NASA Education Program -- Outcomes, Objectives, & Measures

Outcome One: Contribute to the development of the STEM workforce in disciplines needed to achieve NASA's strategic goals, through a portfolio of investments, **(Higher Education -- Employ & Educate)**					
1.1 **Faculty and Research Support** Objective: **(Employ)** Provide NASA competency-building education and research opportunities for faculty, researchers, and post-doctoral fellows.	1.1.1 Number and diversity of faculty who participate in NASA competency-building research & STEM education programs	1.1.2 Ratio of number of research awards to participants in NASA competency-building programs to number of proposals submitted 1.1.3 Percentage of resumes rated "qualified" (note: assumes a reliable & valid evaluation rubric)	1.1.4 Ratio of participants who successfully obtain NASA research and development grant funding to the number of participants supported 1.1.5 Use a communications network of colleges and universities to inform them of NASA's direction and needs.	1. List of priority competencies as defined by NASA Human Resources 2. Disciplines of awardees 3. Resumes of awardees 4. Post-participation proposal success rate of research participants.	• Proposal success rate comparable to average success rate across program • Improved competency in post-participation evaluations
1.2 **Student Support** Objective: **(Educate)** Provide NASA competency-building education and research opportunities to individuals to develop qualified undergraduate & graduate students who are prepared for employment in STEM disciplines at NASA, industry, & higher education.	1.2.1 Number and diversity of NASA supported higher education students graduating in NASA related fields	1.2.2 Number of student participants employed by NASA, aerospace contractors, universities, & other educational institutions 1.2.3 Number of undergraduate students who move on to advanced education in NASA-related disciplines	1.2.4 Ratio of student participants employed by NASA, aerospace contractors, universities, & other educational institutions to the total number of NASA supported higher education students 1.2.5 Percentage of higher education program participants who have participated in NASA elementary or secondary programs.	5. Database of programs, opportunities, & STEM-related resources available through HQ, Centers, and/or external partners 6. Database of student participants 7. Five-year longitudinal studies (i.e. follow-up mechanisms)	• Percentage of NASA higher education student participants studying or working in NASA-related fields five years after their involvement has ended
1.3 **Student Involvement Higher Education**	1.3.1 Number & diversity of students participating in	1.3.3 Number of students taking next steps (e.g. further research; advanced	1.3.6 Ratio of the number of student researchers entering	8. Longitudinal	•

Objective: **(Educate)** Provide opportunities for groups of post-secondary students to engage in authentic NASA-related, mission-based R & D activities	projects 1.3.2 Level of involvement (e.g. FTE) of NASA supported student researchers	education) to students participating in projects 1.3.4 Number of NASA supported student researchers that enter the NASA-related STEM workforce 1.3.5 Quality & merit of R & D projects	the NASA-related STEM workforce to the total number of students involved	tracking data over time	
1.4 **Course Development** Objective: **(Educate)** Develop NASA-related course resources for integration into STEM disciplines	1.4.1 Number of NASA-supported courses offered at institutions of higher education targeted at the STEM skills needed by NASA 1.4.2 Number of higher education institutions that incorporate NASA research and material in course in their schools of education	1.4.3 Number of students successfully completing courses incorporating NASA content 1.4.4 Number of pre-service teachers who successfully complete courses incorporating NASA content 1.4.5 Success rate of STEM certification for pre-service teachers participating in courses incorporating NASA content		9. Number of participating institutions of higher education 10. Number of courses offered incorporating NASA content 11. Number of students enrolled 12. Number of students successfully completing course 13. Database of contacts and programs so that institutions can replicate or build upon offerings	•
1.5 **Targeted Institution Research and Academic Infrastructure** Objective: **(Employ)** Improve the ability of targeted institutions to	1.5.1 Number of participating states 1.5.2 Number of Minority-Serving Institutions (MSI's) participating	1.5.3 Number of new research/technology development partnerships with other organizations 1.5.4 Ratio of number of proposals submitted prior to participation to number submitted after participation 1.5.5 Number of faculty who		14.	•

compete for NASA research and development work.		successfully obtain NASA research and development grant funding			

