



NASA Education Recommendation Report Presentation

Education Design Team
21 January 2011

Agenda



- Introductions
- Overview
- Recommendations
- Next Steps

The Education Design Team employed a systems design approach to examine NASA's Education Program and the STEM education landscape



Overview

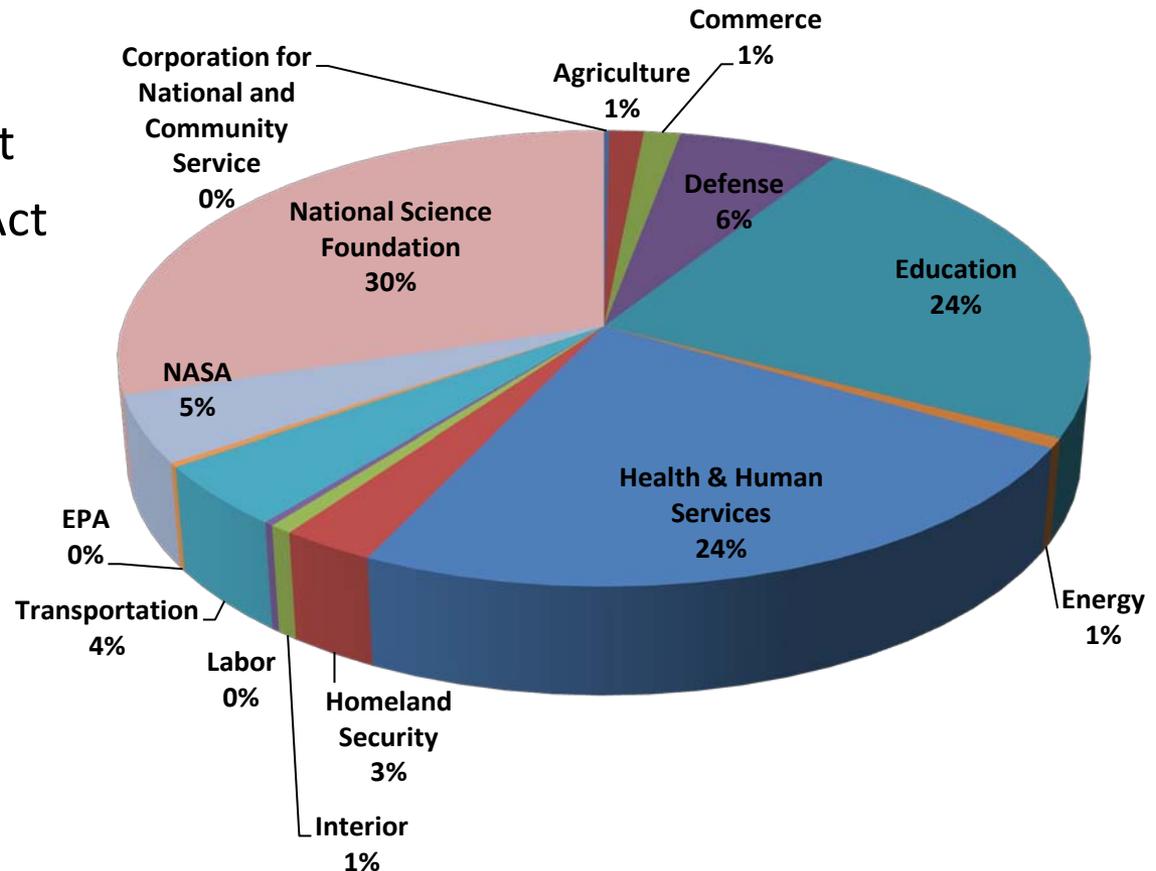
- Since early May, the Team held 27 meetings of which six were all day or two day meetings. The team:
 - Heard from 40 education experts, both internal and external to NASA
 - Analyzed NASA Education's historical budget trends, congressional appropriations, etc.
 - Researched reports and articles including:
 - *Rising Above the Gathering Storm*
 - *NASA Engagement in STEM Education: Innovation in Education for Sustainable Achievement*
 - *Disrupting Class: How Disruptive Innovation Will Change the Way the World Learns*
 - Conducted a web survey distributed to the NASA education community to capture information from leaders and innovators
 - Conducted an extensive final review of recommendations with all members of the education community, as well as a "red team" review with all Center Directors, and key external experts

The Team reviewed the following legislative requirements that bound its recommendations...



