continues a very focused MSP-*Research, Evaluation and Technical Assistance* (RETA) component inviting proposals that directly support the work of the Institute Partnerships, and adds a focus that engages the national disciplinary or professional societies to (a) assist science, technology, engineering and mathematics (STEM) faculty and university administrators in preparing to work effectively in K-12 mathematics/science education and/or (b) leverage the considerable influence of the societies in identifying and promoting the institutional changes in higher education that are critical for sustaining faculty engagement in K-12 STEM education.
2. The Institute Partnerships focus on the secondary science disciplines and on elementary specialists for science, although innovative proposals for all STEM domains are welcome.
3. For this competition, an institution of higher education may submit only one proposal as LEAD partner in an Institute Partnership. An institution of higher education or eligible nonprofit organization may submit one or more RETA proposals.

SUMMARY OF PROGRAM REQUIREMENTS

General Information

Program Title:

Math and Science Partnership (MSP)

Synopsis of Program:

The Math and Science Partnership (MSP) program is a major research and development effort that supports innovative partnerships to improve K-12 student achievement in mathematics and science. MSP projects are expected to both raise the achievement levels of all students and significantly reduce achievement gaps in the mathematics and science performance of diverse student populations. Successful projects serve as models that can be widely replicated in educational practice to improve the mathematics and science achievement of all the Nation's students.

In this solicitation, NSF seeks to support two types of MSP projects:

- ***Institute Partnerships – Teacher Institutes for the 21st Century***, especially for the science disciplines in the secondary grades and for elementary science specialists; and
- a focused set of ***Research, Evaluation and Technical Assistance*** (RETA) projects that directly support the work of the Institutes or engage the national disciplinary and professional societies in MSP work.

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

- 47.076 --- Education and Human Resources

Eligibility Information

- **Organization Limit:**

  Detailed guidance regarding Eligibility is provided in Section III of this solicitation.

  Lead Partner eligibility for Institute Partnerships is limited to institutions of higher education only.

  Eligibility for Research, Evaluation and Technical Assistance (RETA) projects is open to all categories of proposers identified in the NSF *Grant Proposal Guide*.

  Any proposal to the MSP Program should be a single submission that includes support for all partners that are requesting funding from NSF.

- **PI Eligibility Limit:**

  Detailed guidance regarding Principal Investigator (PI) Eligibility is provided in Section III of this solicitation.

  The PI of each Institute Partnership must be a mathematics, science or engineering faculty member in a higher education core partner. One or more co-Principal Investigators must be representative(s) from the K-12 core partner organization(s).

- **Limit on Number of Proposals:** An institution of higher education may submit only one proposal as LEAD partner in an Institute Partnership. For this competition, an institution of higher education and its institutionally affiliated foundation or research foundation are considered to be the same organization. An institution of higher education or nonprofit organization may submit one or more RETA proposals.

Award Information

- **Anticipated Type of Award:** Standard or Continuing Grant or Cooperative Agreement
- **Estimated Number of Awards:** 8 including up to three RETA awards, pending availability of funds.
- **Anticipated Funding Amount:** $13,000,000 - Approximately $13M in FY 2006 pending availability of funds for the MSP program.

Proposal Preparation and Submission Instructions

A. Proposal Preparation Instructions

- **Letters of Intent:** Submission of Letters of Intent is optional. Please see the full text of this solicitation for further information.
- **Full Proposal Preparation Instructions:** This solicitation contains information that deviates from 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

- **Letters of Intent *(optional):***
  April 14, 2006
  Optional, but strongly encouraged
- **Full Proposal Deadline Date(s)** (due by 5 p.m. submitter's local time):
  May 17, 2006

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

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I. INTRODUCTION

The Math and Science Partnership (MSP) program is a major research and development effort designed to improve K-12 student achievement in mathematics and science. Since the program was initiated in FY 2002, awards have been made for (a) Comprehensive Partnerships, (b) Targeted Partnerships, (c) Institute Partnerships – Teacher Institutes for the 21st Century and (d) Research, Evaluation and Technical Assistance (RETA) projects. **In this solicitation, NSF seeks to support two types of MSP projects:**

1. ***Institute Partnerships – Teacher Institutes for the 21st Century***, especially for the science disciplines in the secondary grades and for elementary science specialists; and
2. a focused set of ***Research, Evaluation and Technical Assistance*** (RETA) projects that directly support the work of the Institutes or engage the national disciplinary and professional societies in MSP work.

II. PROGRAM DESCRIPTION

The MSP program seeks to improve K-12 student achievement through a sharp focus on three inter-related issues:

- Ensuring that all students have access to, are prepared for and are encouraged to participate and succeed in challenging and advanced mathematics and science courses;
- Enhancing the quality, quantity and diversity of the K-12 mathematics and science teacher workforce; and
- Developing evidence-based outcomes that contribute to our understanding of how students effectively learn mathematics and science.

K-20 education organizations (that is, colleges and universities offering graduate and/or undergraduate programs, and K-12 schools and school districts) are critical partners in all Institute Partnership projects. Specifically, disciplinary faculty in departments of mathematics, the sciences and/or engineering, as well as education faculty and administrators in higher education partner organizations, join with administrators, teachers of mathematics and the sciences and guidance counselors in K-12 partner organizations in efforts to effect deep, lasting improvement in K-12 mathematics and science education. Furthermore, the partner organizations commit to implementing the K-20 institutional change necessary to sustain Partnerships' successes in the long-term; this includes the continued participation of mathematics, science and engineering faculty in work that clearly results in improved K-12 student and teacher learning.

Other partners and partner organizations are also involved in Partnership projects, and may include business and industry, state education agencies, district-level educational support centers, parents and families, science centers and museums, disciplinary and professional societies, research laboratories, private foundations and other public and private organizations with interests in K-12 mathematics and science education. The participation of mathematicians, scientists and/or engineers from such organizations is encouraged. Partnerships are expected to collaborate with their State education agency, as appropriate, to ensure that successful Partnership activities may be replicated throughout the State.

Mathematicians, scientists and engineers, particularly those who are faculty in higher education partner organizations, play substantial roles in Partnership projects. Their substantial intellectual engagement in these projects is one of the attributes that distinguishes the MSP program from other programs seeking to improve K-12 student outcomes in mathematics and science.

All Institute Partnerships focus on (a) improving K-12 student achievement and other outcomes in mathematics and/or the sciences and (b) developing an accomplished teacher workforce capable of engaging all students. All projects incorporate a depth and quality of creative, strategic actions that ***extend beyond commonplace approaches*** to improve K-12 mathematics and science education.

Through the MSP Research, Evaluation and Technical Assistance (MSP-RETA) component, the capacity of MSP-funded Partnerships to achieve their goals and contribute to the development and dissemination of the knowledge base necessary to achieve sustained educational reform is enhanced.

