NASA's Education Mission

Status

Mission

To inspire the next generation of explorers
… as only NASA can

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Education as a Core Mission

➢ *Our Nation's education system is failing to equip our children with essential mathematics and science skills*

  ➢ **Despite national needs for greater economic security and technology, nearly 75% of our nation's 4th and 8th graders and nearly 80% of our 12th graders are scoring at levels below proficient in mathematics and science for their grades**

  ➢ **International mathematics and science assessments show that as U.S. students progress through their education they do progressively worse than the rest of the world.**

  ➢ **National and international benchmarks confirm that minority students and students from low-income families perform particularly poorly in relation to other U.S. and international students.**

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Education as a Core Mission

➢ *Our Nation is failing to produce the number of Scientists, Mathematicians, Engineers and Technologists needed to support our Nation's Economic Needs and National Security Needs*

  ➢ **Consequently, hundreds of thousands of foreign nationals are being imported into the United States to fill our Nation's needs**

  ➢ **The trend for the future suggests that this problem will worsen, as our public and private education systems will not satisfy the increasing need for a more sophisticated work force.**

Education as a Core Mission

➢ *Mathematics and Science Spur Economic Growth and Competitiveness*

  ➢ Science and mathematics are key drivers in an economy that relies heavily on emerging technologies.

  ➢ Other nations have stepped up their efforts in creating a well-trained workforce in science and technology, often competing with U.S. workers.

  ➢ Many of today's fastest growing jobs require a solid mathematics or science background.

  ➢ Of the 20 fastest growing occupations projected by the Bureau of Labor Statistics (BLS) through 2010, 15 of them require substantial mathematics or science preparation.

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Education as a Core Mission

➢ *NASA's workforce, and that of its contractors, is aging*

  ➢ **Due to the shortage of scientists, mathematicians, engineers and technologists, NASA's ability to maintain a qualified workforce is impaired.**

Education as a Core Mission

➢ *NASA is uniquely positioned to be able to positively effect an increase in the numbers of scientists, mathematicians, engineers and technologists*

➢ *NASA's Enterprise activities produce:*

   ➢ **Amazing <u>Scientific</u> Discoveries;**

   ➢ **Cutting Edge <u>Technologies</u> which depict Extraordinary Visualizations;**

   ➢ **Marvelous Feats of <u>Engineering</u>;and**

   ➢ **Embedded in all of the Enterprise activities is a fundamental knowledge of <u>Mathematics.</u>**

➢ *NASA can and must leverage its unique Enterprise activities to Inspire the Next Generation of Explorers like it has not done before.*

Goals/Priorities

If we are to Inspire the Next Generation of Explorers … as only NASA can, we must:

➢ **Motivate students to pursue careers in science, mathematics, engineering, and technology**

➢ **Provide educators with unique teaching tools and compelling teaching experiences**

➢ **Seek to ensure that we are investing the taxpayer's resources wisely**

➢ **Engage minority and underrepresented students, educators, and researchers in NASA's education program**

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Reorganizing to Meet Mission

➢ *There was no single person or group responsible and authorized to manage the efforts*

➢ *There were numerous foci and purposes, thus there was no particular focus or purpose of the efforts*

➢ *NASA had 17 different locations where we undertook various kinds of education outreach activities*

  ➢ **Headquarters Education Activity**

  ➢ **Headquarters Minority Education Activity**

  ➢ **5 Enterprise Activities**

  ➢ **10 Centers served largely as implementing arms of the above 7, but also had their own programming**

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Reorganizing to Meet Mission

➢ *We are creating a new organizational platform to perform our new core mission.*

   ➢ **Leadership**
   ➢ **Human Resources**
   ➢ **Budget**

Reorganizing to Meet Mission

➤ *Leadership*

  ➤ **Serves as Associate Administrator, Office of Education (Code N)**

  ➤ **AA is a full-fledged member of the Enterprise Council and the Executive Committee**

  ➤ **Code NEO will be a hybrid organization:**

    ➤ **Like Code Q in that it has a cross-cutting function and accountability**

    ➤ **Like Enterprises in that it has program responsibility and budget authority**

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Reorganizing to Meet Mission

➢ *Human Resources*

   ➢ **Reassign existing education staff in FE (HQ Regular Ed) and EU (Minority Ed) into the new education organization**

   ➢ **Reassign all current Enterprise education personnel to the education organization, but they remain co-located in the Enterprises**

   ➢ **Center education staff will remain assigned to Centers**

   ➢ **Continue to leverage existing relationships with universities, museums, government agencies, and other organizations**

   ➢ **Detail people from Dept of Education to NASA and vice versa**

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Reorganizing to Meet Mission

