Mission Directorate: Education

Overview

"The nation that out-educates us today will out-compete us tomorrow", said President Barack Obama in an April 27, 2009 speech to the National Academy of Science. NASA performs a leading role in assuring that the U.S. is not out-educated by inspiring the next generation of explorers in the disciplines of science, technology, engineering, and mathematics (STEM). The FY 2011 President's Budget provides a 14% increase to NASA's Education budget, which will enable NASA to continue to capitalize on the excitement of NASA's mission to inspire innovative solutions, approaches, and tools that inspire student and educator interest and proficiency in STEM disciplines and pursue new innovative approaches to reaching students. NASA will continue to capitalize on the excitement of NASA's mission to inspire innovative solutions, approaches, and tools that inspire student and educator interest and proficiency in STEM disciplines. This strategy will increase the distribution and impact of NASA's progressive opportunities for elementary and secondary teachers, university faculty, students of all ages, and the public.

NASA is a leader among Federal Research and Development agencies in promoting STEM education opportunities, and NASA has recently established an Agency High Priority Performance Goal related to education and future workforce development. NASA partners with academic institutions, professional education associations, industry, and other Government agencies to provide teachers and faculty with the experiences that capitalize on the excitement of NASA's discoveries to spark their students interest and involvement. Strategies include offering professional development experiences, lessons, and classroom materials; using emerging communications and education technologies; and providing research opportunities, and hands-on science and engineering activities that draw on NASA's unique missions. NASA resources and opportunities are available to a diverse audience of educators and students, including women, minorities, and persons with disabilities. Special projects within the NASA portfolio of investments ensure that a diverse audience is actively engaged in NASA STEM education. In FY 2011, NASA will pursue the following education priorities:

Support the Administration's STEM education teaching and learning improvement education efforts, including Race to the Top and Educate to Innovate;
- NASA will support the Summer of Innovation project by partnering with internal and external stakeholders, and other education organizations to leverage the excitement of NASA's missions.
- Continue efforts to incorporate NASA content into STEM education efforts of other federal agencies.

Engage the Nation's universities, colleges, students and faculty;
- Stimulate competitive NASA-themed STEM research, through NASA Research Announcements and Announcements of Opportunity offered to targeted states, universities, and other educational institutions. In order to prepare institutions for future competitions, benefit NASA, and prepare students for future employment (at NASA, in aerospace industry, or academia), research and engineering activities will be directly tied to NASA missions and research objectives (e.g. Mars Exploration; global climate change; aeronautics).
- Collaborate with the Office of Human Capital Management to recruit participants in NASA's scholarship, internship and fellowship projects into cooperative-education (co-op) and Federal Career Intern Program (FCIP) positions at NASA.
- Broaden community college participation in NASA research and STEM workforce development.

Inspire and engage the Nation's K-12 students and educators;
- Pursue innovative approaches that enable additional student launch initiatives and other hands-on payload development and engineering opportunities for NASA missions. Through partnerships with NASA centers, universities, and industry, students will gain research experiences and hands-on engineering experience on a variety of real-world platforms that may include high altitude balloons, sounding rockets, aircraft, space satellites, and the International Space Station (ISS). High school students will intern under mentorship of NASA scientists and engineers, and university students will participate in ongoing space and aeronautics research missions. Many will contribute to original research and support designing hardware to fly on future NASA missions.
- Expand teacher pre-service, professional development and training opportunities that are based on education research and reflect current and future NASA science and exploration missions.
- Prepare pre-college students for undergraduate study through "transitional" experiences that blend NASA research and engineering experiences with classroom study and near-peer/NASA mentoring.
- Immerse students and educators in current NASA science and technology, with an increasing emphasis on e-Education and cyber-learning opportunities.

Mission Directorate: Education

FY 2011 Budget Request

Budget Authority ($ millions)	FY 2009 Actual	FY 2010 Enacted	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FY 2011 President's Budget Request	**169.2**	**183.8**	**145.8**	**145.8**	**145.7**	**145.7**	**146.8**
Education	169.2	183.8	145.8	145.8	145.7	145.7	146.8
FY 2010 President's Budget Request	**169.2**	**126.1**	**123.8**	**123.8**	**123.8**	**125.5**	**--**
Education	169.2	126.1	123.8	123.8	123.8	125.5	--
Total Change from FY 2010 President's Budget Request	**0.0**	**57.7**	**22.0**	**22.0**	**21.9**	**20.2**	**--**

Note: In all budget tables, the FY 2011 President's Budget Request depicts the July 2009 Operating Plan including American Recovery and Reinvestment Act for the FY 2009 Actual column and the Consolidated Appropriations Act, 2010 (P.L. 111-117) without the Administrative transfers for the FY 2010 enacted column.

Plans for FY 2011

Education

Education

New Initiatives:

In FY 2011, NASA will implement the Summer of Innovation initiative to provide an intensive STEM teaching and learning experiences during the summer. It is targeted at the middle school level and complements school year curricula. Summer camps, Saturday-programs, and other forms of intensive NASA and STEM-focused experiences, will be offered in the summer and beyond. These strategies are designed to help STEM underperformers catch up to, and perhaps surpass, standard expectations of STEM performance for their grade level. A significant outcome of the program will be to expand the pool of students - particularly females, those from low-income and underserved/underrepresented populations, and those underperforming in STEM - who consider and pursue STEM professions. STEM learning experiences provided by the Summer of Innovation will engage at least 100,000+ middle school students and 5,000+ teachers (program-wide, not per state) with the ultimate goal of increasing the number of future scientists, mathematicians, and engineers in the U.S.