All MSP-funded projects contribute to the MSP Learning Network, a network of researchers and practitioners studying, documenting and evaluating promising strategies to improve K-12 student achievement in mathematics and science. MSP projects are therefore designed to make evidence-based contributions to the learning and teaching knowledge base. The work of the MSP Learning Network fosters greater national collaboration and informs our understanding of how students effectively learn mathematics and science such that successful approaches can be broadly disseminated and emulated in educational practice.

KEY FEATURES

Each MSP Institute Partnership must incorporate ALL of the five following Key Features, although the manifestation of these Key Features may differ among individual Institute Partnerships. Each MSP-RETA project must identify the Key Features to be addressed and describe how its work contributes to the underlying knowledge base for those features.

Partnership-Driven - Projects partner disciplinary faculty in mathematics, the sciences and/or engineering, as well as education faculty and administrators in higher education, with key administrators, teachers and guidance counselors in participating K-12 core partner organizations and other relevant organizational entities (e.g. professional associations and unions). These Partnerships draw upon the disciplinary expertise of faculty in mathematics, the sciences and/or engineering, undergraduate students (including pre-service), graduate students, and postdoctoral candidates in the higher education core partner organizations, and link these individuals with in-service teachers, administrators and guidance counselors in K-12 core partner organizations. Scientists, mathematicians, engineers and individuals from other core and supporting partner organizations may also play significant roles in project activities. Core partners are deeply engaged in the effort at both the institutional and individual levels, and share goals, responsibilities and accountability for the project.

Teacher Quality, Quantity and Diversity - Partnerships enhance and sustain the quality, quantity and diversity of K-12 teachers of mathematics and/or the sciences. Drawing upon the expertise of scientists, mathematicians and/or engineers in partner organizations, pre-service students and in-service K-12 teachers are engaged in the development of strong mathematics and/or science content knowledge and related pedagogical methods and skills, including the effective use of technology in the teaching of mathematics and/or the sciences. These activities support the challenging courses and curricula implemented in the K-12 core partner organizations. Partnerships develop and apply innovative strategies that include: increasing the diversity of the K-12 teacher workforce; recruiting qualified individuals to the teaching profession; influencing the teacher certification process; providing for the effective induction of new teachers; establishing policies and procedures that appropriately impact teacher qualification requirements and placement; and/or increasing teacher retention rates. Projects ensure that K-20 educators develop the knowledge and skills necessary to effectively match local and state standards with challenging courses and curricula, instructional strategies, learning technologies and assessments.

Challenging Courses and Curricula - Partnerships ensure that K-12 students are prepared for, have access to and are encouraged to participate and succeed in challenging mathematics and/or science courses and curricula. Challenging coursework enables all students to develop a deeper understanding of mathematics and/or the sciences. Innovative approaches integrate a mastery of fundamentals with the more sophisticated conceptual understandings essential to improve student achievement in mathematics and the sciences, drawing – where appropriate – upon computer-communications technology and contemporary research on the science of learning to enhance student and teacher access and performance. Challenging courses and curricula are aligned with State mathematics and science student academic achievement standards, resulting in a greater number of students participating and succeeding in advanced courses. Projects ensure that K-12 students develop sufficient depth and breadth of content knowledge, skills and ways of thinking to allow them to apply the mathematics and/or science knowledge and skills acquired throughout life.

Evidence-Based Design and Outcomes - Project design is informed by current research and studies on learning and teaching. Project outcomes make evidence-based contributions to the learning and teaching knowledge base, so that research findings and successful evidence-based strategies can be broadly disseminated to improve educational practice. Projects also link assessment (classroom, local and state) and accountability measures. Collected data include both student

and teacher indicators in mathematics and/or the sciences; and, unless precluded by local or state law, are disaggregated by race, ethnicity, socio-economic status, gender and disability. Indicators that measure the effectiveness of the Partnership; the impact of the contributions made by faculty in the sciences, mathematics and/or engineering; the effect of new institutional policies and practices; and other important factors are developed, collected and analyzed to inform the continuous refinement of the project.

Institutional Change and Sustainability- To ensure project sustainability, K-20 core partner organizations redirect resources and design and implement new policies and practices to result in well-documented, inclusive and coordinated institutional change at both the college/university and the local school district levels. Higher education core partners reward faculty in mathematics, the sciences and/or engineering for strengthening their own teaching practices and for their work in K-20 mathematics and science education, including K-12 teacher preparation and professional development. K-12 core partner organizations create and sustain an environment that values an evidence-based approach and that recognizes and rewards significant contributions to improved mathematics and science learning and teaching. Other core partners commit to engaging mathematicians, scientists and/or engineers and other individuals in activities that strengthen their roles in K-12 mathematics and science education for the long-term.

INSTITUTE PARTNERSHIPS: TEACHER INSTITUTES FOR THE 21st CENTURY

Approximately 50 years ago, the National Science Foundation created its Summer Institute Program "in recognition of the important role of teachers in developing our scientific . . . [workforce] potential" [Krieghbaum & Rawson, 1969]. The Institutes, which began in 1954 and continued for nearly twenty years, stressed subject-matter competence for science and mathematics teachers. The significance of the original NSF Institutes cannot be underestimated. Dr. James Bryant Conant, in his 1963 book on *The Education of American Teachers*, wrote: "The use of [NSF] summer institutes for bringing teachers up to date in a subject-matter field has been perhaps the single most important improvement in recent years in the training of secondary school teachers." The original NSF Institutes are widely acknowledged as having been integral to the development of much of the Nation's human infrastructure and leadership capacity in K-12 mathematics and science education in recent decades.

A successful proposal for a new Institute Partnership will reflect the enthusiasm and disciplinary spirit of the original NSF Institutes, while responding to 21st Century needs for accomplished teachers who are intellectual leaders and master teachers in K-12 mathematics and science. Graduates of the Institutes will be school- and district-based intellectual leaders and accomplished practitioners in their disciplines. They are the mathematics/science specialists in grades K-5 and the curricular leaders of mathematics and the sciences in the secondary grades. Their expertise lies in the intellectual substance of school mathematics and the sciences and in the special knowledge needed for their teaching.

Institute participants will be experienced classroom teachers who wish to renew their interest in and enthusiasm for their discipline, deepen their knowledge of the subjects they teach and the research relevant to STEM teaching and learning, and build leadership skills. They will return to their classrooms and schools with an expanded disciplinary, pedagogical and leadership repertoire, able to analyze and continually refine their practice of teaching. They will be catalysts for the reform of mathematics and science education programs in their schools and will contribute to the development of challenging or advanced courses. As instructional leaders, master teachers and mentors, they will become resources for their peers and their profession. Through their involvement in policy and decision-making, they will work with their peers and key administrators on behalf of improved mathematics and science education in their schools and districts.