➢ *Budget*

  ➢ **The new AA will manage a portfolio of education investments for the Agency**

  ➢ **AA will present education investments to the Executive Committee**

  ➢ **Priority will go to investments that line up with "as only NASA can"**

  ➢ **All investments will conform to the overarching education program**

  ➢ **AA is authorized to curtail investments in programming that do not conform to the overarching education program**
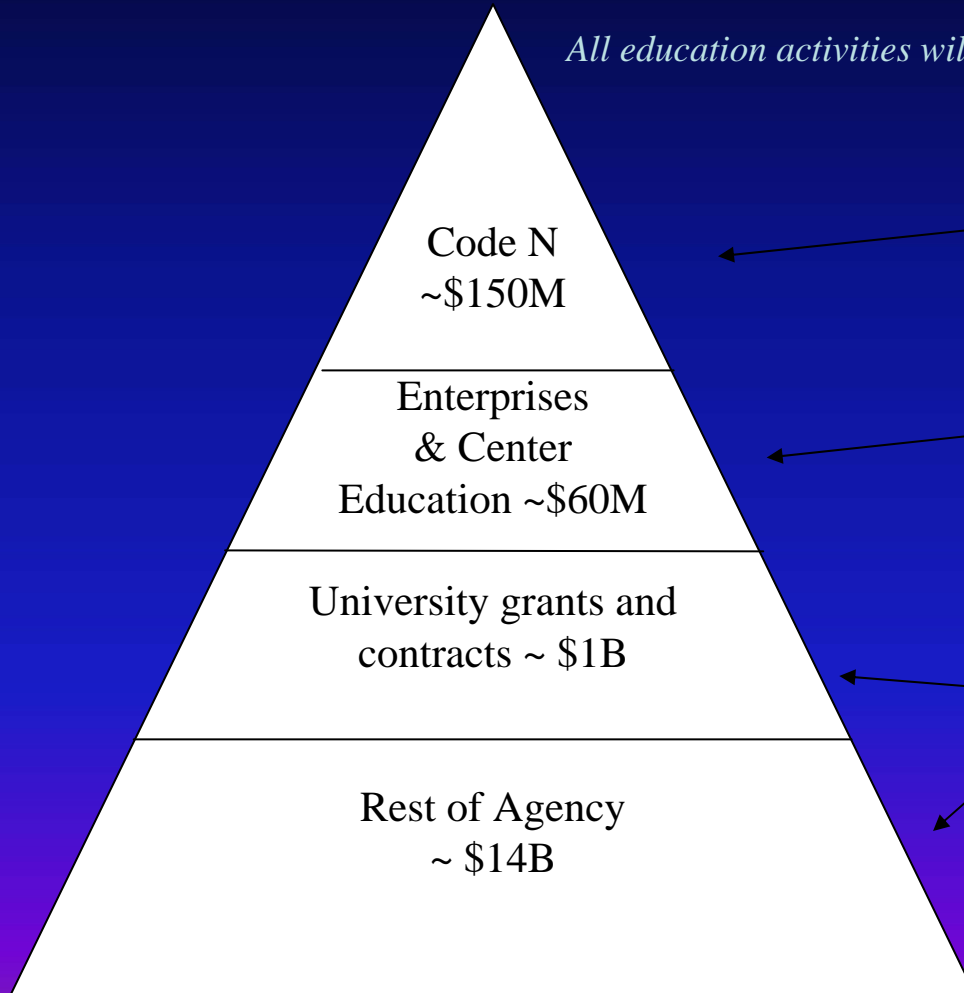
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Reorganizing to Meet Mission

Where is the money located?

Control by Code N?

All education activities will conform to the overarching education program

Code N
~$150M

Enterprises
& Center
Education ~$60M

University grants and
contracts ~ $1B

Rest of Agency
~ $14B

Direct Control by Code NEO

Enterprises and Centers initiate and
seek concurrence from Code NEO.
Code NEO can curtail investments
that do not conform to Agency
education program

Code NEO influences other codes to
spend so as to "inspire the next
generation." Code NEO does not
control or direct these expenditures

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Revamping Existing Programs

- *Many NASA Education programs can inspire the next generation, but many are:*
  - One time impacts
  - Not coordinated and connected to each other
  - Focused on too small of a population
  - Not aligned with the new priorities

- *Begun a review of all NASA Education programming to ensure alignment with the new priorities. Review to be completed by December 02.*
  - A number of programs have already been re-evaluated and re-targeted to the new priorities and the NEO Initiative

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New Explorers Opportunity Initiative (NEO)

The __NEO Initiative__ will capitalize on the excitement of NASA to recapture the imagination of the Nation's youth and inspire them to pursue careers in STEM.