Major Changes:

In FY 2011, NASA will explore innovative ways to reach university level students and improve STEM retention; engage younger K-12 students through authentic hands-on STEM learning; and capture the public's attention by an innovative approach to imparting informal education in the Nation's science centers, museums, community groups, and other organizations. These new innovative projects will include:

The Innovation in Higher Education STEM Education and Innovations in Global Change Education, projects within the Higher Education STEM Education Program, will focus on innovative ways to reach undergraduate and graduate student, improve student retention in STEM disciplines, leverage the research platform of the ISS, and better engage community colleges and minority institutions.

The Innovation in K-12 STEM Education, a project within the K-12 STEM Education program, will provide competitive opportunities for NASA partners to engage students through authentic hands-on learning opportunities that build STEM knowledge and skills. The Summer of Innovation initiative will fall under this project.

The NASA Informal Education Opportunities, a project within the Informal STEM Education program, will seek innovative approaches to conducting informal education in the Nation's science centers, museums, community groups, and other organizations. NASA Informal STEM Education will continue to support both the NASA Field Center requests from local, state, and other informal education providers who use NASA content to engage their audiences in STEM experiences that inspire STEM achievement and increase public understanding and awareness of NASA's mission achievements.

NASA does not request FY 2011 funding for the Global Climate Change Education, the K-12 Competitive Educational Grant Program, Science Museums and Planetarium Grants, or NASA Visitors Centers. NASA will be able to achieve the intended outcomes of these Congressional-directed initiatives (in FY 2008 and FY 2009), as well as NASA's stated education goals, through the programs for which the Agency is requesting funding.

Major Highlights for FY 2011

In FY 2011, NASA will continue its investment in STEM education and proposes to:

-Continue the Summer of Innovation pilot project, encouraging participation from additional states and education organizations. The FY 2011 Summer of Innovation will provide intensive Summer STEM experiences for middle school students.

-Expand Innovations in STEM Higher Education to build on pilot projects initiated in FY 2010 and to align to the innovation agenda of the Agency.

-Support more than 30,000 undergraduate and graduate students participating in NASA education opportunities.

-Expand collaborations with the more than 850 college, university and industry partners in the National Space Grant College and Fellowship Program to engage students in student launch activities, research and engineering grants, and courses based upon NASA science and engineering.

-Refocus the Graduate Student Research Program (GSRP) to a Graduate Student STEM Education (GSE) to include support of graduate studies in STEM education and education administration.

-Provide over $20M in grants to universities to support NASA-related research and to enhance their capacity to compete for new Federal research dollars.

-Fully realize and execute new infrastructures to improve higher education student recruitment, application processes, and mentoring through the One Stop Shopping Initiative and Virtual Student Ambassadors.

-Work with the Office of Human Capital Management and other internal and external stakeholders to improve the conversion of NASA Higher Education student participants into full time employment with NASA, aerospace industry, and STEM education organizations. This reflects the Agency's High Priority Performance Goal related to education and future workforce development.

-Engage 1,000,000 elementary and secondary student participants in NASA instructional and enrichment activities. Authentic hand-on experiences leverage NASA's education technologies and other communication tools. Student design competitions will be tied to NASA's ongoing priorities, allowing teachers to engage students in real-time, cutting edge science and engineering problems. NASA will make extensive use of telepresence technologies, from web disseminated information and remote control of science instruments, to learning in virtual worlds.

-Engage 75,000 formal and informal educators in NASA's education programs by providing NASA-related STEM education resources and opportunities.

-Actively engage 350 science centers, museums and planetariums, and community-based informal education providers in sharing the excitement of NASA's mission with the American public.

Mission Directorate:	Education
Theme:	Education

Theme Overview

FY 2011 Budget Request

Budget Authority ($ millions)	FY 2009 Actual	FY 2010 Enacted	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FY 2011 President's Budget Request	**169.2**	**183.8**	**145.8**	**145.8**	**145.7**	**145.7**	**146.8**
Higher Ed. STEM Education	107.7	121.2	81.0	81.0	81.0	81.0	81.0
K-12 STEM Education	47.5	46.5	62.8	62.8	62.7	62.7	63.8
Informal STEM Education	14.0	16.1	2.0	2.0	2.0	2.0	2.0
FY 2010 President's Budget Request	**169.2**	**126.1**	**123.8**	**123.8**	**123.8**	**125.5**	**--**
Higher Ed. STEM Education	107.7	80.6	80.6	80.6	80.7	80.7	--
K-12 STEM Education	47.5	43.3	41.0	41.0	41.0	42.7	--
Informal STEM Education	14.0	2.1	2.1	2.1	2.1	2.1	--
Total Change from FY 2010 Request	**0.0**	**57.7**	**22.0**	**22.0**	**21.9**	**20.2**	**--**

Relevance

Relevance to national priorities, relevant fields, and customer needs:

The Obama Administration has identified STEM education as a high priority and is calling on federal agencies to help "improve the performance and participation of American students in STEM". A strong U.S. economy is founded on the abilities, interests and innovations of its citizens, yet performance of American students on international assessments of STEM ability is "middle of the pack" and falling (as identified in the Third International Mathematics & Science Study). NASA will partner with K-12 schools and districts, other federal agencies, industries, colleges and universities, and other education institutions.