An Institute Partnership is expected to immerse teachers for a multi-year program of rigorous and appropriate courses and experiences that provide coherent study within a particular discipline(s). In the Institute, teachers will focus on the intellectual substance of the subject they teach and the special knowledge needed for its teaching, interacting with other professionals who teach and do research in their field of expertise. Teachers broaden, deepen and/or update their disciplinary knowledge and, as a result, emerge from the experience with increased confidence, becoming more effective practitioners. They should no longer see themselves as isolated individuals but rather as members of a professional community, linked with others devoted to learning and practice. Through the Partnerships, professional communities grow among K-12 teachers and college/university faculty and researchers in mathematics, the sciences, engineering and education; and understanding, communications and rapport are significantly improved.

Although proposals will describe varying models of Institute Partnerships, each Institute is expected to have its own compelling sense of identity and purpose and be fully informed by research on how to develop in teachers a deep understanding of mathematics and/or the sciences that allows them to grow individually as intellectual leaders and experts in their profession. Each Institute Partnership should recognize that, to develop as intellectual leaders, teachers need multiple, coordinated professional development experiences of sufficient duration to help them build the critical capital needed.

A proposal must articulate the process for recruitment and selection of participants and delineate a vision of the attributes to be developed in those who are selected, together with a clear plan for doing so. The curriculum for teacher participants must be coherent and multi-year in duration. Within this requirement, Institute Partnerships may differ in their intensity (e.g., numbers of weeks) and venues (e.g., residential, commuter, distance-learning or blends thereof; national or regional/local

geographic reach). A local, commuter institute might, for example, be designed with a content focus on the physical sciences for emerging middle school teacher leaders, while a national leadership institute for high school teachers of biology might be residential in nature.

Each Institute is expected to have a content focus that, in addition to building depth within one or more disciplines or sub-disciplines in the sciences or mathematics, also includes opportunities for participants to (a) explore newer or cross-disciplinary themes at the research frontiers of mathematics, the sciences and/or engineering; and (b) reflect on strategies by which these themes may revitalize their classes, contribute to the development of more challenging curricula and cultivate student enthusiasm and interest in science broadly writ. Each Institute curriculum is also expected to include leadership development and the preparation necessary to work with adult learners, as well as a component that assists participants in working in the implementation of contemporary research findings on effective classroom practice and the science of learning. While decisions about the selection of participants and about program and curricular design may vary, all such decisions will be based on relevant evidence or research findings or on conceptual rationales, and these are to be detailed in the proposal.

A proposal for an Institute Partnership will define goals for preparing the school- and district-based intellectual leaders and accomplished practitioners envisioned, and will describe a project design with a focus on the five MSP key features. The proposal will describe a Partnership led by an institution of higher education that includes a department(s) in the sciences, mathematics or engineering, in collaboration with other university/college departments (e.g., education faculty), administrative units or other institutions that contribute needed expertise; K-12 districts or schools; and other stakeholders, as enumerated in the earlier section on Eligibility Information. Instructors in the Institutes will include college/university faculty members drawn from the sciences, mathematics, engineering and education who model effective pedagogy.

The project's core K-12 partners will be the schools or districts from which teacher participants are to be selected, and these core organizations will be expected to show evidence of their Partnership through commitments and agreements that define (a) an alignment of the teacher leadership effort with a strategic plan that includes ongoing educational improvements and reform in mathematics and science, (b) increased responsibilities for the emerging teacher leaders in their home organizations, as a result of successful completion of the Institute and (c) administrative support, time, resources and recognition/rewards commensurate with this increased responsibility. K-12 core partners are required to grant sufficient nonclassroom time to Institute participants to carry out their responsibilities as master teachers and intellectual leaders, and to provide assurance of this commitment. To enhance the supportive culture in schools/districts, provide greater opportunity for ongoing professional communities, and contribute to institutional change and potential sustainability, schools and districts are encouraged to support small teams of Institute participants.

A proposal will describe the intended institutional change in all core partner organizations, detailing the change from current practice/policy and its importance for project sustainability. Institutions of higher education are encouraged to rethink their policies for faculty rewards to recognize an appropriate and fundamental commitment to teaching and learning. K-12 partner organizations recognize that the presence and full utilization of teacher leaders requires adjustment. They therefore implement the policy changes, restructuring, reorganization or other innovations needed to fully support and encourage teacher leadership.

Project evaluation is a major component of the Institutes and must include (a) an assessment of teachers' growth as intellectual leaders and accomplished classroom practitioners and of their effects on the quality and practice of STEM education in their schools, (b) data on mathematics/science achievement or other outcomes for their students and (c) impacts on the instructional practice of faculty who are instructional leaders in the Institutes. All Institutes contribute to the broad MSP knowledge base through evaluation and/or research and through their participation in the MSP Learning Network.

RESEARCH, EVALUATION AND TECHNICAL ASSISTANCE (RETA) PROJECTS

The substantial engagement of STEM disciplinary faculty in the work of K-12 mathematics and science education, as articulated in the MSP Key Feature for Partnership-driven work, is one of the attributes that distinguishes the MSP program from other programs seeking to improve K-12 student outcomes in mathematics and science. The MSP Key Feature for Institutional Change and Sustainability further articulates the potential that is resident in institutions of higher education to encourage and reward educational work by their STEM disciplinary faculty.

This solicitation calls for proposals that build and sustain the capacity of the nation's STEM disciplinary faculty for educational work by

- engaging the national disciplinary or professional societies to (a) assist STEM faculty and university administrators in preparing to work effectively in K-12 mathematics/science education; and/or (b) leverage the considerable influence of the societies in identifying and promoting the institutional changes in higher education that are critical for sustaining faculty engagement in K-12 STEM education

and for proposals that directly support or inform the work of the Institute Partnerships through

- research on the characteristics that define teacher intellectual leadership in K-12 mathematics and the sciences, and the factors that contribute to its development;
- development of tools that assess teachers' growth in the knowledge of mathematics or the sciences needed for teaching, especially for grades 9-12.

A proposal should address the current state of knowledge relevant to the proposed work, including a brief review of relevant literature, and indicate the gap(s) in the current base of knowledge or practice to be addressed by the proposed work. The quality of research and scholarship expected in all MSP-funded RETA projects should be commensurate with results that are potentially publishable in appropriate and respected peer-reviewed journals.

