

## THEME: Education Programs



Barbara Morgan, educator-astronaut, in the classroom.

# EDUCATION PROGRAMS

## MAJOR EVENTS IN FY 2004

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- New solicitation for the university research center program that will further expand and strengthen the research capacity of minority institutions.
- Selection of the first class of educator astronauts.
- Pilot implementation of approximately 50 Explorer Schools.
- Initiate Explorer Institutes linking the informal education community to NASA's programs.
- Implement pilot scholarship for service.

**THEME: Education Programs (ED)**

**OVERVIEW**

To develop “the next generation of explorers,” NASA must do its part to inspire and motivate students to pursue careers in science, technology, engineering, and mathematics. Diverse student populations need to become proficient in these academic disciplines and enter the science and technology workforce, becoming the next generation that will “understand and protect our home planet” and “explore the universe and search for life.” NASA’s Education Program provides a wealth of opportunities for educators and students at all levels of the education system. Those opportunities will inspire and motivate students and engage the public. With the FY04 budget request, NASA will expand our efforts to inspire the next generation of explorers by continuing to align all education programs with the new mission, and by building on new initiatives that were piloted in FY03: the NASA Explorer Academies/Institutes, the Educator Astronaut Program, and the Scholarship for Service.

Missions	Goals supported by this theme	Objectives supporting those goals <span style="float: right;">Reference 2003 Strategic Plan</span>
Inspire the Next Generation of Explorers	6. Inspire and motivate students to pursue careers in science, technology, engineering, and mathematics (STEM).	6.1 Improve student proficiency in STEM by creating a culture of achievement using educational programs, products and services based on NASA's unique missions, discoveries and innovations. 6.2 Motivate K-16+ students from diverse communities to pursue science and mathematics courses, and ultimately college degrees in science, technology, engineering, and mathematics. 6.3 Enhance science, technology, engineering, and mathematics instruction with unique teaching tools and experiences that are compelling to educators and students as only NASA can provide. 6.4 Improve higher education capacity to provide for NASA's and the Nation's future science and technology workforce requirements.
	7. Engage the public in shaping and sharing the experience of exploration and discovery.	7.1 Improve the capacity of science centers, museums, and other institutions and organizations through the development of partnerships, to translate and deliver engaging NASA content. (Supporting role.)

**RELEVANCE**

Our Nation’s education system is currently not producing the number of scientists, technologists, engineers, and mathematicians needed to replace those that are leaving the Nation's workforce. NASA is uniquely positioned to be able to positively effect an increase in the numbers of scientists, technologists, engineers, and mathematicians. Our Enterprises produce amazing scientific discoveries, cutting edge technologies, and marvelous feats of engineering. Our mission, our people, and our facilities are unique assets that help NASA inspire the next generation of explorers to see learning about science and technology in a new light that is relevant and exciting.

If we are to inspire the next generation, we must motivate students to pursue careers in science, technology, engineering, and mathematics, provide educators with unique teaching tools and compelling teaching experiences, ensure that we invest the public resources wisely, and fully engage minority and underrepresented students, educators, and researchers in NASA’s Education Program.

Education and Public Benefits
By supporting the mathematics and science components of the No Child Left Behind Act, and by participating with the Department of Education and the National Science Foundation in the Math/Science Partnership, the NASA Education Program broadens the reach of science and technology literacy across numerous Federal programs to the education community and the general public. The NASA Education Program is fully responsive to our stakeholders -- the taxpayer -- by actively engaging with other Federal agencies, Federal education policy, and the non-governmental organization community.