NASA's Education programs are fully supportive of national STEM priorities (e.g. Race to the Top) that focus on state-based education and student performance. NASA Education specialists, scientists and engineers work collaboratively with school/district administrators, universities, science centers and industry partners to offer hands-on learning, mentoring and participatory exploration. Programs are based on STEM research and best practices. Investments are evaluated and assessed for impact and performance. NASA provides practical experience and skills development for the future workforce through internships, fellowships and student research related to NASA missions. NASA is uniquely qualified to attract students to STEM study and careers as it is able to engage these future workers in inspiring NASA missions, foster relationships with the current workforce, offer opportunities to work in "out of this world" facilities, and capitalize on the innovative perspectives and problem-solving approaches offered by student researchers. Hands-on challenges with expert mentors increase the likelihood of undergraduate STEM study and increase the number of students who seek employment in a STEM or related field. It also fosters pursuit of graduate study aligned to NASA's missions.

Relevance to education and public benefits:

NASA Education projects (such as Space Grant and MUREP) increase the number of students who are proficient in, who choose to major in, and who pursue careers in STEM fields. Improving STEM ability, increasing public scientific literacy, increasing the talent pool of future STEM workers, and developing the STEM skills of the future workforce are imperatives for a nation to remain globally competitive and sustain a strong economy. To effect STEM improvement, it is simply not enough to offer a grant or provide materials to educators and students. NASA actively works through mutually beneficial relationships with 500+ colleges and universities, hundreds of K-12 schools/districts, and 350+ museums and science centers to provide education experiences so that all students can learn deeply and think critically in STEM disciplines. Such relationships enable NASA to reach tens of thousands of collegians, a million K-12 students and innumerable members of the public.

NASA is a supporter of STEM education efforts that engage a broad range of students and educators, providing access to personnel, research, technology and access to facilities that allow participation in NASA's missions. NASA supports cutting-edge student research that contributes to NASA missions while training the next generation of scientists, engineers and innovators. NASA works with state and community leaders to offer professional development opportunities needed by teachers, better preparing pre-service and in-service educators to teach STEM topics. NASA pursues collaborative partnerships that improve STEM teaching and learning. NASA targets recruitment and retention of underserved and underrepresented students, including women and girls, drawing on a rich and underutilized for education opportunities and developing our future workforce.

Mission Directorate:	Education
Theme:	Education

Performance Achievement Highlights:

NASA provided opportunities to help students and educators gain hands-on experiences in STEM through internships, fellowships and research. NASA reached more than 24,000 higher education students, of which more than 4,500 received substantial research/fellowship awards. This included 550 intensive study opportunities for underserved students, teachers and faculties. Of students participating in undergraduate programs, 41 percent continued to pursue advanced degrees; 57 percent entering the workforce pursued NASA-related careers, including work for NASA, aerospace industry and STEM education.

NASA awarded 43 institutional research awards, worth more than $32M, to targeted colleges and universities. This NASA-related research, will better enable these institutions to compete for funding from sources other than NASA's Office of Education.

NASA increased its commitment to high quality professional development projects targeted to pre- and in-service educators. Education research shows that in-depth and sustained experiences increase the impact of training and improve STEM teaching practices. NASA launched the first year of the Endeavor Science Teacher Certificate Project, reaching 40 educators through intensive professional development that will culminate in a NASA STEM teaching certificate. NASA also supported teachers through short experiences offered by the Digital Learning Network (reached 13,000 educators), Education Flight Project (reached 13,000 educators), Aerospace Education Services (reached 8,000 educators) and other projects. NASA is increasing use of technology to provide "virtual" workshops and other experiences to educators and students.

NASA attracted and retained students in STEM disciplines by: engaging over 1300 high school interns in NASA STEM activities through the Interdisciplinary National Science Program Incorporating Research & Education that targets underserved students; leveraging partner distribution infrastructures to reach more than 7 million on-line viewers (e.g. Channel One); and supported Science, Engineering, Mathematics, and Aerospace Academy activities that actively engaged over 40,000 students. According to the National Research Council, NASA has had a unique role in inspiring, engaging, and educating students about STEM and STEM careers.

Partnerships through the NASA Museum Alliance, the Space Place Network, Smithsonian, Visitor Centers and others engage and inform the public. The NASA Museum Alliance provided programming at 400 science centers and museums across the U.S.. Museums were able to share features and education materials related to STS-119 and the flight of two Educator Astronauts. Coverage/exhibits on a number of aeronautics and space activities, materials and experts were provided to institutions during the International Year of Astronomy.

NASA awarded 22 innovative grants through the Global Climate Change Education initiative, and awarded 11 grants to public schools and nonprofit organizations through the K-12 Competitive Educational Grant Program, Science Museums and Planetarium Grants, and NASA Visitor Centers as directed by Congress in FY 2008 and 2009. NASA's FY 2009 Performance and Accountability Report provides further discussion and detail regarding the performance of NASA's Education Program. The report can be found at http://www.nasa.gov/budget.

Mission Directorate:	Education
Theme:	Education

Independent Reviews:

Review Type	Performer	Last Review	Purpose/Outcome	Next Review
All	Abt Associates, Cambridge, MA	FY 2008	An external independent evaluation of the SEMAA project, (including RCT), is assessing the effectiveness and determining how intended goals are being implemented. Evaluation will consider the overall effort, provide data on how differences in effectiveness are associated with site-site variations, and offer explanations for observed outcomes. Abt is to provide results in Q2 2010.	FY 2013
All	Abt Associates, Cambridge, MA	FY 2009	The external evaluation contractor is initiating the planning phase for reviewing selected projects in the Higher Education program. Abt is to provide results at the end of Q1 2011	FY 2010
All	NRC - National Academies	FY 2008	The recommendations for the NASA K-12 Education Program, provided by the NRC review, reinforced the important complementary role of NASA STEM education. Improvement areas include: (1) the nature of NASA's role in K -12 STEM education, (2) continuous improvement of projects, (3) partnerships and expertise in education, and (4) information and communications technology; for details go to http://www.nap.edu/catalog/12081.html.	FY 2010-12
All	Abt Associates, Cambridge, MA	FY 2010	The external evaluation contractor is initiating the planning phase for the Informal Education program. Abt is to provide results at the end of Q4 2010	FY 2010
All	Booz-Allen Hamilton	FY 2009	An external independent evaluation of the NES project was conducted by Booz-Allen Hamilton (BAH), per Congressional Direction. The evaluation included review of previous assessments and the NES redesign model. Results were received by NASA in FY 2009. BAH identified several structural elements that limited the NES project's ability to scale up to a level that would support significantly greater numbers of schools, students and educators. A redesign of the project is underway.	FY 2010-12

