



## **Education & Public Outreach**

# **Explanatory Guide to Proposal Evaluation Factors for ROSES Program Element: Opportunities in Education & Public Outreach for Earth and Space Science (EPOESS)**

Version 2.1  
December 2012

The most current version of this document can be downloaded at  
<http://nasascience.nasa.gov/researchers/education-public-outreach/explanatory-guide-to-smd-e-po-evaluation-factors>

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## Change History

<p>February 2009 Version 1.0</p>	<p>Initial Release of “<i>Explanatory Guide To Proposal Evaluation Factors for ROSES program Element: Opportunities in Education and Public Outreach for Earth and Space Science (EPOESS)</i>”</p> <p>It is based on updates of the “Explanatory Guide to the NASA Science Mission Directorate Education &amp; Public Outreach Evaluation Factors” (<i>April 2008</i>)</p>
<p>February 2010 Version 1.1</p>	<p>Updates to Evaluation Factors to discuss compliance with laws concerning use of human subjects and data collection instruments. Clarification on acceptability of foreign travel and promotional items.</p>
<p>November 2010 Version 1.2</p>	<p>Updated Heliophysics Forum Lead</p>
<p>December 2011 Version 2.0</p>	<p>Re-organized Guide to emphasize information directly related to Evaluation Factors and proposal requirements. Most omitted information is included in the new <i>SMD E/PO Help Guide</i>.</p>
<p>December 2012 Version 2.1</p>	<p>Updated Section 6 (“Content”) to include Next Generation Science Standards and using NASA Wavelength. Updated Section 7 (“Resource Utilization”) to make travel to annual Forum meeting optional, but strongly encouraged. Updated various Web addresses.</p>

## Preface

NASA's founding legislation, the Space Act of 1958, directs the Agency to expand human knowledge of Earth and space phenomena and to preserve the role of the United States as a leader in aeronautics, space science, and technology. High achievement in STEM education is essential to the accomplishment of NASA's mission. The NASA Science Mission Directorate is a major contributor to the overall NASA education and outreach effort through a portfolio of investments in Higher Education, Elementary and Secondary Education, Informal Education, and Outreach.

NASA continues the Agency's tradition of investing in the Nation's education programs and supporting the country's educators who play a key role in preparing, inspiring, exciting, encouraging, and nurturing the young minds of today who will manage and lead the Nation's laboratories and research centers of tomorrow.

In 2006 and beyond, NASA will pursue three major education goals:

- Strengthen NASA and the Nation's future workforce—NASA will identify and develop the critical skills and capabilities needed to ensure achievement of the Vision for Space Exploration. To help meet this demand, NASA will continue contributing to the development of the Nation's science, technology, engineering, and mathematics (STEM) workforce of the future through a diverse portfolio of education initiatives that target America's students at all levels, especially those in traditionally underserved and underrepresented communities.
- Attract and retain students in STEM disciplines—NASA will focus on engaging and retaining students in STEM education programs to encourage their pursuit of educational disciplines and careers critical to NASA's future engineering, scientific, and technical missions.
- Engage Americans in NASA's mission—NASA will build strategic partnerships and linkages between STEM formal and informal education providers. Through hands-on, interactive educational activities, NASA will engage students, educators, families, the general public, and all Agency stakeholders to increase Americans' science and technology literacy.

NASA delivers a comprehensive education portfolio implemented by the Office of Education, the Mission Directorates, and the NASA Centers. Through the portfolio, NASA contributes to our Nation's efforts in achieving excellence in STEM education. Three Outcomes serve to align all Agency education activities:

**Outcome 1:** Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals through a portfolio of investments.

**Outcome 2:** Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers, and faculty.

**Outcome 3:** Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission.

The Education Strategic Framework depicted in Figure 1 provides a conceptual basis for examining, guiding, and coordinating the NASA education portfolio.

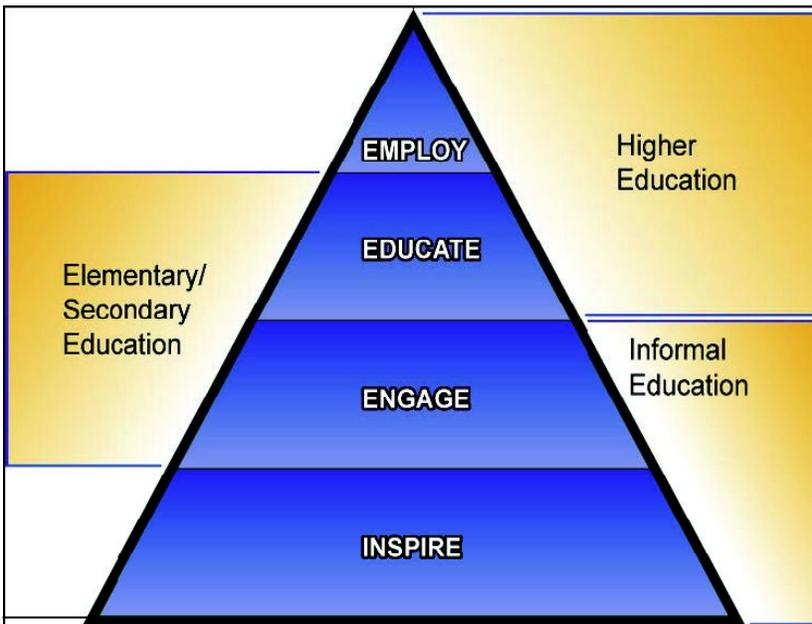


Figure 1

The Education Strategic Framework is a strategic management tool that allows the Agency to monitor participant movement through education activities, with each category leading to the next. Education programs and projects draw from the category below them – as a key source for participants – and they connect participants to the category above them – providing a more experienced and focused group and creating a measurable pipeline. If a participant’s

imagination is captured by an inspirational activity, it will be far easier to interest that individual in more interactive engagement activities. As that individual becomes more engaged, he or she may search for opportunities to learn and eventually become employed in the aerospace industry - either in the private or public sector (e.g., NASA). Student opportunities at NASA include internships, scholarship programs, and student education employment programs (e.g., cooperative education). No matter where the individual decides to pursue their career, the goal is to direct a subset of the original audience through the pipeline to pursue a career in science, technology, engineering, or mathematics while drawing in new participants along the way.