Outcome II: Attract and retain students in STEM disciplines through a progression of educational opportunities for students, teachers and faculty, **(Elementary and Secondary Education -- Educate & Engage)**					
2.1 **Educator Professional Development—Short Duration** Objective: (**Engage**) Provide short duration professional development and training opportunities to educators, equipping them with the skills and knowledge to attract and retain students in STEM disciplines.	2.1.1 Number of elementary and secondary educators participating in NASA-sponsored short-term professional development opportunities	2.1.2 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom 2.1.3 Percentage of elementary and secondary educators using NASA content-based STEM resources in the classroom who rate the resources as effective	2.1.4 Number of formal partnerships with professional education associations	1. Database on "yield" from partnerships for NASA 2. Utilization of Business Management System (BMS)as a quarterly reporting mechanism 3. DB Tracking of distance learning partnerships	
2.2 **Educator Professional Development—Long Duration** Objective: **(Educate)** Provide long-duration and/or sustained professional development training opportunities to educators that result in deeper content understanding and/or competence and confidence in teaching STEM disciplines.	2.2.1 Number of elementary and secondary educators participating in NASA-sponsored professional development opportunities. 2.2.2 Number of colleges & universities training elementary and secondary educators who partner with NASA in their STEM teacher educator programs.	2.2.3 Number of teachers who use NASA content or resources as a result of another teacher's direct involvement with a NASA program. 2.2.4 Percentage of NASA teacher program participants who become active within a national network to train other teachers. 2.2.5 Percentage of elementary and secondary educators who participate in	2.2.8 Reach educators through partnerships with professional organizations and teacher associations rather than running NASA-only programs 2.2.9 Reach pre-service and in-service teachers through partnerships with universities and colleges authorized by State Departments of Education to train and license teachers 2.2.10 Percentage of programs that operate through Digital Learning Network (DLN) structures	4. Database of participants in NASA formal education programs 5. Database of universities and colleges that engage in the training of teachers 6. Data base of services offered to each college and university 7. Longitudinal data studies of participants in long-term programs and the	•

		NASA training programs who use NASA resources in their classroom instruction. 2.2.6 Evidence that teachers who use NASA resources perceive themselves as more effective teachers in achieving STEM results with their students. 2.2.7 Percentage of higher education partners that use NASA resources in STEM preservice education methods courses & student teaching experiences		impacts on teaching in their classrooms from their NASA experience.	
2.3 **Curricular Support Resources** Objective: **(Educate)** Provide curricular support resources that use NASA themes and content to a) enhance student skills and proficiency in STEM disciplines **(Educate)**; b) inform students about STEM career opportunities **(Engage)**; c) communicate information about NASA's mission activities **(Engage)**.	2.3.1 Quantity, type, & cost of educational resources being produced 2.3.2 Quantity, type, & cost of educational resources approved through the NASA education product review process. 2.3.3 Number of approved materials that are electronically accessible	2.3.4 Customer satisfaction data regarding relevance of NASA educational resources. 2.3.5 Customer satisfaction data regarding effectiveness of NASA educational resources.	2.3.6 Use of technology to improve data collection, reporting strategies & dissemination 2.3.7 Minimize printing costs by making print-based resources availableelectronically 2.3.8 Turn around time from submission of product for formal review to (online) distribution.	8. Electronic tracking system on turn-around time from inception to availability of products	•
2.4 Student Involvement K-12 Objective: **(Engage)** Provide K-12 students with authentic first-hand opportunities to participate in NASA mission activities, thus inspiring interest in STEM disciplines and careers. Objective: **(Engage)** Provide opportunities for	2.4.1 Number of elementary and secondary student participants in NASA instructional and enrichment activities 2.4.2 Number of elementary and secondary student participants in NASA-	2.4.5 Activities and investigations result in increased student interest in STEM 2.4.6 Activities and investigations result in increased student knowledge about careers in STEM		9. Database of effective practices and research summaries on career development 10. DB tracking of participants 11. DB tracking of	•

family involvement in K-12 student learning in STEM areas.	sponsored extended learning opportunities 2.4.3 Number of opportunities for family involvement 2.4.4 Percentage increase in number of elementary and secondary student participants in NASA instructional and enrichment activities.	2.4.7 Family participants will show an increased interest in their student's STEM coursework 2.4.8 Level of student learning about science and technology resulting from elementary and secondary NASA education programs. 2.4.9 Level of student interest in science and technology careers resulting from elementary and secondary NASA education programs.		family involvement 12. Pre/post-assessments on student interest and knowledge	