Mission Directorate:	Education
Theme:	Education
Program:	Higher Ed. STEM Education

FY 2011 Budget Request

Budget Authority ($ millions)	FY 2009 Actual	FY 2010 Enacted	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FY 2011 President's Budget Request	107.7	121.2	81.0	81.0	81.0	81.0	81.0
STEM Opportunities (Higher Education)	9.5	12.4	16.9	16.9	16.9	16.9	16.9
NASA Space Grant	40.0	45.5	27.7	27.7	27.7	27.7	27.7
Experimental Program to Stimulate Competetive Research	20.0	24.9	9.3	9.3	9.3	9.3	9.3
Minority University Research & Education Program	28.2	28.4	27.2	27.2	27.2	27.2	27.2
Global Climate Change Education	10.0	10.0	0.0	0.0	0.0	0.0	0.0
FY 2010 President's Budget Request	107.7	80.6	80.6	80.6	80.7	80.7	--
STEM Opportunities (Higher Education)	9.5	11.6	11.6	11.6	11.6	11.6	--
NASA Space Grant	40.0	28.4	28.4	28.4	28.4	28.4	--
Experimental Program to Stimulate Competetive Research	20.0	10.0	10.0	10.0	10.0	10.0	--
Minority University Research & Education Program	28.2	30.7	30.7	30.7	30.7	30.7	--
Global Climate Change Education	10.0	0.0	0.0	0.0	0.0	0.0	--
Changes from FY 2010 Request	0.0	40.6	0.4	0.4	0.4	0.4	--

Mission Directorate:	Education
Theme:	Education
Program:	Higher Ed. STEM Education

Project Descriptions and Explanation of Changes

STEM Opportunities (Higher Education)

STEM Opportunities focuses on strengthening the research capabilities of the Nation's colleges and universities, and providing opportunities that attract and prepare increasing numbers of students for NASA-related careers. The research conducted by these institutions contributes to the research needs of NASA's Mission Directorates and furthers the Nation's scientific and technology innovation agendas. The student projects serve as a major link in the pipeline for addressing NASA's Human Capital Strategies. The projects build, sustain, and effectively deploy the skilled, knowledgeable, diverse, and high-performing workforce needed to meet the current and emerging needs of NASA and the Nation's workforce.

STEM Opportunities consist of the Undergraduate Student Researchers Project (USRP), the Graduate Student Education (GSE) project, and the Innovations in Higher Education STEM Education project. USRP attracts undergraduate students from a wide array of backgrounds, who are representative of America's racial, economic, ethnic, and cultural diversity. It provides them with hands-on, challenging research experiences that stimulate continued student interest in the fields/disciplines aligned with NASA's research and development mission.

The GSE project awards research fellowships for graduate study leading to masters or doctoral degrees in the fields of science, mathematics, and engineering related to NASA research and development, and education, thereby cultivating research ties to the academic community and helping meet the continuing needs of the Nation's aeronautics, space research, and STEM education efforts. GSE increases the number of highly trained scientists and engineers in aeronautics and space-related disciplines, broadens the base of students pursuing advanced degrees in science, mathematics, and engineering; and supports graduate level education in STEM education and education administration.

The Innovation in Higher Education STEM Education project enables NASA to seek out and support innovative and replicable approaches to improve STEM learning and instruction, and opportunities for student and faculty to participate in NASA related research and launch/payload development activities. These activities include working with the ISS Program Office to reach students and faculty in developing new ISS hardware, conducting experiments, and identifying new strategies for utilizing ISS data in classroom activities.

National Space Grant

NASA initiated the National Space Grant College and Fellowship Program (Space Grant) in FY 1989. Space Grant is now composed of 52 consortia in 50 states, the District of Columbia and the Commonwealth of Puerto Rico. The Space Grant national network includes over 850 affiliates from universities, colleges (including minority-serving institutions), community colleges, industry, museums, science centers, and state and local government agencies. These institutions support a national network that expands opportunities for Americans to understand and participate in NASA's aeronautics and space projects. Space Grant institutions leverage the resources of the members, state and local aerospace industries to support and enhance science and engineering education, research, and public outreach efforts in higher education, elementary and secondary education, and informal education.

The Space Grant consortia fund fellowships and scholarships for students pursuing NASA-related STEM careers, and fund curriculum enhancement and faculty development. Between FY 2003 and FY 2009, Space Grant awarded almost 20,000 scholarships and fellowships, over 700 research infrastructure development grants, 850 higher education program grants, and conducted over 400 public service/engagement program awards, reaching hundreds of thousands of students across the U.S. In recent years, scholarship and fellowship recipients included 21% underrepresented minorities and 42% women, well above other non-targeted and/or STEM-directed programs. In FY 2009, Space Grant programs reached over 21,000 higher education participants, including 3,400 individuals receiving significant education and research support. Longitudinal tracking of students indicates that typically 90% of Space Grant award recipients become employed in STEM fields after graduation or matriculate into an advanced STEM degree program.