Outreach is also an essential aspect of the SMD program. It directly connects to many aspects of NASA Public Affairs and NASA education efforts. It often provides an inspirational spark for participants to seek out education opportunities. The SMD Outreach Goal is to stimulate interest in science, engineering, and technology relevant to NASA SMD. There are four objectives:

1. Increase interest in careers that use science, engineering, and/or technology relevant to NASA SMD
2. Increase understanding by the general public of SMD science, engineering, and technologies
3. Increase participation of citizen scientists in SMD education opportunities
4. Increase public engagement in improving science, mathematics, engineering, and technology education in the United States.

Outreach can be directed at any audience including students, teachers, citizen scientists, and the general public. The term is usually associated with outreach to the public but may also be used in relationship to activities targeting specific groups/individuals such as those underserved and underrepresented in the scientific, engineering, technology, and mathematics professions. It also includes efforts to engage members of these professions in NASA education and outreach efforts

such as training of scientists and engineers in effective techniques for conducting education and outreach.

The Factors discussed in this guide serve as the basis for evaluating E/PO proposals solicited in the **Opportunities In Science Mission Directorate Education And Public Outreach** portion of the annual **Research Opportunities In Space And Earth Sciences (ROSES)** solicitation.

This Guide is meant to provide assistance to investigators in aligning their proposed efforts with the goals, objectives, and key requirements of NASA and SMD education. It also provides the means for proposers, partners and facilitators, and reviewers to have a common understanding of what these factors mean in practice.

The Guide provides an elaboration of each of the SMD E/PO proposal Factors and includes "Indicators" that may be used by both proposers and reviewers to assess how well a proposal segment meets the Evaluation Factors. For the latest version, please link to <http://nasascience.nasa.gov/researchers/education-public-outreach/explanatory-guide-to-smd-e-po-evaluation-factors>

General information about developing an E/PO project is contained in the *SMD E/PO Help Guide*, available at <http://nasascience.nasa.gov/researchers/education-public-outreach/explanatory-guide-to-smd-e-po-evaluation-factors>

If you have comments or questions, please send E-mail to [HQ-SMD-ROSES-EPO@hq.nasa.gov](mailto:HQ-SMD-ROSES-EPO@hq.nasa.gov)

## The Proposal Review Process

The process of handling proposals follows the known best and fair practices for proposal review in current use throughout SMD. (See the *Guidebook for Proposers Responding to NASA Research Announcements Appendix C*, which is available at <http://www.hq.nasa.gov/office/procurement/nraguidebook/>.)

Appropriately qualified scientific, and education/outreach personnel evaluate proposals using the SMD E/PO Evaluation Factors. To ensure quality and consistency in the review process, review panels for E/PO proposals include both scientists and education/outreach professionals.

Reviewers are knowledgeable about SMD's education goals, and are briefed on the Evaluation Factors. Some reviewers are previous submitters to EPOESS or the ROSES E/PO Supplemental opportunity. The results of these reviews are conveyed to proposers as part of their debriefings.

In order to avoid "Conflict of Interest" during the review process, it is essential that all key personnel participating in the proposal are identified and names and addresses of all current institutions of employment be provided.

## SMD E/PO Evaluation Factors

Project Activities proposed to the science emission Directorate are required to make a valuable contribution to Higher Education, Elementary/Secondary Education, Informal Education and/or Public Outreach.

The principal elements considered in evaluating a proposal are its intrinsic merit, relevance to NASA's objectives, and its cost. **The failure of a proposal to be rated highly in any one of these elements is sufficient cause for the proposal to be declined.** (Intrinsic Merit and Relevance are equally weighted and approximately twice that of Cost). NASA also has a strong interest and commitment to meeting the needs of underserved and underrepresented groups in STEM. As part of this commitment SMD will use the Program Balance Factors in selecting among proposals of essentially equivalent overall rating based on the Intrinsic Merit, Relevance, and Cost Factors noted above.]

*Sub-factors indicate areas of evaluation where strengths and weaknesses will be identified. The collection of strengths/weaknesses under each principal element will determine the rating for that principal element.*

### Intrinsic Merit

- 1. Quality, Scope, Realism, and Appropriateness:** Project Activities are clearly organized, consistent with the requested budget, have clear lines of management responsibilities, and demonstrate a high probability for successful implementation.
- 2. Connections to Other NASA E/PO Activities:** Project Activities draw from audiences that have demonstrated interest in NASA and connect participants to the next level of engagement or to other NASA Education or Outreach Activities.
- 3. Partnership Leverage/Sustainability:** Project Activities leverage and achieve sustainability through their intrinsic design and/or the involvement of appropriate local, regional, and/or national partners in their design, development, or dissemination. As appropriate, key aspects of Project Activities are replicable, scalable, and demonstrate potential for continuation beyond the period of direct NASA funding.