For research proposals, methodologies must be well defined, rigorous and appropriate and should result in valid, reliable findings with the potential to inform MSP work. The logic among research question, method, evidence, analysis and inference should be well articulated. The development of any tools is to be accompanied by sufficient piloting, revision and field-testing – with appropriate methodologies – to ensure confidence in subsequent use by Institute Partnerships and others.

For proposals from the national disciplinary or professional societies, the logic and connections between any proposed faculty development and the work to be done in K-12 should be well articulated. Faculty/administrator enhancement plans and anticipated outcomes should be given in detail.

MSP LEARNING NETWORK

All MSP-funded projects participate in the MSP Learning Network through which they are linked with other researchers and practitioners in the study and evaluation of educational innovations designed to improve student achievement in mathematics and science. The MSP Learning Network fosters greater national collaboration and contributes to the Nation's capacity to engage in and understand large-scale education innovation.

MSP DATA COLLECTION, PROGRAM EVALUATION, KNOWLEDGE MANAGEMENT AND DISSEMINATION

The MSP program has funded the development of data collection modules in an MSP Management Information System (MSP-MIS) to collect common data from funded projects. The program has also awarded an external contract for overall program evaluation (MSP-PE) that addresses evaluation questions consonant with the role of the MSP program as part of a research and development enterprise, as well as its role as an educational enterprise. Thus, the MSP-PE will address evaluation questions not only about what impacts the MSPs might have produced but also about their contribution to advancing knowledge in mathematics and science education.

MSP-funded knowledge management projects synthesize findings across MSP work and integrate them into the larger knowledge base for educational reform, thus strengthening the potential bonds between educational research and practice and contributing to the nation's capacity to understand and engage in large-scale education innovation.

MSP awardees are required to provide the common data required by the MSP-MIS and to cooperate with the MSP-PE. The MSP-PE is a program-level evaluation, in addition to the evaluation required of individual projects.

MSP awardees are also expected to contribute to MSP knowledge management at the program level and, at the project level, to disseminate key findings and promising policies and practices derived from MSP project work and evaluation.

REFERENCES

Krieghbaum, H., & Rawson, H. (1969). *An investment in knowledge: The first dozen years of the National Science Foundation's Summer Institutes programs to improve secondary school science and mathematics teaching, 1954-1965*. New York: New York University Press.

III. ELIGIBILITY INFORMATION

PARTNERS DEFINITION AND ELIGIBILITY FOR INSTITUTE PARTNERSHIPS

MSP Institute proposals are developed by Partnerships that must include CORE Partners and may also include SUPPORTING Partners.

Each proposal to the MSP Program for an Institute Partnership should be a single submission that includes support for all partners that are requesting funding from NSF. Collaborative proposals, as defined in the NSF *Grant Proposal Guide* (Chapter II, Section D.3. Collaborative Proposals), are not appropriate and will be returned without review.

CORE PARTNERS

Core partner organizations share responsibility and accountability for the MSP project. Core partner organizations ARE REQUIRED to provide evidence of their commitment to undergo the institutional change necessary to sustain the partnership effort beyond the funding period. This is what distinguishes core partner organizations from other supporting partner organizations.

Core partner organizations in each partnership MUST include:

- At least one institution of higher education (including 2-year and 4-year colleges and universities) AND
- At least one K-12 local school district.

Within core partnering institution(s) of higher education, the Partnership must include science, mathematics and/or engineering departments. Community colleges and minority-serving institutions are encouraged to participate as core partner organizations in MSP projects because of the strong role they play in the preparation and professional development of a diverse K-12 mathematics and science teacher workforce.

Core partner organizations may also include other stakeholder organizations in K-12 mathematics and science education, such as state education agencies, business and industry, science centers and museums, disciplinary and professional societies, research laboratories, district-level educational support centers, private foundations and other public and private organizations with interests in K-12 mathematics and science education. The participation of scientists, mathematicians and/or engineers from these core partner organizations is encouraged.

SUPPORTING PARTNERS

Supporting partners include important stakeholders and stakeholder organizations in K-12 mathematics and science education, including parents and families and the types of partner organizations described above. The main distinction between core and supporting partners is that, while supporting partners clearly add value to the proposed project, they are not required to commit to the institutional change necessary to sustain project activities beyond the funding period.

LEAD PARTNER DEFINITION AND ELIGIBILITY

For all Institute Partnerships, one of the core partner organizations serves as the LEAD partner and submits the MSP proposal on behalf of the Partnership. The lead partner accepts management and fiduciary responsibility for the project.

The lead partner organization for an Institute Partnership MUST be an institution of higher education (including 2-year and 4-year colleges and universities).

PARTNERSHIP LEADERSHIP TEAM DEFINITION AND ELIGIBILITY INFORMATION

The Partnership Leadership Team MUST include those individuals identified in the proposal as Principal Investigator and co-Principal Investigators. The Principal Investigator of each Institute Partnership MUST be a science, mathematics or engineering faculty member in a higher education core partner and one or more co-Principal Investigators MUST be representative(s) from the K-12 core partner organization(s).

The Partnership Leadership Team should also include a Project Director who is responsible for day-to-day management of the project; the Project Director need not be identified as a Principal Investigator or co-Principal Investigator.

ELIGIBILITY FOR RETA PROPOSALS

The categories of proposers identified in the NSF *Grant Proposal Guide* are eligible to submit Research, Evaluation and Technical Assistance proposals under this program announcement/competition.

PARTNER ORGANIZATION PROPOSAL LIMIT

For this competition, an organization may submit only one proposal as a LEAD partner in an Institute Partnership. An institution of higher education with more than one campus or location is considered to be only one organization if they have the same sponsored projects office. There is no limit on the number of Research, Evaluation and Technical Assistance (RETA) proposals an organization may submit.

Limit on Number of Proposals:

An institution of higher education may submit only one proposal as LEAD partner in an Institute Partnership. For this competition, an institution of higher education and its institutionally affiliated foundation or research foundation are considered to be the same organization. An institution of higher education or nonprofit organization may submit one or more RETA proposals.

IV. AWARD INFORMATION

NSF expects to make an estimated 8 awards (Standard or Continuing Grant or Cooperative Agreement) including up to 3 RETA awards. The anticipated funding amount is approximately $13M in FY 2006, pending availability of funds for the MSP program.