- Space Grant legislation
- Authorization bills
- Appropriation laws
- America Competes Act
- No Child Left Behind Act
- OMB guidance

2009 STEM Funding



The Team developed six recommendations designed to leverage NASA's strengths to address national STEM education needs



Recommendations

1. Focus the NASA Education Program to improve its impact on areas of greatest national need, rather than spreading its resources across a NASA-unique education pipeline.

- 1.1.** Focus NASA K-12 education programs to address the professional training and development of educators working with middle-school age students
- 1.2.** Refocus the Office of Education's Higher Education program on providing experiential opportunities for students, internships, and scholarships for high school and undergraduate students
- 1.3.** Partner with informal learning providers to enhance NASA's ability to increase capacity to help scale up informal learning
- 1.4.** Improve accessibility and usability of NASA online content
- 1.5.** Shift responsibility for the Experimental Program to Stimulate Competitive Research (EPSCoR) to an appropriate office that can provide sufficient technical oversight (e.g. the Office of the Chief Technologist) in coordination with OMB and Congress

The intended outcomes of focusing the NASA Education program include...

- Improving STEM literacy and inspiring more students through teachers than can be reached through programs providing direct services to students
- Contributing to the creation of a more competent educator workforce capable of inspiring and educating students in STEM disciplines
- Maximizing internal resources for greater education initiative ROI
- Concentrating NASA's efforts to enable a clear demonstration of the Agency's influence in STEM education



2. Identify and strategically manage NASA Education Partnerships: *NASA should be deliberate in developing partnerships to ensure alignment with NASA's Education goals, defining specific benefits and outcomes, and leveraging each partner's resources appropriately. A NASA Education partnership strategy should inform and guide Centers and Mission Directorates as well as the Office of Education.*

- 2.1. Develop partnership criteria
- 2.2. Strategically manage the Agency's education partnerships
- 2.3. Foster joint solicitations with other agencies to coordinate content delivery and program participation
- 2.4. Expand NASA content available to partners for wider distribution
- 2.5. Develop partnerships with organizations that make NASA content useable and responsive to national and state standards

The intended outcomes of leveraging and strategically managing partnerships include...

- Fostering relationships to leverage partner resources and NASA content to create mutually beneficial outcomes
- Allowing NASA to maintain a robust portfolio without having to increase NASA funding
- Enabling wider distribution of NASA content to educators, students, and the general public
- Developing a comprehensive partnership inventory to enable NASA to use proven partners across multiple projects



3. Participate in National and State STEM Education policy discussions: *NASA should actively engage in national and state level STEM education policy debates and development.*

3.1. Develop an Agency position on STEM education topics

- 3.1.1.** Provide guidelines and training on how, when, and to what extent the Center education staff should engage in STEM education policy discussions
- 3.1.2.** Center Education Director's responsibilities should include engaging with his/her region's education leaders
- 3.1.3.** Identify opportunities for NASA STEM subject matter experts to participate in key STEM education advisory boards, STEM-related committees, and other national organizations addressing STEM education

The intended outcomes of participating in STEM Education Policy discussions include...

- Ensuring NASA's content is integrated into STEM curricula
- Engaging with curriculum developers, advisory boards, and other STEM related associations to provide NASA's unique perspective in policy discussions
- Preparing NASA staff to actively engage in STEM policy discussions on behalf of the Agency
- Ensuring NASA's role at the national level in collaboration with other federal agency partners such as the National Science Foundation, Department of Education, Department of Defense and others



4. Establish a structure to allow the Office of Education, Centers and Mission Directorates to implement a strategically integrated portfolio: *NASA Office of Education should consider its new roles, organize to best accomplish them, and delegate responsibilities as necessary to the Centers, Mission Directorates, and other offices across the Agency.*

- 4.1. Enhance the professional development of education program/project staff throughout NASA
- 4.2. Review organizational structures and adjust to accommodate new initiatives and recommendations
- 4.3. Tailor NASA Program Project Management Requirements (NPR 7120.7) by creating an education specific appendix
- 4.4. Encourage Mission Directorates to invest in and provide support for NASA education efforts aligned with their programmatic content
- 4.5. Identify opportunities for NASA staff to work with organizations on education projects
- 4.6. Create separate functions (e.g. teams, groups) with responsibility for evaluating education programs and projects and for collecting outcome data to support education research

The intended outcomes of restructuring how Education is implemented include...