*Science Mission Directorate E/PO Project Activities require the active involvement and participation of partners with appropriate expertise.*

- 4. Evaluation:** Project Activities document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation is appropriate to the content and scale of the targeted activity or product.

## Relevance to NASA's Objectives

**5. Customer Needs Focus:** Project Activities have been designed to respond to a need identified by the education community, a customer, or a customer group.

**6. Content:** Project Activities have a clear intellectual linkage to SMD science/technology, uses NASA SMD content, people or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and/or mathematics.

*Proposals that include Elementary/Secondary education must demonstrate alignment with appropriate educational standards.*

## Cost

**7. Resource Utilization:** The adequacy, reasonableness, and realism of the proposed budget including demonstration of effective use of funds.

## Program Balance Factors

**8. Pipeline:** Through the use of NASA Earth and space science, Project Activities and/or products make a demonstrable contribution to attracting diverse populations to careers in science, technology, engineering, and mathematics (STEM).

**9. Diversity:** Through the use of NASA Earth and space science, Project Activities and/or products reach identified targeted groups. They contribute to the involvement, broad understanding, and/or training of underserved and/or underutilized groups in science, technology, engineering, and mathematics (STEM).

# Indicators of Alignment with the SMD E/PO Evaluation Factors

To aid proposers in the preparation of their proposals, as well as to ensure that reviews are carried out on a consistent basis aligned with the NASA Education Goals and SMD implementation, this section offers further elaboration of each of the Evaluation Factors. Note that although creativity and innovation are certainly encouraged where appropriate, the factors do not focus on the originality of the proposed effort. This is a fundamental departure from standard scientific review factors and allows Earth and space scientists to become actively involved in the kinds of education and public outreach activities that have already proven to be meaningful, effective, and credible.

## INTRINSIC MERIT

**1. Quality, Scope, Realism, and Appropriateness:** Project Activities are clearly organized, consistent with the requested budget, have clear lines of management responsibilities, and demonstrate a high probability for successful implementation.

Indicators of alignment include:

- Individuals (researchers, scientists, engineers, technologist, etc.) involved in Earth and/or space science are engaged in meaningful and appropriate roles. (Active involvement of these individuals is required on SMD Project Activities.)
- Essential information about each proposed activity and product is provided (e.g., who, what, when, where, why, how).
- Objectives are clearly and succinctly described. Implementation is feasible and appropriate for the specified intended audiences.
- There is a schedule and/or timeline for proposed activities or other clear indication of how activities will be phased that is clearly aligned to the budget request.
- Members of the target audience (whether they are underserved or not) are actively involved in the design and execution of the Project Activity.
- The management is clearly defined with clear lines of authority. Areas of responsibility are defined and specified. All key personnel are identified and have institutional authorization to participate.
- Partners have well-defined roles, specific tasks, and relevant expertise that are substantively related to the design, development, dissemination, implementation, or evaluation of activities and/or products.
- There are clear plans for dissemination of the product(s) or results of the activities.

Note that all NASA-sponsored awardees are required to submit their Earth and space science education products and resources to the NASA Education Produce Review. The timeline should account for submission of products to this review and potential revision based on review feedback. See <http://nasareviews.strategies.org/>

**2. Connections to Other NASA E/PO Activities:** Project Activities draw from audiences that have demonstrated interest in NASA and connect participants to the next level of engagement or to other NASA education or outreach activities.

Indicators of alignment include:

- Methods are identified that will draw Project Activity participants from other NASA educational and/or outreach opportunities.
- Methods are identified that will connect Project Activity participants to other NASA educational and/or outreach opportunities.

For the differences between “Connections to Other NASA E/PO Activities” and “Pipeline”, see the section on Pipeline.

**3. Partnership Leverage/Sustainability:** Project Activities leverage and achieve sustainability through their intrinsic design and/or the involvement of appropriate local, regional, and/or national partners in their design, development, or dissemination. As appropriate, key aspects of Project Activities are replicable, scalable, and demonstrate potential for continuation beyond the period of direct NASA funding.

Active involvement of appropriate and qualified partners is required for Science Mission Directorate E/PO Project Activities.

Indicators of committed, qualified, and capable partnerships include:

- E/PO partners are specifically identified. Partners identified in the proposal provide their consent by registering with the proposal in NSPIRES. Letters of commitment are not necessary.
- The proposal clearly defines the terms of the partnership, and the roles and responsibilities of the partner. The nature of the collaboration between researchers and partnering E/PO organizations or individuals is clearly stated.
- The proposal clearly demonstrates that the proposer and partners have relevant and appropriate experience applicable to the proposed effort.
- Any funding directed to the partners is clearly explained in the budget justification.

Indicators for High Leverage and/or Sustainability include:

- A Project Activity can achieve high leverage by having an impact beyond the direct beneficiaries, reaching large audiences, being suitable for replication or broad dissemination, or drawing on resources beyond those directly requested in the proposal.
- A Project Activity is sustainable beyond initial NASA funding by showing the potential for continuation, adoption by the target audiences, and/or incorporation into institutional programmatic efforts.
- A Project Activity is replicable in other educational institutions.

**FAQ: What specific requirements apply when partnering with a for-profit organization?**

NASA policies prohibit offering a grant, contract or subcontract for the sole purpose of generating a potentially marketable (retail/for profit) educational end product such as a book, video, CD-ROM, slide set, poster, computer software, or web-based activity/resource. Funds can be awarded for an activity that might incorporate the use and assessment of a developed product. Example: A proposed program may involve the development of a product, but this product would be part of a larger activity and would be distributed either for free or at cost, and be subject to all SMD E/PO Evaluation Factors.