INSTITUTE PARTNERSHIPS: Awards for Institute Partnerships will be made for up to 5-year durations and for average annual budgets of up to $1M, commensurate with the geographic reach of the Institute (i.e., national or regional/local) and expected numbers of participants. This award amount is to include participant support and other subsistence. Teacher stipends of at least $1000 per week for structured, summertime Institute participation are to be included, where a week is defined as five days (totaling 30 or more hours) and where local district policies are not in conflict with such stipends. Stipends for structured academic-year participation are pro-rated, as appropriate or needed, and a supporting rationale is to be included. Appropriate participant support for subsistence (e.g..., travel, lodging, supplies) is also to be included, together with a supporting rationale. Funding for nonclassroom time for an Institute participant to carry out his/her responsibilities as an intellectual leader and master teacher in the school may be requested for up to one year, if needed. In such cases, a supporting rationale and a plan by which the district will continue support for such nonclassroom time after one year must be provided. Since NSF funds may be requested to support project administration, instruction and indirect costs, NSF monies may not be requested for tuition. It is, however, expected that institutions will award teachers appropriate credits for completion of Institute curricula and experiences, consistent with institutional policy and with a reward system for teachers that enhances their professional standing in their schools and districts.

Funds requested must directly correlate with the scope and complexity of the project as well as with the numbers of K-12 teachers and/or students engaged in or impacted by the project.

RESEARCH, EVALUATION AND TECHNICAL ASSISTANCE PROJECTS:

RETA awards will be made for up to 3-year duration and for average annual budgets of up to $500,000.

V. PROPOSAL PREPARATION AND SUBMISSION INSTRUCTIONS

A. Proposal Preparation Instructions

Letters of Intent *(optional):*

Lead partners, working on behalf of Partnerships intending to submit proposals to this competition, ARE STRONGLY ENCOURAGED to submit a Letter of Intent by April 14, 2006, indicating: proposal designation according to *Institute* or *RETA*; PI and co-PI names; lead organization; and, for Institute Partnerships, (a) the names of core and supporting partners, (b) disciplinary focus of the Institute and (c) grade range focus. **Letters of Intent must be submitted via FastLane.**

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 GPG guidelines.

After selecting the MSP program solicitation number on the Cover Sheet, the "NSF Unit Consideration" must be specified - select either Institute **or** RETA.

ALL PROPOSALS MUST CONTAIN THE FOLLOWING SECTIONS:

- **PROJECT SUMMARY**

  Provide a one-page summary that briefly describes the project vision, goals and work to be undertaken. For Institute Partnerships, the Project Summary should begin by listing the following: the title of the proposed project, the name of the lead partner, the name(s) of the additional core and supporting partners, and the numbers of teachers to be directly engaged in the project. For RETA projects, the Project Summary should begin by stating the title of the proposed project and the lead institution. **Note that the Project Summary MUST address both NSB-approved merit review criteria in separate statements. Effective October 1, 2002, NSF will return without review proposals that do not address both merit review criteria in separate statements.**

- **PROJECT DESCRIPTION**

  Provide a Project Description that does not exceed 15 SINGLE-SPACED PAGES. The text font size must be 10 point or larger (See GPG, Chapter II, Proposal Margin and Spacing Requirements). Proposals that do not comply with these formatting requirements may not be reviewed or considered for funding. In preparing proposals, Principal Investigators are encouraged to consult Section VI of this solicitation, which includes additional review criteria specific to this solicitation.

  FOR INSTITUTE PARTNERSHIPS

  The Project Description should address ALL of the MSP Key Features described in this solicitation, Section II, within the following elements.

  Vision, Goals and Outcomes

  A proposal must clearly describe the Partnership’s vision, goals and anticipated outcomes with respect to the MSP Key Features.

  The Partnership's vision and goals for the project are informed by relevant baseline student and teacher data, and are consistent with relevant State mathematics and/or science student academic achievement standards. (Baseline data and quantitative outcome goals and annual benchmarks are to be provided in the Supporting Documents section of the proposal. Except where precluded by local or state law, supporting teacher data and supporting student data that are disaggregated by race, gender, socio-economic factors and disability must be provided in the Supporting Documents section of the proposal.)

  Provide data on the numbers of in-service teachers (participants) and the expected numbers of hours of structured professional development for a typical participant over the life of the project.

  Describe the current state of the higher education core partners that sets the context for this project and the anticipated work in K-12 science and mathematics education; the degree and kinds of prior involvements/ experiences with K-12 education or disciplinary faculty in the sciences, mathematics and engineering; and a description of relevant institutional policies/practices that reward such faculty involvement.

  The proposal should provide evidence of (a) an effective partnership among core and supporting organizations that work together to realize the project’s vision and goals, (b) the participation of all key stakeholders (including teachers, faculty and administrators) in project planning and design and (c) sufficient capacity in and preparation of the higher education partners to support the scale and scope of the project, especially the number of teacher participants.

  Lessons learned from previous and current support, including a discussion of successes and of lessons

learned, should be included. ***The proposal should also clearly indicate how the intended work differs from, builds on or is otherwise informed by prior efforts***.

Action Plan

Describe in detail HOW the Partnership will achieve the project vision, goals and anticipated quantitative outcomes by means of a coherent plan. This description should include the research or evidence base that constitutes the foundation on which the proposed work rests. Consistent with the MSP Key Feature on Evidence-Based Design and Outcomes, it is also expected that this research/evidence base and subsequent project work will further contribute to the learning and teaching knowledge base.

Describe the creative, strategic actions **that extend beyond commonplace approaches** and that promise significant improvements in student and teacher workforce outcomes accruing from the work of the Partnership. All project work directed towards improvement of the teacher workforce should support the implementation of challenging courses and curricula to result in improved K-12 student learning and achievement in mathematics and/or the sciences.

Consistent with the Partnership-Driven Key Feature, describe how each partner will contribute to the proposed work, with particular emphasis on the contributions scientists, mathematicians and/or engineers will make. If applicable, describe how the Partnership collaborates with or complements other K-12 educational initiatives supported by NSF and/or other private or public funds.

Provide a project timeline that correlates with the proposed action plan and the quantitative outcome goals and annual benchmarks described in the Appendices section of the proposal.

Evaluation Plan

Describe the evaluation plan that will guide project progress annually and will measure the impact of the work described in the action plan, including a description of the instruments/metrics by which partners will document, measure and report on the project's progress toward realizing improved student and teacher outcomes. The evaluation plan should directly relate to the annual benchmarks and outcome goals in the Appendices section of the proposal. Formative evaluation should provide evidence of the strengths and weaknesses of the project, informing the Partnership's understanding of what works and what does not in order to inform project progress and success. Summative evaluation should give an objective analysis of qualitative and quantitative data, thus demonstrating the effectiveness of the project on student and teacher outcomes and K-20 institutional change. Although the evaluation plan will be developed with input from the Partnership, objective analyses and findings require either an external evaluator or an evaluator within a partner institution who is clearly separate and distinct from the partnership participants and their departments/units (e.g., in a department/unit within a university that is not part of the Partnership itself).

Partnership Management/Governance Plan

Describe the management plan by which all partners are fully engaged to realize the partnership's vision, goals and outcomes.