The __NEO Initiative__ will work with private enterprise, federal and state agencies, and education associations to develop a unified national strategy

The __NEO Initiative__ will be:

> ➢ **integrated**
>
> ➢ **continuous**
>
> ➢ **interactive and**
>
> ➢ **collaborative**

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NEO Initiative - *Use What We Have*

➤ *The NEO Initiative will use existing programming to support key programs.*

➤ *Where existing programming does not meet the priorities, we will re-craft as necessary to support the key programs.*

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NEO Initiative - *2 Strategies*

➢ *The NEO Initiative will incorporate two major strategies to ensure the Agency's success in inspiring the next generation of explorers:*

  ➢ **Expand the pool of students entering the STEM pipeline (Pre-college)**

   ➢ **NASA Explorer Schools/Academies**

   ➢ **Educator Mission Specialist**

   ➢ **NASA Explorer Institutes (Informal Education)**

  ➢ **Increase the number of individuals entering the STEM workforce (Post-secondary)**

   ➢ **Scholarship for Service**

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#1 Explorer Academies

➢ *Goals:*

   ➢ Provide the <u>educator</u> with sustained professional development, unique teaching and collaborative tools, digital resources, and compelling teaching applications that align with national standards

   ➢ Provide ALL <u>students</u> the opportunity to apply multiple uses of advanced technologies to inspire them to pursue careers in science, technology, engineering, and mathematics

   ➢ Develop <u>strategic partnerships</u> among NASA, other Federal Agencies, academia, private sector, professional and non-profit organizations

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#1 Explorer Academies

➢ *Create a "portal" for middle school classrooms to import NASA's excitement and content with a broad reach and impact to the next generation of explorers*

  ➢ **Program basics:**
    ➢ Explorer Academies will initially target middle schools where at least one classroom would house a math/science telepresence laboratory
    ➢ All middle school children at an Explorer Academy will be exposed year round to sound interactive learning experiences and rich storylines provided by NASA thru an internet connection (and other visual and physical means) to create an unparalleled experience for students.
    ➢ NASA experiences, projects, and resources will be customized by schools and educator teams to meet State and local STEM needs and challenges

  ➢ **How do you become an Explorer Academy?**
    ➢ Schools apply and sign up for at least a 3-year commitment with NASA
    ➢ Initial cohort will be 40-80 middle schools, to include schools with significant enrollment of underrepresented and rural populations

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#1 Explorer Academies

➢ *What are the benefits of Explorer Academies?*
  ➢ **Educator**
    ➢ Access to NASA digital materials through a customized interface that allows the user to obtain scientific information and educational resources and services in a manner relevant to the user
    ➢ Participate in teams through sustained professional development with NASA and develop action plans to address student needs
  ➢ **Students**
    ➢ Capitalize on existing, interactive NASA internet programs--sample projects include:
      – EarthKAM (JPL/JSC/HQ)
      – Signals of Spring (Learning Technologies)
      – Astro-Venture (ARC)
      – Exploring the Environment eMission (NASA Classroom of the Future)
    ➢ Participate in national student competitions and challenges that could lead to follow-on experiences at a NASA Center, university, or museum partner
  ➢ **Schools**
    ➢ Utilize technology infrastructure that would enable distance learning opportunities with NASA and between other Explorer Academies.
    ➢ Access to outreach programs and activities for parents

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#1 Explorer Academies

➢ *The portal created by NASA would enable other providers of exciting math and science materials to reach Explorer Academies. We will look for partnerships with:*

  ➢ **Museums, such as the American Museum of Natural History and the Air and Space Museum;**

  ➢ **Foundations, such as the Space Foundation and Space Day Foundation;**

  ➢ **Universities, such as CalTech and Hampton University**

  ➢ **Federal Agencies, such as the Department of Education, National Science Foundation, National Guard, Environmental Protection Agency, and OSTP**

  ➢ **Industry, such as Sony Playstation 2, Lightspan**

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#2 Scholarship for Service

➢ *Goals:*

  ➢ **Provide focused talent pool to reinvigorate NASA workforce competencies and eliminate skill gaps**

➢ *Components:*

  ➢ **1st year: 150-200 undergraduate sophomores/juniors; estimate steady-state level of ~300 students annually**

  ➢ **Align intake (numbers, disciplines, etc.) with NASA Strategic Human Capital Implementation Plan; adjust/manage target levels annually**

  ➢ **Covers tuition, fees and other expenses**

  ➢ **One full year of NASA service for each year of scholarship received; Service obligation begins within 60 days of graduation (*requires Congressional legislation*)**

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#3 Educator Mission Specialist