In addition, it is strongly encouraged that any co-investigator or partner/individual with a salaried position in a for-profit company sign a non-disclosure agreement to avoid potential conflicts of interest directly related to the intellectual property rights of other E/PO team members and partnering institutions. If an individual or company is unwilling to comply with this request, it is usually not advisable to proceed with the proposed partnership.

**4. Evaluation:** Project Activities document their intended outcomes and use metrics to demonstrate progress toward and achievement of these outcomes and annual performance goals. Evaluation is appropriate to the content and scale of the targeted activity or product.

Indicators of appropriate evaluation include:

- Evaluation methods provide useful information on the effectiveness of the proposed project and the project implements improvements based on evaluation evidence.
- There is evidence that the evaluation is based upon reputable models and techniques or are designed and applied by a project partner who is knowledgeable in research and evaluation methods applicable to outreach efforts. Where appropriate, the evaluation plan includes field-testing and modifications before broad dissemination.

Evaluation efforts should reveal lessons learned, and whether the proposed Project Activity meets the stated goals and objectives and/or had other unanticipated effects. The formality and comprehensiveness of the evaluation will depend on the scope of the proposed activity. *All SMD Project Activities must include an evaluation plan and all components of a project activity must be evaluated.*

The proposed evaluation should be appropriate for the scale and type of each project activity component; for instance, a small outreach effort might measure web page views, or audience attendance on an event; a larger effort might include an online survey for a website, viewer tracking, or audience feedback from an event. A small education effort might use pre-test/post-tests at a workshop or web surveys; a larger effort might include an educator survey conducted by education students at a local university to determine longer-term impact. It is useful to follow standard methods or consult an individual trained in research and evaluation methods when designing an evaluation procedure, even when the evaluation is to be done informally by the proposer(s).

Note that there are a number of requirements with regard to evaluation:

**a. Complying with “The Common Rule for Protection of Human Subjects” and Using an Institutional Review Board (IRB)**

Awardee institutions have the responsibility for budgeting and documenting compliance with Code of Federal Regulations commonly referred to as “the Common Rule for the Protection of Human subjects.” Activities to develop NASA exhibits, programs, curriculum products etc. may involve full human subjects review through an institutional review board (IRB) or it may be exempt. An IRB will certify when an activity is exempt. Note that a PI cannot exempt him/herself. Activities using surveys, observational or ethnographic methods, cognitive and educational tests, etc. is "exempt" unless two things apply: the information would allow subjects to be identified, and disclosure of the data would reasonably place the subject at risk of harm. It is assumed that most SMD education and outreach activities will be exempt. A PI should begin the IRB process as soon as a proposal is submitted to determine whether any proposed activities require IRB approval or is exempt. PI’s should use the IRB available to them through their evaluator, or through their institution if they are not a civil servant at a NASA Center. As part of their reporting, PI’s should provide a copy of their exemption letter/document from their IRB to the EPOESS/ROSES Supplemental/SMD E/PO program manager.

In cases where it is not possible to use the evaluator’s or the institution’s IRB, then PIs may use the NASA IRB at Johnson Space Center, which can review plans and authorize exemptions.

Although the JSC IRB deals primarily with issues concerning astronauts, they are the Agency’s IRB and will accept other applications. They are aware that most of what the SMD E/PO community does will be exempt. See <http://irb.nasa.gov/> for more information.

**b. Complying with OMB’s Controlling Paperwork Burdens**

The use of data collection instruments, such as surveys, must comply with OMB regulation *Controlling Paperwork Burdens on the Public* (5 CFR §1320). For details see Title 5, part 1320, of the Code of Federal Regulations, <http://www.ecfr.gov/>.

In most cases, EPOESS recipients are exempt from this regulation, since they use their own evaluation instruments and do not use questions given to them by NASA. Specifically, recipients are exempted when:

- (i) evaluation data is compiled by the grantee for the primary purpose of carrying out the grantee’s own program,
- (ii) the recipient obtains this data in a form of the recipient’s choosing and sole discretion (i.e. not using questions provided by NASA),
- (iii) the evaluation data is presented to NASA in a summary form and not as a series of responses to identical questions provided by NASA.

Most often the only occurrence when OMB approval is necessary is when a recipient partners with another federal agency and the survey is conducted with that agency’s personnel. In those instances be aware that obtaining approval for a data collection instrument is a significant effort and OMB clearance typically takes 6 to 9 months. A proposal must account for this time and effort. Affected awardees must submit the data collection instrument and supporting documentation to the cognizant NASA Program Officer via OMB Form 83-I

(<http://www.whitehouse.gov/omb/inforeg/83i-fill.pdf>). NASA will then review the submitted information, and either request revisions or submit it to OMB. OMB may request additional revisions prior to initiating the approval process.

Proposers, including those from NASA Centers, that anticipate the need for OMB approval of data collection instruments must include in their proposal, a discussion of alternative evaluation techniques that will be used if the instruments are not approved.