- Creating an increasingly efficient management structure that defines clear roles and responsibilities
- Strengthening the education workforce through a tailored professional development program
- Ensuring more rigorous evaluation, project design and management



5. Expand the charter of the Education Coordinating Committee to enable deliberate education program design and evaluation: *The Education Coordinating Committee should serve as a governance body for the purpose of assessing and evaluating education programs and projects at key life cycle decision points. An empowered ECC will enable NASA to be deliberate in the design of its education programs and projects.*

- 5.1. The ECC should update the Agency's education strategy and framework as needed based on acceptance of the Team's recommendations
- 5.2. Expand the ECC charter to empower it to serve as an education governance body

The intended outcomes of expanding the ECC charter include...

- Providing consistent guidance for education strategy and portfolio alignment
- Empowering the ECC with greater management of the education portfolio
- Strengthening Center Education and Mission Directorate Leads' oversight of programs and projects



6. Improve communication to inspire learners: *NASA should increase the capacity of the Office of Communications in order to more effectively support NASA's outreach efforts to inspire educators, students, and learners of all ages.*

- 6.1.** Increase the capacity of the Office of Communications in order to enable NASA education to more effectively reach those who are the targets of its educational programs and projects
- 6.2.** Recognize and encourage employee participation in sanctioned STEM education and outreach activities in coordination with the Office of Education, Centers, Mission Directorates, and Communications
- 6.3.** Expand the charter of the Communications Coordinating Committee (CCC) to better coordinate internal and external communications and to align mission- and center-funded outreach efforts with overall Agency goals
- 6.4.** NASA Education and the Office of Communication should be involved early in the planning of major NASA missions

The intended outcomes of improving communications include...

- Inspiring educators , students and learners of all ages to take an interest in STEM
- Helping NASA communicate education program offerings
- Ensuring educators and students have the latest information on NASA missions
- Developing consistent and unified education messages across NASA Education
- Identifying education and outreach opportunities early in the mission lifecycle
- Aligning NASA's education and outreach goals

Next steps involve developing a comprehensive implementation plan to successfully roll-out the accepted recommendations