Describe in detail the specific roles, responsibilities and time commitments of the members of the Partnership Leadership Team. Also provide the number of scientists, mathematicians and/or engineers who will be engaged in the work of the project and provide detailed information on their intellectual contributions/ roles and responsibilities.

Institutional Change and Sustainability

Describe how the proposed action plan will result in institutional change within all core partner organizations to ensure sustainability of project work. Include plans to redirect resources and develop/revise and implement policies and practices critical for the work of the Partnership and necessary for project sustainability.

FOR RESEARCH, EVALUATION AND TECHNICAL ASSISTANCE (RETA) PROJECTS

The project description should contain the following elements.

Clear Description of Proposed Work

Describe in detail the research/work being proposed, with clear connections to one or more of the MSP Key Features.

Research Base

Discuss the current state of knowledge relevant to the proposed work, including a brief review of the relevant literature, and the gap(s) in the base of current knowledge or practice to be addressed by the proposed work. If the proposal builds on prior work, indicate what was learned from this work and how any lessons learned are incorporated in the proposed project.

Methodologies and Plan of Work

Provide a clear plan for carrying out the proposed work. The logic among research question, method, evidence, analysis and inference should be well articulated. Methodologies must be well defined, rigorous and appropriate and should result in valid, reliable findings with the potential to inform MSP work. The development of any tools is to be accompanied by sufficient piloting, revision and field-testing – with appropriate methodologies – to ensure confidence in subsequent use by Institute Partnerships and others. Faculty/administrator enhancement plans and anticipated outcomes should be given in detail. The logic and connections between any proposed faculty development and the work to be done in K-12 should be well articulated.

For research projects and those that propose the development of tools, include a plan for working with a small group of existing or new Institute Partnerships. The project description should discuss how the project expects to interact with the Institute Partnerships, including an estimate of the number of Institutes to be involved and the time and effort to be required of them. The proposal should clearly indicate the benefits to the Institutes by virtue of their participation. NSF will work with the awardees under this solicitation and with the Institutes to ensure appropriate interactions among all projects.

Evaluation, Data Sharing and Dissemination

The quality of research and scholarship expected in all MSP-funded RETA projects should be commensurate with results that are potentially publishable in appropriate and respected peer-reviewed journals. The development of any tools is to be accompanied by sufficient piloting, revision and field-testing. Describe plans for sharing findings and for dissemination of products.

For projects that engage the national disciplinary or professional societies in MSP work, describe the evaluation plan that will guide project progress annually and will measure the impact of the work. Evaluation must include data documenting the numbers of faculty/administrator participants and, for these participants, (a) the types of K-12 STEM activity in which they are currently engaged and the degree of intensity of their engagement, (b) the types of K-12 STEM activity in which they are subsequently engaged after completion of the enhancement activities and the degree of intensity of their engagement, (c) impacts of K-12 engagement on their own instructional practice in higher education and (d) impacts of K-12 engagement on their own careers in higher education. Formative evaluation should provide evidence of the strengths and weaknesses of the project, informing the project's leadership of what is working and what is not in order to inform project progress and success. Summative evaluation should give an objective analysis of qualitative and quantitative data, thus demonstrating the effectiveness of the project in building the capacity of STEM faculty to engage in K-12 education and in promoting the institutional changes in higher education needed to sustain their engagement. Although the evaluation plan will be developed with input from project leadership, objective analyses and findings require an external evaluation.

In addition, all MSP RETA projects are expected to be active participants in the MSP Learning Network, sharing approaches, data, preliminary findings and ideas with others in the Network.

Expertise

Demonstrate that project personnel have the expertise and capability to carry out the proposed work.

Management Capability

Demonstrate that the submitting team has the capability to manage the project, organize the work and meet deadlines.

- **RESULTS FROM PRIOR NSF-SUPPORT**

If any Principal or co-Principal Investigator has received funding from NSF in the last five years, information on the prior award is required IF RELEVANT TO THE PROPOSED SCOPE OF WORK (see Grant Proposal Guide NSF 04-23). The results of any prior NSF investment(s) should be clearly demonstrated and supported by data. A discussion of both successes and lessons learned from previous support MUST be included. The proposal should also clearly indicate how the intended work differs from, builds on or is otherwise informed by prior efforts.

- **BIOGRAPHICAL SKETCH**

Provide a Biographical Sketch for the Principal Investigator, co-Principal Investigators and Project Evaluator. Individual biographical sketches must not exceed two pages and may include a list of up to five publications most closely related to the proposed endeavor.

- **CURRENT AND PENDING SUPPORT**

Provide a Statement of Current and Pending Support for the Principal Investigator and all co-Principal Investigators.

- **SPECIAL INFORMATION AND SUPPLEMENTARY DOCUMENTATION**

For ***RETA projects***, no Appendices are permitted; however, letters of commitment/collaboration may be submitted in FastLane's Supplementary Documents Section.

For ***Institute Partnerships***, Supplementary Documents should be uploaded in FastLane as a separate PDF file NOT TO EXCEED 20 PAGES. Include in this documentation:

(1.) Baseline Data. Institute Partnerships must provide a plan by which baseline data will be collected after teacher participants have been selected, including a description of any instruments/metrics to be used. Baseline student data must be data that enable each Institute to demonstrate the effects of Institute participation by its teachers on the achievement of their students or on other student outcomes (e.g., tracking student academic performance or choice of post-secondary studies in mathematics, the sciences, engineering or technology). Student achievement data are to be the most recent in comparison to state and/ or national averages and, unless precluded by local or state law, disaggregation by race-ethnicity, socio-economic status, gender and disability is expected. The data should identify the test and indicate the grade levels in which system-wide science and/or mathematics assessments were administered. They should include achievement scores, the percentage of students tested against grade-level enrollment and the appropriate categories for reporting test results (quartiles, mean percentiles, proficiency levels, or above or below cut scores). Data must also include course enrollment and completion rates and, where appropriate, college matriculation rates. Baseline teacher data are to document teacher qualifications and enable an assessment of their growth as intellectual leaders and accomplished practitioners and of their effects on their school environment.

(2.) Annual Benchmarks and Outcome Goals. Provide a summary of quantitative benchmarks that are linked to strategies/activities and summative goals of the project. While some benchmarks and goals may be qualitative in nature, most indicators of student achievement, of the teacher workforce and of higher education involvement should be quantitative and should describe expected project progress relative to baseline data provided elsewhere in the Project Description and Appendices. The project's proposed Evaluation Plan should directly relate to the benchmarks and goals. Institute Partnerships should, in addition, include a plan by which the project will document the career paths of Institute graduates.

(3.) Partnership Leadership Team and Disciplinary Partners. Identify members of the Partnership Leadership Team and the scientists, mathematicians and/or engineers engaged in the work of the project. For each, briefly describe their specific roles and responsibilities and indicate the time committed.