### **c. Submitting Products to the NASA Education Product Review**

Projects which result in a product for formal or informal education audiences must submit their product to the SMD Education Product Review. The Review accepts both hardcopy and electronic materials of formal and informal education resources. This review does not take the place of formative evaluation of education materials and it is expected that products have been reviewed for scientific accuracy and educational value, as well as field-tested by teachers and/or students as appropriate. In their project timelines, proposers must account for submitting materials to the Product Review and for the potential revision of their materials based on the Review outcome. For more information about the Product Review, see <http://nasareviews.strategies.org/>

### **d. Reporting outcomes to NASA Office of Education Program Management System**

The project must collect, analyze, and report output and outcome data to a common NASA database (Office of Education Program Management (OEPM) System) to determine project effectiveness and meet the requirements of stakeholders. It is anticipated that this will be nominally a two person-day effort to format and submit the data annually. Directions are provided in award documentation.

## **RELEVANCE TO NASA OBJECTIVES**

**5. Customer Needs Focus:** Project Activities have been designed to respond to a need identified by the education community, a customer, or a customer group.

Indicators of alignment include:

- The project is based on a clearly expressed, compelling mutual need between NASA and the audience. (**Evidence of target audience need is required for SMD E/PO projects**).
- NASA funded researchers can make an effective content contribution which is appropriate for the target audience.

It is essential to establish that both the target audience(s) and NASA have an interest and need for the products and opportunities that would be made available through the E/PO activities. The interest/need should be specific to the proposed efforts and products. The specific interest and needs of the target audience can be documented through a variety of approaches including published documents, surveys, interviews, letters of interest, etc. from members of the target

audience.

Audience need for educator workshops can be established via a letter of partnership from a school district. The audience need for a new exhibit or planetarium show can be demonstrated through visitor questionnaires. In addition, proposers are strongly encouraged to discuss audience needs with NASA SMD mission E/PO programs and the SMD Forums which are working with similar audiences. (See the *SMD E/PO Help Guide* for information about the Forums).

Interest and need by NASA may be established by reference to appropriate portions of the NASA strategic plan or similar SMD documents.

**6. Content:** Project Activities have a clear intellectual linkage to SMD science/technology, uses NASA SMD content, people or facilities to involve educators, students, and/or the public in NASA science, technology, engineering, and/or mathematics.

Indicators of alignment include:

- The Project Activity is based upon and has a clear intellectual linkage to SMD science/technology.
- The Project Activity ensures that the content is technically accurate.
- Elementary/Secondary Education Project Activities are aligned (as described below) with education standards.

SMD E/PO projects must be connected to SMD science and technology. SMD desires that SMD project science be represented in the E/PO Project Activity to greatest extent practical. However, the details of a particular research area may too focused and/or too complex to be valuable for general use in K-14 education or public outreach. A knowledgeable assessment of the needs of the audience, such as age-appropriateness, and/or the unique interests or special needs of the particular targeted audience should determine the focus of product or activity design.

Any proposed effort that includes elementary/secondary education via use of a curricular product, data analysis, or educator workshop must demonstrate a substantive and informed alignment with educational standards appropriate to the target audience and scale of the activity. National or regional (multi-state) activities should align with the National Research Council's *National Science Education Standards (NSES)* and/or the American Association for the Advancement of *Science's Benchmarks for Science Literacy*. In Fall 2012, the National Research Council was in the process of developing the *Next Generation Science Standards*, replacing the *NSES*. These are scheduled for completion in 2013 and for implementation in 2014. Proposers should demonstrate awareness of these new standards and be prepared to utilize them. (See the *SMD E/PO Help Guide* for more information). Alternatively, proposed efforts may align with the mathematics education standards provided by the National Council of Teachers of Mathematics, and/or *Technology Foundation Standards for All Students* from the International Society for Technology in Education (See Appendix E in the *Help Guide* for links to these and other relevant education standards.) **Alignment is done by providing specific reference to at least one of the standards publications cited above, citing specific standards to be addressed, and as appropriate providing evidence of use of standards for professional development.** Similarly local (single state) projects/activities may choose to align with national or appropriate state

standards by providing the same level of documentation. Indicators of appropriate alignment with elementary/secondary education efforts include the following:

- Descriptions of the content of curricular products and/or educator training opportunities explicitly demonstrate alignment with education standards in one or more of the following educational fields: science (Earth and space science or physical science), mathematics, or technology.
- Evidence that the partners engaged in developing and evaluating curricular products or educator training are knowledgeable about how to align products and activities with relevant education standards

Proposers should be wary of developing materials that address a standard or topic for which there are already numerous resources. Proposers may determine the number of SMD education products which already address a topic or relevant science education standard using the NASA Wavelength online catalog (<http://nasawavelength.org/>). The catalog can be searched by topic and grade level, and includes links to AAAS Strand Maps. Within the Strand Maps, each benchmark is linked to a list of NASA SMD resources which align with that benchmark. For proposed materials that address standards or topics already covered by multiple resources, the proposer should identify what the planned new product would contribute that is unique compared to existing resources (e.g., a different target audience, a new aspect of the topic, new science results, new pedagogical approach, etc.). Proposers are encouraged to design products addressing education standards and topics for which few or no SMD products are aligned.

## COST

**7. Resource Utilization:** The adequacy, reasonableness, and realism of the proposed budget including demonstration of effective use of funds.

Indicators of alignment include:

- Budget details, along with an explanation, are provided. This includes the amount of individual labor effort, details of travel, supplies, and subcontractor expenses. These must be clearly connected to the described effort.
- The overall Project Activity budget (including in-kind contribution and other funds leveraged from E/PO partners' resources) is cost-effective and provides a realistic and worthwhile “return on the dollar” for the effort. The budget provides cited or estimated figures for the fiscal contribution of each partner. Overall project cost, costs of project deliverables, and the relationship of proposed budget to available funds are each realistic and reasonable. For example, a \$1.5 million E/PO Project Activity is multifaceted and reaches an appropriately large and diverse audience (statewide, regional, or national scope); and a \$50,000 E/PO Project Activity is appropriately focused and does not propose unrealistic outcomes that are clearly beyond Project Activity resources.
- Adequate funds are included for E/PO partners commensurate with their level of involvement in proposed activities.