Next Steps

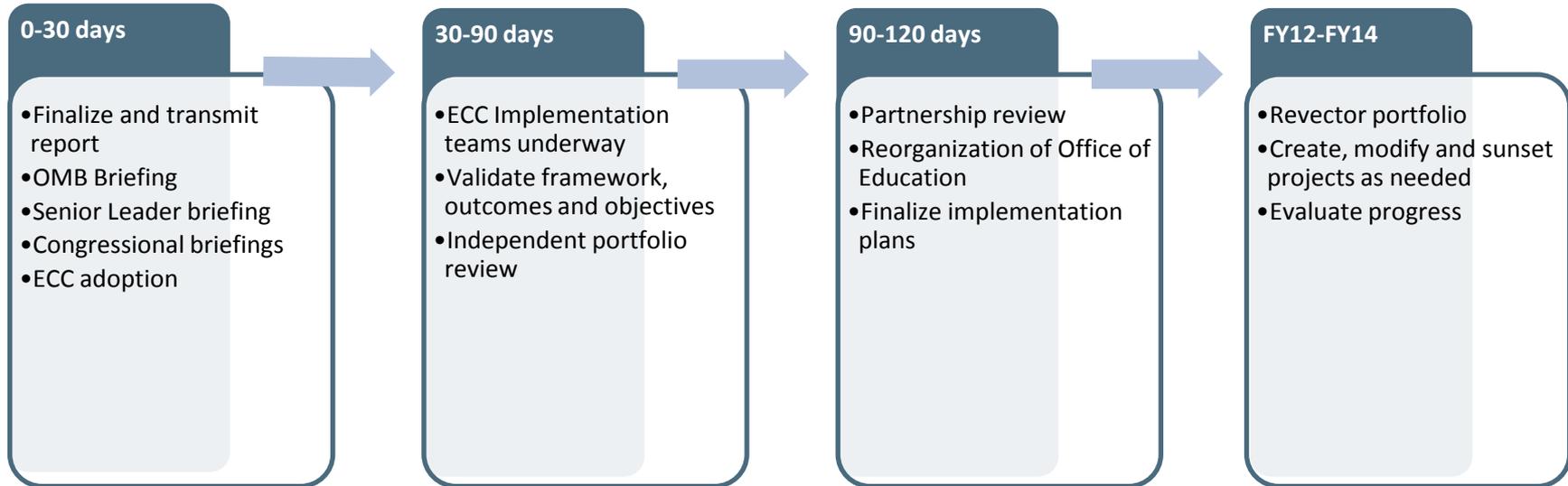


Figure 1. Estimated Timeline for Implementation

The Implementation Plan will include:

- A review of the NASA education portfolio to include a feasibility assessment
- A review of NASA education partnerships
- Specific program and project plans, estimated budgets and timelines



Backup Slides

Education Design Team



- **Trish Pengra**, Co-Lead of Education Design Team, Deputy Associate Administrator for Independent Program and Cost Evaluation, NASA Headquarters
- **Jim Stofan**, Co-Lead of Education Design Team, Deputy Associate Administrator for Education Integration, NASA Headquarters
- **Bill Anderson**, Education Specialist and Education Portfolio Manager, NASA Headquarters (Retired)
- **Gregg Buckingham**, Deputy Director, Education and External Relations Directorate, Kennedy Space Center
- **Carmel Conaty**, Systemic Planning & Analysis Manager, Goddard Space Flight Center
- **Lisa Guerra**, Senior Advisor for Strategic Planning, NASA Headquarters
- **Dean Kern**, Deputy Education Director, Goddard Space Flight Center
- **Rob LaSalvia**, NASA Explorer School Project Manager, Glenn Research Center
- **Lori Manthey**, Executive Officer, Office of the Director, Glenn Research Center
- **Kendra Perkins**, Acting Director, Legislative Reference and Analysis Division, NASA Headquarters
- **Bonita Soley**, Social Scientist/ODEO, NASA Headquarters
- **Stephanie Stockman**, Science Mission Directorate Education Manager, NASA Headquarters
- **Tammy Rowan**, Education Director, Marshall Space Flight Center*
- **Carolyn Knowles**, Executive Officer, Office of Education*

* Provided support to the EDT

Note: Prior to his appointment as NASA Associate Administrator for Education, Leland Melvin was team Co-Lead from May through October 2010.

The Team engaged numerous education experts to deepen its understanding of STEM education challenges and successes



External

- **Margaret Ashida**, Empire State STEM Learning Network Director, ashidm@rpi.edu
- **Norm Augustine**, “Rising Above the Gathering Storm”, norm.augustine@lmco.com, assistant: laura.j.ahlberg@lmco.com
- **Angela Baber**, National Governors Association Center for Best Practices, ababer@nga.org
- **Steve Barkanic**, Gates Foundation, steve.barkanic@gatesfoundation.org, assistant: leslie.vesha@gatesfoundation.org
- **Claudine Brown**, Smithsonian Institution, Education Director, brownck@si.edu
- **Valerie Caracelli**, GAO Center for Evaluation Methods and Issues
- **John Clemons**, Raytheon Company, Corporate Director of Community Relations, jgclemons@raytheon.com
- **Kristen Edwards**, Einstein Fellow and former Teach for America (TFA) Teacher, kristen.a.edwards@nasa.gov
- **Kumar Garg**, Office of Science and Technology Policy (OSTP), Policy Analyst, kgarg@ostp.eop.gov
- **Michael Horn**, co-author of, “Disrupting Class; How Disruptive Innovation Will Change the Way the World Learns.” mhorn@innosightinstitute.org
- **Rita Karl**, Challenger Center for Space Science Education, Director of Education, rkarl@challenger.org
- **Louisa Koch**, National Oceanic and Atmospheric Administration, Director of Education, louisa.koch@noaa.gov
- **Chris Koehler**, National Council of Space Grant Directors and Director of Space Grant Colorado, Koehler@Colorado.edu

The Team engaged numerous education experts to deepen its understanding of STEM education challenges and successes (cont.)