(4.) Commitment to Institutional Change. Provide evidence of commitment to institutional change in the form of one or more letters signed by senior administrator(s) (equivalent to a Dean or higher) in the higher education core partner(s). In addition, provide at least one letter signed by senior administrator(s) in a school

district core partner from which the Institute expects to select participants. As applicable, other letters of commitment are to be provided by future core K-12 partners (i.e., the schools or districts from which teacher participants are to be selected) as part of the selection process for the participants. Letters from K-12 core partners will be expected to show commitment to (a) an alignment of the teacher leadership effort with ongoing educational improvements and reform in mathematics and science, (b) increased responsibilities for the emerging teacher leaders in their home organizations, as a result of successful completion of the Institute, and (c) administrative support, time, resources and recognition/rewards commensurate with this increased responsibility. K-12 core partners are required to grant sufficient nonclassroom time to Institute participants to carry out their responsibilities as master teachers and intellectual leaders, and to provide assurance of this commitment. If -- in addition to core partners in higher education and K-12 -- there are other core partners, provide letters signed by senior officials that describe plans to redirect resources and to develop/revise policies and practices critical to the work of the Partnership and necessary to ensure the sustainability of project work.

(5.) Other Letters of Substantive Commitment. As space will allow, provide letters of substantive commitment from other project partners.

Proposers are reminded to identify the program announcement/solicitation number (06-539) 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 is not required by NSF in proposals submitted under this Program Solicitation.

Other Budgetary Limitations:

Awards for Institute Partnerships will be made for durations of up to five years and for average annual budgets of up to $1M. Teacher stipends of at least $1000 per week for structured Institute participation are to be included, where local district policies are not in conflict with such stipends. See Section IV. AWARD INFORMATION for additional details.

Awards for MSP-RETA will be made for durations of up to three years and for average annual budgets of up to $500,000.

C. Due Dates

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

Letters of Intent *(optional):*

April 14, 2006
Optional, but strongly encouraged

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

May 17, 2006

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 elaboration of the general NSF review criteria, reviewers will also be asked to review MSP proposals by considering the following questions.

For Institute Partnerships

- **Partnership-Driven**

  Is there sufficient evidence of an effective Partnership among the partnering institutions and organizations? Is there sufficient evidence that the core partners share in the goals, responsibility and accountability for the proposed work?

  Is there evidence that scientists, mathematicians and engineers from higher education institutions will be significantly engaged in the work of the project and make substantial intellectual contributions? How well does the capacity of the Partnership's cadre of disciplinary faculty match the scope of work proposed? Is there an appropriate plan for ongoing recruitment of disciplinary faculty?

- **Teacher Quality, Quantity and Diversity**

  Is the professional development curriculum of sufficient quality and duration that it is likely to improve K-12 mathematics and/or science education, consistent with state mathematics and science student academic achievement standards? Is the mathematics and science curriculum for preservice students adequately described, if appropriate? Is it clear how proposed revisions will lead to a better qualified teacher workforce in the partnering school districts? If appropriate, how well will preservice students be prepared to teach challenging courses and contribute to a challenging curriculum for all students?

  Will participating teachers be adequately supported (e.g., by stipends or other subsistence, released time), either by the project or by their districts/schools, as appropriate? Are there appropriate commitments to ensure or encourage teacher participation (e.g., commitments from districts/schools and departmental units within schools, teacher unions or other teacher organizations)?

  Does the Partnership have a credible plan for addressing teacher quality and diversity? For teacher recruitment and retention? If appropriate, for recruitment of preservice students in mathematics and the sciences?

  Has the Institute Partnership articulated both a clear vision for teacher leadership and a mechanism (s) for measuring growth in leadership attributes?

- **Challenging Courses and Curricula**

  Are the project's vision and related goals appropriately focused on challenging courses and curricula in mathematics and/or science for all K-12 students?

  Does the Partnership offer a credible or innovative strategy for ensuring that all students have access to and succeed in challenging courses, consistent with State mathematics and science student academic achievement standards?

How well does the planned professional development curriculum enhance teachers' content knowledge and pedagogical skills to reach all students? To reach those traditionally underserved in mathematics/science? To reach the mathematically/scientifically gifted?

- **Evidence-based Design and Outcomes**

  How well is the proposed project informed by current literature and research findings on teaching and learning, the results of prior work (i.e., prior work of the Partnership or of others, prior NSF-supported work or work supported elsewhere) or by other evidence/data? To what extent have "lessons learned" informed the conception and planning of the proposed project? What is the "value added" over any past work? How does the project's evaluation plan provide for assessing this "value added"?

  Does the proposed project include innovative approaches or strategies? To what degree do project strategies extend beyond the commonplace in the improvement of mathematics and science education? Is an adequate rationale/evidence provided to suggest that the proposed innovations will result in the desired outcomes? Are the project's quantitative benchmarks sufficiently ambitious, yet reasonable?

  How useful is the project's formative evaluation likely to be in guiding decision-making? In contributing to the project's summative evaluation?

- **Institutional Change and Project Sustainability**

  How effective are the project's plans likely to be in fostering institutional change and sustaining the efforts after the award ends?

  Do the core partners provide sufficient evidence that the project will likely lead to appropriate changes in institutional policies and practices? Have higher education institutions provided sufficient evidence of commitment to engage science, mathematics and engineering faculty in practices that strengthen their role in K-12 education and in teacher education and professional development?

  Is there adequate evidence that core K-12 partners (i.e., the schools or districts from which teacher participants are to be selected) are/will be committed to (a) an alignment of the teacher leadership effort with ongoing educational improvements and reform in mathematics and science, (b) increased responsibilities for the emerging teacher leaders in their home organizations, as a result of successful completion of the Institute, and (c) administrative support, time, resources and recognition/rewards commensurate with this increased responsibility? Of their commitments to provide nonclassroom time to Institute participants time to carry out their responsibilities as master teachers and intellectual leaders?

- **NSF-Funded Prior Work**

  If NSF-funded prior work is mentioned, are the results clearly described and well documented? Is there sufficient evidence to justify further investment?

- **Evaluation Plan**

  Does the evaluation plan provide for assessing the overall impact of the partnership's work with respect to the numbers of students and teachers to be directly engaged?

  Is the evaluation plan comprehensive in nature and does it include both formative and summative components?

  Is there appropriate expertise to fully implement the evaluation design?

  Does the evaluation plan provide for an objective analysis – either via an external evaluator or via an unbiased analysis by an evaluator within a partnering organization who is clearly separate and distinct from the partnership participants (e.g., in a department/unit within a university that is not part of the partnership itself) – of project effectiveness of "what works" and "what does not" to inform mid-course project corrections and/or modifications?