Proposals are submitted through NSPIRES or grants.gov and use budget forms similar to the sample in Appendix C. The proposal must reflect the entire cost of the effort including cost sharing and in-kind contributions.

The budget should indicate the value (if any) of cost sharing and in-kind contributions. Cost Sharing includes items such as waiver or reduction of overhead expenses, personnel costs, and/or other direct charges. In-kind contributions includes the fair market value of services rendered, goods donated, facilities provided.

Also note that NASA can award grants to “for-profit” companies if no fee is included in the requested funding. For profit entities may wish to consider requesting a grant award rather than a contract.

**FAQ: What are the requirements and restrictions on the Project Activity budget?**

All costs must be allowable under Federal Acquisition Regulations. Promotional items, awards, and other “give-aways” are generally not allowable but the proposer may include them as cost-sharing or in-kind contributions. Beyond that there are some recommended guidelines in keeping with the spirit and purpose of the SMD funding:

**Salaries and Wages:** Salaries and wages must be connected to the effort and justified. Adequate funds should be included for partners commensurate with their level of involvement in proposed activities.

**Equipment:** It is not the intent of the program to purchase equipment for general use in schools, museums, planetariums, or other institutions. There must be a detailed justification for any equipment, including how it will be incorporated as an essential component into a large-scaled educational activity. Any requests for equipment must also be accompanied with certification that it will be used strictly for educational purposes both during the program and once the program is completed. Hardware such as computers, telescopes, and so on should be ancillary to the E/PO activities being proposed rather than the primary use of funding. Requested items must be essential to the successful of the project. In any event, no more that 50% of the total budget (including cost sharing and in-kind contributions) may be used for this purpose.

**Travel:** Travel for investigators is acceptable if it is for the purpose of carrying out the proposed activity, disseminating information about the activities or for the purpose of attending E/PO training for scientists. Awardees are encouraged to participate in an annual NASA SMD Forum meeting, and may budget appropriately. (The Astrophysics Forum holds their annual meeting in Chicago. The Planetary Forum holds theirs in the Washington DC area. The Earth Science Forum usually holds theirs in Greater Washington DC area. The Heliophysics Forum expects to hold its 2014 annual meeting in the Greater Washington DC area. (See the *SMD E/PO Help Guide* for information about the Forums).) Foreign travel must be essential to the execution of the effort and is inappropriate as the means of disseminating Project Activity results.

**Meals and Coffee Breaks:** When certain meals are an integral and necessary part of a conference (e.g., working meals where business is transacted), grant funds may be used for such meals. Grant funds may also be used for furnishing a reasonable amount of hot beverages or soft drinks to conference participants and attendees during periodic coffee

breaks.

**Indirect Costs:** SMD requests (but does not require) that the institutional overhead for the budget be reduced or waived by the submitting organization, since such activities in many cases will be of direct value to local educational and/or public science institutions and the budget available for this SMD E/PO program is extremely restricted.

**FAQ: Can SMD E/PO funds be used for Public Affairs or Public Relations?**

In general, No. Public Affairs or Public Relations (PR) (or “Communications”) products and activities are important to public awareness, but they are not appropriate for funding by the SMD E/PO program.

PR products may include press conferences, press releases, video clips, mission-related brochures, posters, and lithographs. Some of these products can be tailored or modified for E/PO uses. For example, a poster could be packaged with an educational guide or insert that takes advantage of the interest and learning opportunity stimulated by the poster image. A video clip and text from a press release might be adapted for use in a teacher guide or workshop. Such tailoring or development of educational products to accompany PR products is potentially fundable with SMD E/PO funds, but it should not dominate an E/PO proposal. In particular, neither PAO nor E/PO funds should be used for "give-away" souvenirs like coffee mugs, lapel pins, patches, T-shirts, mouse pads, and other items of limited educational value.

E/PO funds may be used to support workshops or similar types of learning experiences for journalist/media when focused on deepening their understanding of SMD science and technology.

**FAQ: How can SMD E/PO funds be used to support efforts directed towards higher education?**

SMD has education and research opportunities for faculty, researchers, and post-postdoctoral fellows, and students through many competitive solicitations such as Research Opportunities in Space and Earth Science (ROSES), NASA Earth and Space Science Fellowships (NESSF), and flight mission Announcements of Opportunities. Historically SMD has placed a premium on training the next generation of scientists via the support of graduates and postgraduates in their usual scientific roles on research proposals. Science and engineering undergraduates have also become increasingly involved in SMD mission operations and scientific research. SMD support for future scientists and engineers is important and ongoing.

The list below offers some of the ways SMD E/PO funds could be used unless otherwise restricted in the solicitation. This list is not meant to be comprehensive, but to convey the spirit of the SMD E/PO interest in higher education:

- Collaboration between Earth and space science departments and schools of education to enhance the science literacy of students preparing to become K-12 teachers.
- Employing a graduate student in education to work on the design and development of educational products and materials or the evaluation of an E/PO activity.

- Enhancing introductory undergraduate courses in Earth or space science for non-science majors at community colleges as well as 4-year colleges and universities.
- Workshops on how to do successful classroom outreach for science and engineering graduates and undergraduates involved in SMD research and development efforts.
- Collaborations with minority institutions to develop undergraduate coursework and/or experiential opportunities that promote increased minority interest and participation in science and engineering (see “Diversity”, below).