In FY 2011, increased funding for Space Grant will enable NASA to increase the depth and breadth of collaborations with lead institutions, affiliates and previously unengaged institutions. Specific goals are to increase the active participation of community colleges and underserved/underrepresented students.

Experimental Program to Stimulate Competitive Research

The Experimental Program to Stimulate Competitive Research (EPSCoR) strives to develop academic research enterprises that are long term, self-sustaining, and nationally competitive by supporting states with modest research infrastructure to become more competitive in attracting research funding. Funding is awarded to lead academic institutions in twenty-eight eligible states (designated by NSF each year) to foster a STEM relationship with industries for research and development opportunities. NASA actively seeks to integrate the research conducted by EPSCoR jurisdictions and the aerospace and exploration agenda being pursued by the Agency.

Representatives from each of NASA's Mission Directorates work closely with EPSCoR program management so that current and future research and engineering needs are reflected in EPSCoR solicitations. The Mission Directorate representatives serve as the proposal selection committee, further ensuring that the selected work contributes to NASA priorities. Technical Monitors at the NASA Field Centers and Headquarters monitor and assess the progress of each award. They provide scientific guidance and technical advice throughout the year, as required, on the overall progress of the proposed effort, and review the annual progress report. Additional involvement may occur, depending upon the nature of the collaboration already established or desired. This includes, but is not limited to, integrating the EPSCoR research into ongoing activities or research efforts, and increasing the Principal Investigator and his/her team's awareness of other related or relevant research in NASA.

Minority University Research and Education Program

In FY 2011, Minority University Research and Education Program (MUREP) will add one project and phase out another. Innovations in Global Climate Change Education, a new project in FY 2011, will seek innovative approaches to providing opportunities for students and teachers to engage in research, use of technological tools, and access NASA data sets to improve teaching and learning in the area of global climate change. The NASA Administrator's Fellowship Project will be phased out in FY 2011.

MUREP engages underserved and underrepresented populations in two ways: 1) multiyear grants awarded to assist minority institutions, faculty, and students in research pertinent to NASA missions; and 2) recruitment and retention of underserved and underrepresented students. Methods by which these are achieved are by providing scholarships, fellowships, internships; mentoring & tutoring; ensuring their completion of undergraduate and graduate degrees; and supporting their entry into the scientific and technical workforce. The program is composed of Research Clusters, University Research Centers and Minority Institution Collaborations.

Research Clusters is composed of five research activities. Motivating Undergraduates in Science and Technology (MUST) provides partial scholarships to underserved undergraduate students to support up to 50% of tuition and fees. Students also participate in a NASA Center internship. Curriculum Improvement Partnership Award for the Integration of Research (CIPAIR) is a 3-year undergraduate STEM curriculum improvement effort, using NASA related content, for minority institutions (MI), including Historically Black Colleges and Universities (HBCUs), Hispanic Serving Institutions (HSIs), Tribal Colleges and Universities (TCUs), and others. NASA Science and Technology Institute for Minority Institutions (NSTI-MI) provides research opportunities for faculty and students from MIs that contribute to NASA's astrobiology, biotechnology, IT, and nanotechnology research agenda. Faculty and students collaborate with scientists at NASA, industry, academia and nonprofit organizations to research technologies enabling future exploration. Jenkins Pre-doctoral Fellowship Project (JPFP) provides support for underrepresented students (women, minorities, and persons with disabilities) in STEM disciplines who seek advanced degrees and opportunities in NASA-related disciplines, thereby increasing the number of skilled workers. The JPFP provides its participants with access to NASA mentors, NASA research opportunities, and the ability to network and collaborate with the aerospace professionals.

University Research Centers provide a broad-based, competitive NASA-related research capability among the Nation's MIs to foster new aerospace science and technology concepts; expand the Nation's base for aerospace R&D; develop mechanisms for increased participation by faculty and students of MI in mainstream research; and increase the number of underserved students obtaining advanced degrees in STEM disciplines.

Minority Institutions Collaborations is a project made up of two activities. Tribal, HSI, and HBCU Collaborations Project enables NASA to partner with these minority institutions to increase student and faculty involvement in space exploration and cutting-edge technology, improve competitiveness for Federal grants and resources, and provide high-quality educational opportunities to traditionally underserved students and faculty. MUREP Small Projects support a variety of opportunities for students, teachers, faculty and researchers from underrepresented and underserved communities in NASA related STEM fields.

Mission Directorate:	Education
Theme:	Education
Program:	Higher Ed. STEM Education

Program Commitments

Commitment/Output FY 2011	Program/Project	Changes from FY 2010 PB Request
Provide undergraduates and graduate students opportunities to engage in research and engineering supporting NASA missions.	Higher Education STEM Education Program/ STEM Opportunities	Same
Promote a nationwide network of state-based consortia to engage students and faculty in NASA research and other opportunities;enhance capabilities of eligible states and institutions to compete for NASA-sponsored research and technology opportunities	Higher Education STEM Education Program/ Space Grant, EPSCoR	Same
Target underserved and under-represented students with opportunities to engage in research and engineering supporting NASA missions. Enhance capabilities of minority serving institutions to compete for NASA-sponsored work.	Higher Education STEM Education Program/ MUREP (Research Clusters, URC, MI Collaborations)	Same

Program Management

The Assistant Administrator for Education is responsible to the NASA Administrator for NASA's education portfolio, reports to the NASA Administrator, serves as NASA Education Officer, and manages all education responsibilities.