External

- **Dr. Anita Krishnamurthi**, After School Alliance, Director of STEM Policy, akrishnamurthi@afterschoolalliance.org
- **Michael Lach**, U.S. Department of Education, Special Assistant for Science, Technology, Engineering, and Mathematics Education, Michael.Lach@ed.gov
- **Zipporah Miller**, National Science Teachers Association, Associate Executive Director for Professional Programs and Conferences, zmiller@nsta.org
- **Dr. Antoinette Mitchell**, Trinity Washington University, Interim Dean, School of Education, MitchellAn@trinitydc.edu
- **Jan Morrison**, Teaching Institute for Excellence in STEM, Executive Director, author of *NASA Engagement in STEM Education*, janmorrison@tiesteach.org
- **Dr. David Morgan**, Immaculata University, Partnership in Math and Science Project, davem@cciu.org
- **Dr. Allison Powell**, International Council for Online Learning, Vice President, apowell@inacol.org
- **Jennifer Rinehart**, Afterschool Alliance, Vice President of Policy and Research
- **James Shelton**, Department of Education, Assistant Deputy Secretary for Innovation and Improvement, jim.shelton@ed.gov
- **Dr. Stephanie Shipman**, GAO Center for Evaluation Methods and Issues, shipmans@gao.gov
- **Dr. Suzanne Weaver Smith**, Space Grant Director for Kentucky, ssmith@engr.uky.edu
- **Dr. Carl Wieman**, Office of Science and Technology Policy (OSTP), [Carl E. Wieman@ostp.eop.gov](mailto:Carl_E_Wieman@ostp.eop.gov)
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The Team pulled common recommendations and themes from presentations given by education experts



Recommendations	Most frequently referenced	Key Takeaways	Most frequently referenced
Seek opportunities to develop and manage Strategic Partnerships, Cooperative Agreements	12	Develop and manage strategic partnerships	6
Focus on teacher professional development	6	Collect data project through surveys, performance measures - output and outcome data	5
Performance Measures - standard, research-based	5	Leverage unique NASA content	5
Clarify NASA Education's goals, objectives, outcomes	5	Value of technology/infrastructure investments	4
Leverage NASA's current content in all education projects	4	Leverage NASA's strong brand	4
Continue to inspire people to pursue STEM disciplines professionally and academically	4	Standardize education project management	2
Performance reviews/evaluations	3	Collaborate across NASA education on project development	2
Reevaluate OEPM/Project Data management	2	Harness the value of Informal Education	2
Use a Systems Engineering Approach to redesigning NASA's education Program	2	Conduct external evaluations	2
Use a mature project management model for education projects	2	NASA has the power to inspire	2

In addition to external experts, the Team met with internal experts to better understand the NASA education portfolio



Internal

- **Bill Anderson**, Education Specialist and Education Portfolio Manager (Retired)
- **Charles Bolden**, NASA Administrator
- **Dr. Diane Clayton**, Education Project Management Requirements
- **Dr. Shelley Canright**, Manager, Elementary and Secondary Education Programs
- **Diane DeTroye**, Space Grant Program Manager
- **Dr. Alyssa Rulf Fountain and Dr. Abigail Jurist Levy**, Abt Associates
- **Lori Garver**, NASA Deputy Administrator
- **Jerry Hartman**, Exploration Systems Mission Directorate Education Lead
- **Dovie Lacy**, Summer of Innovation Program Manager
- **Alan Ladwig**, Deputy Associate Administrator for Communications
- **Rob LaSalvia**, NASA Explorer School Program Manager
- **Dr. Mabel Matthews**, Manager, Higher Education Program
- **Kathy Nado**, Participatory Exploration Manager
- **Dr. Carl Person**, Minority Programs Manager
- **Mary Sladek**, Informal Education Manager
- **Tony Springer**, Aeronautics Research Mission Directorate Education Lead
- **Stephanie Stockman**, Science Mission Directorate Education Manager
- **Jim Stofan**, Deputy Associate Administrator for Education Integration
- **Alotta Taylor**, Space Operations Mission Directorate Education Lead
- **Dr. Michele Viotti**, Mars Education and Outreach Manager
- **Dr. Brian Yoder**, Evaluation Manager, NASA Office of Education