## Program Balance Factors

NASA has a strong interest in attracting and retaining students in STEM disciplines. NASA also has a strong interest and commitment to meeting the needs of underserved and underrepresented groups in STEM. As part of this commitment SMD will use these program balance factors in selecting among proposals of essentially equivalent overall rating based on Intrinsic Merit, Relevance, and Cost Factors noted above.

**8. Pipeline:** Through the use of NASA Earth and space science, Project Activities and/or products make a demonstrable contribution to attracting diverse populations to careers in science, technology, engineering, and mathematics (STEM).

Indicators of alignment include one or more of the following:

- The program promotes careers in STEM.
- The program promotes improvement of STEM skills.
- The program creates linkages to other STEM opportunities.
- The program/product addresses diverse populations of students.
- Members of the target audience are involved in the development and execution of the effort.

Approaches include:

- Teacher and student use of NASA data, research experiences for students and teachers, exposure to career options through hands-on participation in STEM enrichment projects/activities.
- Engaging students in participatory activities, such as hands-on learning, research, the use of innovative technology, peer support groups, and mentoring relationships with professionals and college students; involving teachers in effective and extensive staff to improve their content knowledge in STEM areas; increasing teacher participation in STEM enrichment projects/activities; and increasing parent awareness of and involvement in student academic progress in STEM activities to strengthen family support of STEM education.
- Utilization of partnerships or having substantive linkage with other federal and NASA education projects and involvement of community groups, corporations, research laboratories, museums, and educational/professional organizations in STEM activities.

### **FAQ: What is the difference between “Connection to Other NASA E/PO Activities” and “Pipeline”?**

Projects that address the *Pipeline* factor are primarily concerned using NASA Earth and space science as a means of increasing the number of students that develop high proficiency in those skills suitable to successful pursuit of STEM careers. This could include programs focused on retention of students in STEM subject areas and/or efforts to increase the students

in STEM subject areas. Approaches include:

- Teacher and student use of NASA data, research experiences for students and teachers, exposure to career options through hands-on participation in STEM enrichment projects/activities.
- Engaging students in participatory activities, such as hands-on learning, research, the use of innovative technology, peer support groups, and mentoring relationships with professionals and college students; involving teachers in effective and extensive staff development opportunities to improve their content knowledge in STEM areas; increasing teacher participation in STEM enrichment projects/activities; and increasing parent awareness of and involvement in student academic progress in STEM activities to strengthen family support of STEM education.
- Utilization of partnerships and/or having substantive linkage with national or state education programs or involvement of community groups, corporations, research laboratories, museums, and educational/professional organizations in STEM activities.

The “Connection to Other NASA E/PO Activities” subfactor of *Intrinsic Merit* is directed at the means of either attracting participants to the Project Activity and/or informing participants about other NASA education and outreach opportunities. The objective is to assist participants in connecting to other NASA education and outreach projects – providing “continuity” of experience in the “*education pipeline*”.

**9. Diversity:** Through the use of NASA Earth and space science, Project Activities and/or products reach identified targeted groups. They contribute to the involvement, broad understanding, and/or training of underserved and/or underutilized groups in science, technology, engineering, and mathematics (STEM).

Engaging more minorities and women in careers and greater interest in science and engineering has become an increasingly critical need in America. Indicators that the proposed activities contribute to underserved and/or underutilized groups (see FAQ below) may include one or more of the following:

- The effort serves individuals from underrepresented groups and ensures accessibility to people with disabilities.
- The effort has been or will be developed in consultation with members of the underserved and/or underutilized communities it is intended to serve.
- The effort provides awareness and understanding through culturally appropriate materials to targeted underserved and/or underutilized communities of how NASA’s research and innovations affect and improve the quality of life for all citizens.
- Members of the underserved and/or underutilized target audience are involved in the development and execution of the effort.
- The effort promotes opportunities for faculty at minority-serving institutions to engage in research consistent with NASA’s requirements. Approaches include utilization of partnerships or having substantive linkage with one or more minority universities such as:

Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs).

- The effort supports closing identified gaps in STEM proficiencies among underserved and/or underutilized populations.

**FAQ: What is meant by "underutilized" and "underserved" groups in science and technology?**

The terms "underutilized" and "underserved" have special meaning in this context. In Equal Opportunity organizations, the operative phrase is "underrepresented in science and engineering" which is currently defined as individuals of Hispanic, African American, Pacific Islander, and Native American origins. In particular, all federal agencies, including NASA, have legislative and White House mandates to increase their support to minority universities. Such universities include Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and other institutions certified by the Department of Education as having more than 50% combined minority undergraduate enrollment. A complete list of all accredited minority institutions is available from the Department of Education at <http://www.ed.gov/about/offices/list/ocr/edlite-minorityinst.html> (also see Appendix F in the *Help Guide*).

The terms "underutilized" and "underserved" encompass "underrepresented," but also include more. Use of the term "underutilized" recognizes that there are groups of people who have the talent and ability to participate in the SMD program and thus should be involved, but for one reason or another, they are not now involved. Such groups obviously include minorities but also include women and the physically challenged.

Use of the term "underserved" recognizes that there are people in areas where goods or services are in short supply. For example, this term is usually applied to individuals in small towns, rural communities, or in economically depressed areas where key services are frequently not available. The usage of "underserved" in this context is also intended to include groups with which NASA has not historically had a significant relationship, such as students at community colleges.