- **Partnership Management /Governance Plan**

  Has the partnership developed a viable management plan and are the roles and responsibilities of all partners clearly described?

  Does the project leadership team have the expertise necessary to guide the project to success?

  Is the project timeline realistic and feasible?

  Is there appropriate alignment between the project's management plan and the budget? Does this include an appropriate management mechanism for subawards, if appropriate?

- **Budget**

  Is the requested budget appropriate to achieve the project's vision and goals and its proposed outcomes with regard to the numbers of students and teachers impacted?

  Does the budget narrative present a sufficiently detailed justification that demonstrates the shared responsibility and accountability of each partner?

For RETA Projects

- **Connection with MSP Goals and Key Features**

  Does the proposal provide evidence of a clear understanding of the goals of the MSP program?

  Does the proposed project respond to the specific areas of interest articulated for RETA in this solicitation?

- **Research Base and Methodologies**

  Is the proposed project clearly informed by the relevant literature and does it build on the existing base of knowledge or practice?

  Is the proposed methodology well defined, rigorous and appropriate and likely to result in valid, reliable findings with the potential to inform MSP work?

  Is the logic among research question, method, evidence analysis and inference well articulated?

  Are the logic and connections between any proposed faculty development and the work to be done in K-12 well articulated?

  Is the proposed length of the project appropriate for the work to be done?

  For research projects and those that propose the development of tools, does the proposal include a clear description of proposed interactions with the Institute Partnerships?

  Are the proposed number, type and intensity of interactions reasonable and appropriate?

- **Evaluation, Data Sharing and Dissemination**

  How likely is it that the work proposed would result in peer-reviewed publications or, in the case of projects led by the national disciplinary/professional societies, in society-sponsored publications? Do the Principal Investigators show evidence of quality in their thinking and work to portend a level of research and scholarship commensurate with publication in appropriate and respected peer-reviewed journals or, as appropriate, in national society-sponsored publications?

For research projects and those that propose the development of tools, how likely is the work to be useful to Institute Partnerships?

For projects that engage the national disciplinary or professional societies in MSP work, does the evaluation plan provide for assessing the overall impact of the project's work with respect to the numbers of STEM faculty/administrator participants? For participants in faculty/administrator development, does the evaluation plan address (a) growth in their capacity to engage in the work of K-12 STEM education and (b) impacts on their own instructional practice in higher education? Does it address the impacts of K-12 engagement on their careers in higher education? Is the evaluation plan comprehensive in nature and does it include both formative and summative components? Is there appropriate expertise to fully implement the evaluation design? Does the evaluation plan provide for an objective analysis by an evaluator or evaluation team that is clearly separate and distinct from the project's organizational home and project leadership?

- **Capability of the Proposed Team**

  Do the Principal Investigators and consultants have the necessary expertise to do the proposed work, including all necessary methodological expertise?

  Where tools are to be developed, are faculty in mathematics, the sciences or engineering sufficiently and appropriately involved for the necessary expertise they bring in ensuring accuracy of disciplinary content and for their broader contextual knowledge of their disciplines?

- **Budget**

  Is the proposed budget commensurate with the scope and complexity of the project?

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.

Consistent with the requirements of OMB Circular A-16, *Coordination of Geographic Information and Related Spatial Data Activities*, and the Federal Geographic Data Committee, all NSF awards that result in relevant geospatial data must be submitted to Geospatial One-Stop in accordance with the guidelines provided at: www.geodata.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/.

*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.

Special Award Conditions:

Special award conditions will be specified at the time of award.

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.

Any special reporting conditions will be specified at the time of award.

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:

- Kathleen B. Bergin, Program Director, Directorate for Education & Human Resources, 865 S, telephone: (703) 292-5171, fax: (703) 292-9322, email: kbergin@nsf.gov
- Joyce B. Evans, Senior Program Director, Directorate for Education & Human Resources, 865 S, telephone: (703) 292-5098, fax: (703) 292-9044, email: jevans@nsf.gov
- James E. Hamos, Program Director, Directorate for Education & Human Resources, 865 S, telephone: (703) 292-4687, email: jhamos@nsf.gov
- Joan T. Prival, Program Director, Directorate for Education & Human Resources, Division of Undergraduate Education, 835 N, telephone: (703) 292-4635, fax: (703) 292-9015, email: jprival@nsf.gov
- Elizabeth VanderPutten, Program Director, Directorate for Education & Human Resources, 855 S, telephone: (703) 292-5147, fax: (703) 292-9046, email: evanderp@nsf.gov

For questions related to the use of FastLane, contact:

- FastLane Help Desk, telephone: (800) 673-6188, email: fastlane@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.

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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

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- **For General Information** (NSF Information Center)**:** (703) 292-5111
- **TDD (for the hearing-impaired):** (703) 292-5090
- **To Order Publications or Forms:**

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  or telephone: (703) 292-7827
- **To Locate NSF Employees:** (703) 292-5111

PRIVACY ACT AND PUBLIC BURDEN STATEMENTS

The information requested on proposal forms and project reports is solicited under the authority of the National Science Foundation Act of 1950, as amended. The information on proposal forms will be used in connection with the selection of qualified proposals; project reports submitted by awardees will be used for program evaluation and reporting within the Executive Branch and to Congress. The information requested may be disclosed to qualified reviewers and staff assistants as part of the proposal review process; to applicant institutions/grantees to provide or obtain data regarding the proposal review process, award decisions, or the administration of awards; to government contractors, experts, volunteers and researchers and educators as necessary to complete assigned work; to other government agencies needing information as part of the review process or in order to coordinate programs; and to another Federal agency, court or party in a court or Federal administrative proceeding if the government is a party. Information about Principal Investigators may be added to the Reviewer file and used to select potential candidates to serve as peer reviewers or advisory committee members. See Systems of Records, NSF-50, "Principal Investigator/Proposal File and Associated Records," 63 Federal Register 267 (January 5, 1998), and NSF-51, "Reviewer/Proposal File and Associated Records," 63 Federal Register 268 (January 5, 1998). Submission of the information is voluntary. Failure to provide full and complete information, however, may reduce the possibility of receiving an award.

An agency may not conduct or sponsor, and a person is not required to respond to an information collection unless it displays a valid OMB control number. The OMB control number for this collection is 3145-0058. Public reporting burden for this collection of information is estimated to average 120 hours per response, including the time for reviewing instructions. Send comments regarding this burden estimate and any other aspect of this collection of information, including suggestions for reducing this burden, to: Suzanne Plimpton, Reports Clearance Officer, Division of Administrative Services, National Science Foundation, Arlington, VA 22230.

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