The Team conducted a short survey to capture information from leaders and innovators throughout the NASA education community



- The Team distributed the survey to 283 people and received 132 responses – a response rate of 47%
- The survey consisted of:
 - Four demographic questions – to better understand the respondent’s perspective
 - Five questions requiring ranking or scoring – to enable quantitative analysis
 - Eight free-response questions – to provide the opportunity to offer substantive recommendations
- Respondents:
 - Devoted an average of 38 minutes to completing the survey
 - Comprise of 60% NASA civil servants, 33% contractors, and 7% other
 - Had a wide range of NASA education experiences
 - Are highly knowledgeable of the NASA education portfolio

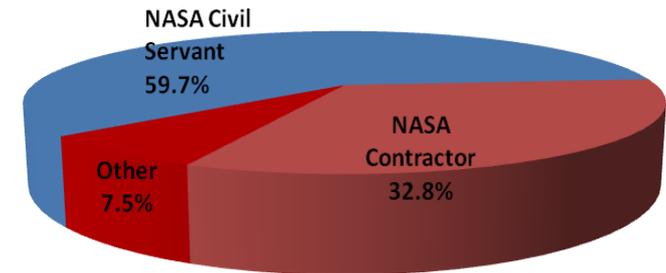


Figure 1. Composition of NASA participants

Survey participants expressed their sentiments by their level of agreement with the following statements...



Statements	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
5-1: NASA's existing education programs are having the desired impact.	7.7%	63.8%	30.8%	7.7%	0.0%
5-2: NASA's current education programs are aligned with the Agency's education goals of; strengthening NASA's and the Nation's workforce, attracting and retaining students in STEM disciplines, and engaging Americans in NASA's mission.	0.0%	84.6%	7.7%	7.7%	0.0%
5-3: NASA and its Missions should put more resources toward education.	46.2%	38.5%	15.4%	0.0%	0.0%
5-4: NASA should be a partner in systemic education reform.	61.5%	23.1%	7.7%	7.7%	0.0%
5-5: NASA should establish partnerships (e.g. corporate, government, non-profit, etc.) to advance education.	69.2%	30.8%	0.0%	0.0%	0.0%
5-6: NASA is viewed as a national leader in STEM education programs.	30.8%	23.1%	23.1%	15.4%	7.7%
5-7: NASA's education goals for FY11 are measurable and achievable.	23.1%	46.2%	23.1%	7.7%	0.0%
5-8: NASA accurately measures the performance of its education programs.	7.7%	38.5%	23.1%	23.1%	7.7%

Members of the NASA education community have constructive, often innovative, feedback to contribute



The open-ended questions provide respondents the opportunity to make recommendations on how to improve NASA's education program and projects

Open-Ended Questions	Key Theme*
How should NASA encourage innovation in education projects?	Seek partnerships with other innovative organizations, universities, educational entities
What is NASA's most innovative education program?	NASA Explorer School
What should NASA's primary goal with regard to education be, and why?	Inspiring and educating the next STEM workforce
What do you think is NASA's biggest challenge when it comes to developing and implementing education programs?	Funding
What do you think is NASA's greatest strength with regard to impacting education in the U.S.?	Its mission and content
Should NASA have standard performance measures that are applied across all education programs?	Yes
If you were the NASA Administrator, what changes would you make to the NASA education program?	Evaluate all programs
If you had designed this survey, is there a question you would have asked that is not found here, and how would you answer it?	NASA needs to find opportunities to better understand its customers

* A count was taken for each time a theme is mentioned across all responses to a question. The theme(s) most commonly referenced is listed here as a *Key Theme*.