## **APPENDIX A: Key NASA Links**

### **NASA Strategy and E/PO Implementation Documents**

- (1) NASA Office of Education Strategy  
[http://www.nasa.gov/offices/education/performance/strategic\\_framework.html](http://www.nasa.gov/offices/education/performance/strategic_framework.html)
- (2) 2011 NASA Strategic Plan  
[http://www.nasa.gov/pdf/516579main\\_NASA2011StrategicPlan.pdf](http://www.nasa.gov/pdf/516579main_NASA2011StrategicPlan.pdf)

### **NASA Information**

- (1) NASA Science Mission Directorate  
<http://nasascience.nasa.gov/>
- (2) NASA Office of Education  
<http://www.nasa.gov/offices/education/about/index.html>

### **Resources for Researchers and Educators**

- (1) SMD E/PO information for researchers  
<http://nasascience.nasa.gov/researchers/education-public-outreach>
- (2) Overviews of SMD Missions and their E/PO projects  
<http://nasascience.nasa.gov/missions>
- (3) NASA Wavelength (<http://nasawavelength.org>)  
The NASA Wavelength online catalog provides access to top-quality, reviewed educational resources produced by NASA's Earth and Space Science Education programs.
- (4) NASA Reviewed Collection  
The NASA Science Reviewed Collection provides educators and students with a direct line of access to quality products reviewed through the NASA product review. The resources have been rigorously reviewed by an independent peer review of teachers, curriculum and design specialists, teacher trainers, and Earth system scientists. The review of the learning resources is based on their scientific accuracy, educational value, documentation, ease of use, their power to engage or motivate students, their robustness/sustainability as a digital resource, and ability to foster mastery of significant understandings or skills. Resources in the collection support the NASA Science Mission Directorate: Earth and Space Science education missions.  
<http://www.dlese.org/dds/histogram.do?group=subject&key=eserev>
- (5) Abstracts of SMD proposals selected for Education and Public Outreach Opportunities in Earth and Space Science (2006-2011)  
NASA lists the titles and abstracts of all proposals and associated Principal Investigators that were selected for funding in response to these opportunities on the NSPIRES Web site, which is located at: <http://nspires.nasaprs.com/>. At this site, click on the link to "Selected Proposals" then select the year, such as "2008", to view the posting of the Education & Public Outreach for Earth & Space Science Program proposals selected.

## APPENDIX B: Sample E/PO Proposal Evaluation Form

NASA Science Mission Directorate  
EDUCATION AND PUBLIC OUTREACH PROGRAM  
E/PO Evaluation Form  
NNH13ZDA001N

<b>Proposal Number:</b>	<b>PI Name:</b>	<b>Version:</b>
<b>Proposal Title:</b>		
<b>Submitting Organization/Institution:</b>		

### Brief Summary of Proposed Project:

<u>Intrinsic Merit</u>					
<b>1. Quality, Scope, Realism, and Appropriateness:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
Major Strengths:					
Minor Strengths:					
Major Weaknesses:					
Minor Weaknesses:					
<b>2. Connections to Other NASA E/PO Activities:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
Major Strengths:					
Minor Strengths:					
Major Weaknesses:					

<b>Minor Weaknesses:</b>					
<b>3a. Partnerships:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					

<b>3b. Sustainability:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					
<b>4. Evaluation:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					

<u>Relevance to NASA's Objectives</u>					
<b>5. Customer Needs Focus:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					
<b>6. Content:</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					

<u>Cost</u>					
<b>7. Resource Utilization</b>	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:					
<b>Major Strengths:</b>					
<b>Minor Strengths:</b>					
<b>Major Weaknesses:</b>					
<b>Minor Weaknesses:</b>					

<u>Program Balance Factors</u>						
<b>8. Pipeline:</b>	<input type="checkbox"/> Not Addressed	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:						
Major Strengths:						
Minor Strengths:						
Major Weaknesses:						
Minor Weaknesses:						
<b>9. Diversity:</b>	<input type="checkbox"/> Not Addressed	<input type="checkbox"/> Excellent	<input type="checkbox"/> Very Good	<input type="checkbox"/> Good	<input type="checkbox"/> Fair	<input type="checkbox"/> Poor
Rating:						
Major Strengths:						
Minor Strengths:						
Major Weaknesses:						
Minor Weaknesses:						

**Overall Comments:**

**APPENDIX C:**  
**NSPIRES Budget Summary Form for Proposed E/PO Activity**

	Year 1 (\$)	Year 2 (\$)	Year 3 (\$)	Total Project (\$)
A. Direct Labor - Key Personnel				
B. Direct Labor - Other Personnel				
Total Number Other Personnel				
Total Direct Labor Costs (A+B)				
C. Direct Costs - Equipment				
D. Direct Costs - Travel				
Domestic Travel				
Foreign Travel				
E. Direct Costs - Participant/Trainee Support Costs				
Tuition/Fees/Health Insurance				
Stipends				
Travel				
Subsistence				
Other				
Number of Participants/Trainees				
F. Other Direct Costs				
Materials and Supplies				
Publication Costs				
Consultant Services				
ADP/Computer Services				
Subawards/Consortium/Contractual Costs				

Equipment or Facility Rental/User Fees				
Alterations and Renovations				
Other				
G. Total Direct Costs (A+B+C+D+E+F)				
H. Indirect Costs				
I. Total Direct and Indirect Costs (G+H)				
J. Fee				
K. Total Cost (I+J)				

NSPIRES also includes forms in which these categories are further broken down and detailed by project year.