Project	Management Responsibility	NASA Center Performers	Cost-Sharing Partners
Undergraduate Student Research Program (USRP)	Johnson Space Center (JSC)	All NASA Centers	None
Graduate Student Research Program (GSRP)	Jet Propulsion Lab (JPL)	All NASA Centers	None
Innovation in STEM Education	NASA Headquarters Office of Education	All NASA Centers	None
National Space Grant College and Fellowship Project (Space Grant)	NASA Headquarters Office of Education	All NASA Centers	Fifty-two (52) state (including Puerto Rico and District of Columbia) consortia provide required cost sharing. In FY 2009 it is anticipated that the average ratio of cost sharing to award will be $0.82 to $1.00; as reported in FY 2008.
Experimental Project to Stimulate Competitive Research (EPSCoR)	Kennedy Space Center (KSC)	All NASA Centers	Twenty-seven EPSCoR eligible states provided required cost sharing funds. In FY 2009 it is anticipated that the average ratio of cost sharing to award for EPSCoR research awards will be $0.81 to $1.00 and EPSCoR RID awards will average to approximately $1.04 to $1.00 cost sharing, as reported in FY 2008.
MUREP: Research Cluster	Ames Res Center (ARC), Glenn Res Center (GRC), Jet Prop Lab (JPL), Marshal Space Flight Center(MSFC	All NASA Centers	None
MUREP: University Research Centers (URC)	Dryden Research Flight Center (DRFC)	All NASA Centers	None
MUREP: Minority Institutions Collaborations	NASA Headquarters Office of Education	All NASA Centers	None
MUREP: Innovations in Global Climate Change Education	Langley Research Center (LaRC)	All NASA Centers	None

Mission Directorate:	Education
Theme:	Education
Program:	Higher Ed. STEM Education

Acquisition Strategy

NASA solicits new and innovative education products, tools, and services from qualified external organizations. This occurs in response to changes in STEM education trends, identified gaps or opportunities in the education portfolio of investments, a response to demonstrated customer need or demand, or when the Administration or Congress identifies new priorities.

NASA encourages participation of new or less experienced organizations and awards education grants and contracts through full and open competition. NASA includes feedback from staff, subject matter experts, and public in developing solicitations, including the requirements, expected outcomes, schedules, proposal instructions, and evaluation approaches. NASA solicits comments on perceived programmatic risk issues associated with performance of the work. Procurement offices at NASA review all solicitations.

NASA awards all major grants and cooperative agreements based on reviews by external panels of peers for educational merit; NASA and external scientists and engineers for content, merit, feasibility, and alignment to education goals; and Mission Directorates for alignment with NASA's research and development interests. Indications of a clear competitive process are an integral part of reviews. NASA makes awards only after qualified assessments of merit. While competition may sometimes be restricted by legislation to designated participants, such as defined EPSCoR states, grant awards and selection of participating institutions are still determined competitively. When designated participants are identified, all proposals are reviewed for merit, and each award must be justified and deemed worthy of funding.

Mission Directorate:	Education
Theme:	Education
Program:	K-12 STEM Education

FY 2011 Budget Request

Budget Authority ($ millions)	FY 2009 Actual	FY 2010 Enacted	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FY 2011 President's Budget Request	47.5	46.5	62.8	62.8	62.7	62.7	63.8
STEM Student Opportunities (K-12)	15.2	17.2	46.1	46.1	46.1	46.1	46.1
STEM Teacher Development (K-12)	16.3	14.3	16.7	16.7	16.6	16.6	17.7
K-12 Competitive Educational Grant Program	16.0	15.0	0.0	0.0	0.0	0.0	0.0
FY 2010 President's Budget Request	47.5	43.3	41.0	41.0	41.0	42.7	--
STEM Student Opportunities (K-12)	10.5	14.5	14.5	14.5	14.5	14.5	--
STEM Teacher Development (K-12)	21.0	28.9	26.5	26.5	26.5	28.2	--
K-12 Competitive Educational Grant Program	16.0	0.0	0.0	0.0	0.0	0.0	--
Changes from FY 2010 Request	0.0	3.2	21.7	21.7	21.6	19.9	--

Mission Directorate:	Education
Theme:	Education
Program:	K-12 STEM Education

Project Descriptions and Explanation of Changes

STEM Student Opportunities (K-12)

STEM Student Opportunities focus on engaging and retaining students in STEM education programs to encourage pursuit of NASA's future engineering, scientific, and technical missions through flight opportunities, hands on research and engineering experiences, and increased knowledge of NASA science and technology content. STEM Student Opportunities is adding Innovations in K-12 STEM Education as a new project in FY 2011. Innovations in K-12 STEM Education will support the Administration's national STEM education efforts by seeking, piloting, and fostering innovative approaches that provide authentic hands-on opportunities for students and teachers to engage in NASA science, engineering, and exploration missions, improving teaching proficiency, student ability, and student interest in STEM. This project will include the Summer of Innovation (SOI) initiative. SOI will provide an intensive Summer learning experience to middle school students. This effort is designed to enable, underperforming and at-risk students to make gains in STEM skills and knowledge during summer breaks.

The STEM Student Opportunities portfolio also includes the following projects. Education Flight Projects provide hands-on experiences through participation in NASA research applications, in order to inspire and motivate students to pursue studies and careers in STEM. Activities include ISS Earth Knowledge Acquired by Middle School Students (EarthKAM), Amateur Radio on the International Space Station (ARISS), ISS In-flight Education Downlinks, and On-orbit Education Activities.