➢ *Goals:*

  ➢ **Inspire the next generation of explorers**
  ➢ **Motivate America's educators, general public, and students to recognize the value of STEM**
  ➢ **Engage underrepresented communities**
  ➢ **Attract more people to teaching profession**

➢ *Elements:*

  ➢ **Invite and select a diverse group of educators to join the astronaut corps and involve other educators in NASA's unique mission**
  ➢ **Involve students and educators in EMS recruitment as well as other NASA programs**
  ➢ **Build career awareness in students of diverse range of technical positions at NASA**
  ➢ **Construct a network of educators to advance student achievement in STEM**

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#4 Explorer Institutes

➢ *Goals:*

  ➢ **Informal Education Initiative**

  ➢ **Involve entities like museums and science centers with NASA's education activities**

  ➢ **Leverage existing infrastructure to deliver existing NASA programming**

  ➢ **Reduce the number of earmarks**

➢ *Components:*

  ➢ **Establish a competitive process for informal organizations like museums and science centers to propose innovative, cutting edge programs that align with Explorer Academies and Institutions activity**

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Back Up Charts

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Education Priorities

➢ **Goal #1**   **Motivate students to pursue careers in science, mathematics, engineering, & technology … as only NASA can**

   ➢ *We will* **reach out to all students** *in this country--not just those near a NASA Center*

   ➢ *We will reach students at an* **earlier age** *to help them make a connection to higher education*

   ➢ *We will* **partner with others** *and use their infrastructure--we will avoid recreating what others have already built*

   ➢ *Centers and Enterprises will work together within an* **overarching education program**

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➢ **Goal #2**   **Provide educators with unique teaching tools and compelling teaching experiences … as only NASA can**

   ➢ *We will not implement programs that are being provided by others*

   ➢ *We will emphasize contributions to education that are unique to NASA -- namely, the "raw material" of <u>inspiration</u> that comes <u>from scientific discoveries</u> and the <u>excitement of human spaceflight</u>*

   ➢ *We will <u>extend</u> the reach of <u>education collaborations</u> between NASA and the academic community that contribute to NASA's research objectives*

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- **Goal #3   Seek to ensure that we are investing the taxpayer's resources wisely**

  - *We will reap the full benefit of our educational investments by <u>replenishing our workforce</u> with students coming out of NASA's educational programs*

  - *We will align education projects to an <u>overarching education strategy</u>*

  - *We will provide for <u>external evaluation</u> to ensure that NASA's programs are meeting their expected outcomes*

  - *We will compare similar programs against one another to ensure that program <u>outcomes are commensurate with program costs</u>*

  - *We will <u>work with NASA contractors and other agencies</u> to coordinate our education program with theirs*

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➢ **Goal #4** **Engage minority and underrepresented students, educators, and researchers in NASA's education program**

  ➢ *We will continue to strengthen the <u>capacity for promising minority institutions</u> to conduct leading-edge research*

  ➢ *We will seek to strengthen the capability for minority educational institutions to <u>fully compete for all NASA grants and contracts</u>*

  ➢ *We will work with others to <u>increase the number of minority students</u> pursuing STEM careers to meet the Nation's and NASA's needs*

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New Explorers Opportunity (NEO) Initiative

The <u>NEO Initiative</u> will be:

- ➢ **integrated**

- ➢ **continuous**

- ➢ **interactive and**

- ➢ **collaborative**

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NEO Initiative - _Integrated_

➤ By using the _best practices of existing models, programs and technologies developed by NASA and other entities_ (public and private sectors, public and private education institutions and organizations) and reaching out to all of our Nation's communities, the NEO Initiative will expand the knowledge of, and recognition of the value science, technology, engineering and mathematics to the future success of all children and Nation.

NEO Initiative - _Continuous_

➢ By providing educational programming _aimed at students throughout all levels of their educational experience_, NASA will be able to share with the next generation of explorers, the wonder of mathematics, science, engineering and technology, rather then with limited, single, education programming episodes.

NEO Initiative - *Systemic*

➢ As NASA's content contacts children as they pass through each grade level, it systemically addresses and complements curriculum and content standards so as to *match what is going on in the classroom*, rather than asking the classroom to match the program.

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NEO Initiative - *Interactive*

➢ Enable the students or scholars to have a _significant qualitative interaction_ with the information NASA will supply because research shows that _they will become more engaged_ with the content and perform at higher academic levels.

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NEO Initiative - *Collaborative*

➤ No one person, entity, agency, locality or state can deliver what is necessary to continuously and systemically affect large numbers of the education community. NASA's programming will therefore require that NASA reach out to partners and endeavor to arrive at a *collective goal and collective will to implement it.*

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