Outcome III: Build strategic partnerships and linkages between STEM formal and informal education providers that promote STEM literacy and awareness of NASA's mission, **(Informal Education -- Engage & Inspire)**

3.1 **Resources** Objective: **(Engage)** Provide informal education support resources that use NASA, themes and content to 1) enhance participant skills and proficiency in STEM disciplines; 2) inform participants about STEM career opportunities; 3) communicate information about NASA's mission activities. Objective: **(Inspire)** Develop a significant pool of qualified presenters of NASA	3.1.1 Number of resources approved bythe NASA education product review process 3.1.2 Number, type, & audience of resources that are standards-based and support informal educators 3.1.3 Number & type of NASA-themed resources developed in collaboration	3.1.4 Perceived degree to which informal education resources meet requirements from informal education community 3.1.5 Degree to which NASA engages the informal education community with NASA science and technology-based resources. 3.1.6 A plan for outreach and	3.1.7 Cost-effective web-based deliverables that take full advantage of the capabilities of the Internet to engage learners; exemplify scientific or technological processes; encourage off-line follow-up activities; provide feedback and guidance to users; have multiple entry points; and accommodate users with special needs to the extent possible 3.1.8 Implementation of a plan for widely sharing approved NASA resources	1. Database of use of NASA's network of ERCs and CORE as a distribution vehicle	

aerospace content interacting with a large number of participants.	with national regional or community-wide organizations. A plan for widely sharing approved materials	complementary products designed to extend the learning experiences of target audiences			
3.2 **Professional Development for Informal Ed Providers** Objective: **(Engage)** Provide opportunities to improve the competency and qualifications of STEM informal educators, enabling informal educators to effectively and accurately communicate information about NASA activities and access NASA data for programs and exhibits	3.2.1 Pool of NASA presenters and trainers prepared to assist informal education venues. 3.2.2 Number of participating museums and science centers	3.2.3 Percentage of Museums and science centers that participate in NASA networks and thatuse NASA resources in programs & exhibits 3.2.4 National network of informal education constituencies who maintain regular quarterly contact with NASA related to STEM products and materials	3.2.5 Use of national network of museums, science centers as the major conduit for communication 3.2.6 Engagement of major museums and informal education environments in being briefed on major NASA science news releases related to their content 3.2.7 Use of major conferences in informal education to provide releases of new products and demonstrations of new products.	2. Database of annual informal education professional organizations and their annual conferences 3. Listserv of informal education network that includes all groups interested in serving the scientific attentive public regardless of venue. 4. Reporting structure for all services rendered. 5. National database on results of focus groups 6. Integration of NASA database with those of informal professional organizations	
3.3 **Informal Education Provider Involvement** Opportunities Objective: **(Engage)** Develop a national pool of qualified informal educators with experience in NASA-mission and related activities.	3.3.1 Number & diversityof participants 3.3.2 Number of participating institutions 3.3.3 Number of states involved	3.3.5 Engage at least 100 museums in all regions of the country to provide deep public insight into major NASA events (e.g. 121 launch; MRO arrival at planet). 3.3.6 Externally review	3.3.8 Percent increase in number applications to NEI program over time. 3.3.9 Number of significant contacts between NASA centers and institutions	7.	

Objective: **(Engage)** Engage informal educators using NASA themes to enable them to 1) enhance participant skills and proficiency in STEM disciplines; 2) inform participants about STEM career opportunities; 3)communicate information about NASA's mission activities. Objective: **(Inspire)** Establish and maintain a single informal education network for accessing NASA materials that has the flexibility for Special Interest Groups to function as a subset of the larger network	3.3.4 Identify and create a network of museums that relate to each of the four mission directorates.	products of NEI program to determine which have best customer satisfaction ratings 3.3.7 Coordinate all activities with informal groups such as Girl Scouts to avoid duplication			
Global Efficiency Measures – Applicable to all outcomes & objectives			Efficiency 1: Cost per participant of programs Efficiency 2: Ratio of administrative cost to total cost of programs Efficiency 3: Ratio of funds leveraged by NASA funding support		