The Interdisciplinary National Science Project Incorporating Research and Education Experience (INSPIRE) is designed to maximize student participation and involvement in NASA and STEM, and enhance the STEM pipeline from high school (grades 9-12) into the undergraduate level.

The Science Engineering Mathematics and Aerospace Academy (SEMAA) reaches K-12 minority and underserved students that are traditionally underrepresented in careers involving STEM. Students meet during school, after school, or on Saturday mornings during the school year, as well as during the summer, to engage in NASA-based hands-on, interactive learning sessions that are specifically designed for each grade level.

The NASA Explorer Schools (NES) project will fully implement its new secondary education model. The NES project will be open to all interested secondary schools and will utilize current technologies in the delivery of opportunities and experiences to meet the needs of today's learning and learners.

The Learning Technologies Project (LTP) develops and refines cutting-edge technologies that are in use within NASA missions and/or projects to enhance the teaching and learning of scientific concepts. Technologies funded under LTP are developed, evaluated, and leveraged with strategic partners throughout the federal government in order to extend their reach into educational and commercial applications.

Mission Directorate:	Education
Theme:	Education
Program:	K-12 STEM Education

STEM Teacher Development (K-12)

STEM Teacher Development uses NASA's unique content and resources to provide pre-service and classroom teachers with learning experiences that build critical instructional STEM skills and enable teachers to better motivate students to achieve academic excellence and pursue STEM careers. The following are projects included in the STEM Teacher Development portfolio.

Aerospace Education Services (AES) has shifted its focus to providing sustained training to in-service and pre-service teachers. AES provides appropriate classroom resources and demonstrations to support classroom instruction.

The Endeavor Science Teacher Certificate Program (ESTCP) provides workshops to in-service and alternate route teachers, as well as faculty at colleges of education who are preparing future STEM educators. Participants receive assistance in delivering NASA content through on-line methods and practicum courses. The majority of the Endeavor fellows serve underrepresented student populations. ESTCP meets state requirements for certification, and enabling teachers to reach a "highly-qualified" STEM teaching status.

NASA Educational Technologies Services (NETS) is responsible for maintaining educational content on NASA Portal, managing operations of the Office of Education web site and other e-based dissemination/publishing networks. Additional web support is provided to the education video file (education programming) on the NASA TV Public Services channel and NASA TV Education Services channel.

The Learning Environments and Research Network (LEARN) encompasses 3 major activities: NASA -sponsored Classroom of the Future, Digital Learning Network (DLN), and electronic professional development network infrastructure (ePDN). The intent of LEARN is to conduct empirical educational research that is the basis for development and testing of off-the-shelf and new educational technologies, enabling NASA to better meet the needs of its educational audiences. LEARN will incorporate research findings on cognition, effective application of technology to educational settings, integration of NASA content, and delivery through videoconferencing, Internet multimedia, handheld devices, and dissemination infrastructures available to the Agency.

e-Education Small Projects develop infrastructure and deploy research-based technology applications, products, and services to enhance the educational process for formal and informal education. The project emphasis is implementation of educational product development, review, and meta-tagging processes and final distribution through approved media, electronic, and/or site-based channels. Another aspect of e-Education Small Projects is the Central Operations for Resources for Educators (CORE). CORE is a national distribution center for NASA's audiovisual educational materials.

Program Commitments

Commitment/Output FY 2011	Program/Project	Changes from FY 2010 PB Request
Provide experiences, tools, & opportunities to educators & students, to engage in missions & learning experiences, & ability to teach/learn in STEM disciplines, & increased use of leveraged multimedia-rich products & technology infrastructures.	K-12 STEM Education/STEM Student Opportunities, STEM Teacher Development	Same

Mission Directorate:	Education
Theme:	Education
Program:	K-12 STEM Education

Program Management

The Assistant Administrator for Education is responsible to the NASA Administrator for NASA's education portfolio, reports to the NASA Administrator, serves as NASA Education Officer, and manages all education responsibilities.

Project	Management Responsibility	NASA Center Performers	Cost-Sharing Partners
Flight Projects (STEM Student Opportunities)	Johnson Space Center (JSC)	All NASA Centers	None
Interdisciplinary Nat Sci Prog Inc Res & Ed Exper (INSPIRE) (STEM Student Opportunity)	Kennedy Space Center (KSC)	All NASA Centers	None
Science, Engin. Math & Aerospace Acad.(SEMAA) (STEM Student Opportunity)	Glenn Research Center (GRC)	All NASA Centers	Fourteen implementation sites are required to develop local partnerships for cost and resource sharing
NASA Learning Technologies Project (LTP) (STEM Student Opportunity)	Goddard Space Flight Center (GSFC)	All NASA Centers	Project Whitecard, Information in Place and Virtual Heroes (competitively selected) will provide in-kind labor and product development costs for an educational game.
Aerospace Education Services Program (AESP) (STEM Teacher Development)	Langley Research Center (LaRC)	All NASA Centers	None
NASA Explorer Schools (NES) (STEM Student Opportunities)	Glenn Research Center (GRC)	All NASA Centers	None
Endeavour Teacher Science Certificate Project (STEM Teacher Development)	Goddard Space Flight Center (GSFC)	All NASA Centers	None
NASA Education Technology Services (NETS) (STEM Teacher Development)	Marshall Space Flight Center (MSFC)	All NASA Centers	None
Learning Environment and Research Network (LEARN) (STEM Teacher Development)	Langley Research Center (LaRC)	All NASA Centers	None
eEducation Small Projects (STEM Teacher Development)	Marshall Space Flight Center (MSFC)	All NASA Centers	None
Innovation in K-12 STEM Education (STEM Student Opportunities)	Goddard Space Flight Center (GSFC)	All NASA Centers	None
Summer of Innovation (STEM Student Opportunities)	NASA Headquarters (HQ)	All NASA Centers	None

Mission Directorate:	Education
Theme:	Education
Program:	K-12 STEM Education

Acquisition Strategy

NASA solicits new and innovative education products, tools, and services from qualified external organizations. This occurs in response to changes in STEM education trends, identified gaps or opportunities in the education portfolio of investments, a response to demonstrated customer need or demand, or when the Administration or Congress identifies new priorities.

NASA encourages participation of new or less experienced organizations and awards education grants and contracts through full and open competition. NASA includes feedback from staff, subject matter experts, and public in developing solicitations, including the requirements, expected outcomes, schedules, proposal instructions, and evaluation approaches. NASA solicits comments on perceived programmatic risk issues associated with performance of the work. Procurement offices at NASA review all solicitations.

NASA awards all major grants and cooperative agreements based on reviews by external panels of peers for educational merit; NASA and external scientists and engineers for content, merit, feasibility, and alignment to education goals; and Mission Directorates for alignment with NASA's research and development interests. Indications of a clear competitive process are an integral part of reviews. NASA makes awards only after qualified assessments of merit. While competition may sometimes be restricted by legislation to designated participants, such as defined EPSCoR states, grant awards and selection of participating institutions are still determined competitively. When designated participants are identified, all proposals are reviewed for merit, and each award must be justified and deemed worthy of funding.

Mission Directorate:	Education
Theme:	Education
Program:	Informal STEM Education

FY 2011 Budget Request

Budget Authority ($ millions)	FY 2009 Actual	FY 2010 Enacted	FY 2011	FY 2012	FY 2013	FY 2014	FY 2015
FY 2011 President's Budget Request	14.0	16.1	2.0	2.0	2.0	2.0	2.0
Science Museums and Planetarium Grants	7.0	7.0	0.0	0.0	0.0	0.0	0.0
NASA Visitor Centers	7.0	6.4	0.0	0.0	0.0	0.0	0.0
NASA Informal Education Opportunities	0.0	2.7	2.0	2.0	2.0	2.0	2.0
FY 2010 President's Budget Request	14.0	2.1	2.1	2.1	2.1	2.1	--
Science Museums and Planetarium Grants	7.0	0.0	0.0	0.0	0.0	0.0	--
NASA Visitor Centers	7.0	0.0	0.0	0.0	0.0	0.0	--
NASA Informal Education Opportunities	0.0	2.1	2.1	2.1	2.1	2.1	--
Changes from FY 2010 Request	0.0	14.0	-0.1	-0.1	-0.1	-0.1	--

Project Descriptions and Explanation of Changes

NASA Informal Education Opportunities (NIEO)

The NASA Informal Education Opportunities (NIEO) project supports the needs of the informal education community. Through informal education experts at NASA centers, NASA provides technical assistance to museums, planetariums, community-based organizations, and other informal education partners in all 50 states. NIEO-funded innovations at NASA Centers, NASA Visitor Centers and elsewhere respond to state, local or national needs, while sharing NASA's mission with students, educators and the public. NIEO significantly invests in support of the NASA Museum Alliance, a free-of-charge, nation-wide online-community of science centers, museums and planetariums hosted by JPL. NIEO at NASA's nine field centers includes mini-grants, cooperative agreements, contracts or other types of assistance to museums, science centers, planetariums, libraries, other institutions of informal education or individuals who seek to partner with NASA to provide STEM education activities, including exhibits or special events, to diverse audiences.

Mission Directorate:	Education
Theme:	Education
Program:	Informal STEM Education

Program Commitments

Commitment/Output FY 2011	Program/Project	Changes from FY 2010 PB Request
Provide educators and students with tools, experiences and opportunities to engage in NASA missions and learning experiences, improving their knowledge of, and ability to teach/learn in STEM disciplines.	Informal STEM Education Program/ NASA Informal Education Opportunities (NIEO)	Same

Program Management

The Assistant Administrator for Education is responsible to the NASA Administrator for NASA's education portfolio, reports to the NASA Administrator, serves as NASA Education Officer, and manages all education responsibilities.

Project	Management Responsibility	NASA Center Performers	Cost-Sharing Partners
NASA Informal Education Opportunities (NIEO)	NASA Headquarters Office of Education	All NASA Centers	None

Acquisition Strategy

NASA solicits new and innovative education products, tools, and services from qualified external organizations. This occurs in response to changes in STEM education trends, identified gaps or opportunities in the education portfolio of investments, a response to demonstrated customer need or demand, or when the Administration or Congress identifies new priorities.

NASA encourages participation of new or less experienced organizations and awards education grants and contracts through full and open competition. NASA includes feedback from staff, subject matter experts, and public in developing solicitations, including the requirements, expected outcomes, schedules, proposal instructions, and evaluation approaches. NASA solicits comments on perceived programmatic risk issues associated with performance of the work. Procurement offices at NASA review all solicitations.

NASA awards all major grants and cooperative agreements based on reviews by external panels of peers for educational merit; NASA and external scientists and engineers for content, merit, feasibility, and alignment to education goals; and Mission Directorates for alignment with NASA's research and development interests. Indications of a clear competitive process are an integral part of reviews. NASA makes awards only after qualified assessments of merit. While competition may sometimes be restricted by legislation to designated participants, such as defined EPSCoR states, grant awards and selection of participating institutions are still determined competitively. When designated participants are identified, all proposals are reviewed for merit, and each award must be justified and deemed worthy of funding.