**THEME: Education Programs (ED)**

**IMPLEMENTATION**

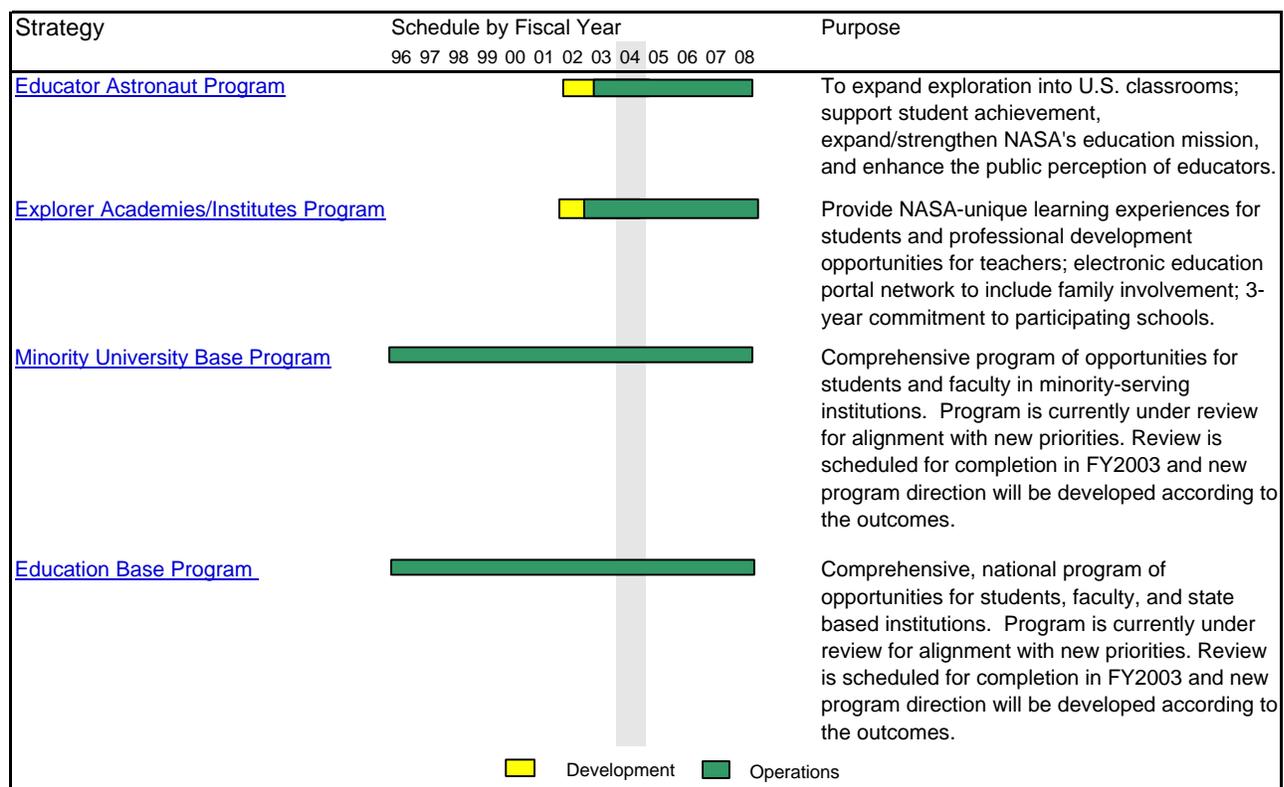
NASA has elevated education to a core mission. Reflecting this new priority, NASA in 2003 established a new Enterprise charged with the overall guidance and direction of the Agency’s education efforts. Every NASA Enterprise makes important contributions to education, and these are coordinated and planned strategically by the Associate Administrator for Education. The new Education organization will unify the Education programs at NASA Headquarters and all NASA Field Centers under a One NASA Education vision, with a clear mandate to inspire and prepare the next generation of explorers...as only NASA can.

NASA’s Education strategy pays particular attention to minority and under-represented populations. We must ensure that our Nation’s diverse communities have access to all NASA opportunities that can advance student achievement in science, technology, engineering, and mathematics. NASA will use the excitement of its missions and programs to inspire more students to pursue the study of science, technology, engineering, and mathematics, and ultimately to pursue careers in aeronautics and space. NASA will also support educators in their efforts to increase student proficiency in these disciplines.

Two key components of NASA’s education strategy are the Educator Astronaut and the NASA Explorer Academies Programs. Under the Educator Astronaut Program, NASA will recruit and select three to six educators to join the Astronaut Corps. The objectives are to make educators a permanent component of the Astronaut Corps to broaden our educational impact, and to engage students, teachers, and the public, drawing national attention to the importance of STEM.

The NASA Explorer Academies Program will engage educators, students, administrators, parents and the community by providing a customized, school-based, sustained learning environment using NASA discoveries, technologies, and exploration opportunities to support increased student interest and achievement in STEM.

NASA will continue to collaborate with institutions of higher learning through student and faculty involvement in NASA research, contributing to more students pursuing science, technology, engineering and mathematics degrees and ultimately careers in those fields.



## THEME: Education Programs (ED)

### IMPLEMENTATION (Continued)

#### Tailoring

No exceptions to NPG 7120.5B have been taken.

### STATUS

During FY02 preliminary estimates of the total in-person involvement in NASA Education activities exceeded 2.6 million. Participant feedback from educational activities was highly favorable (5=excellent; 1=very poor): rate staff - 4.71; recommend to others - 4.63; expect to apply what was learned - 4.55; valuable experience - 4.66. In response to the NASA Education Program Evaluation Review Panel (NEPER), NASA has established a student tracking longitudinal data base; data entry will begin with selected student programs in FY 2003.

For more detailed status information, please go to: <http://education.nasa.gov/> or <http://mured.nasaprs.com/>

### PERFORMANCE MEASURES

#### Annual Performance Goals

##### OUTCOME 6.1.1: Kindergarten through graduate students will be more proficient in science, technology, engineering, and mathematics (STEM)

4ED1 Develop/implement customized education program for pilot cohort of 40 schools to improve student STEM proficiency. Progress will be validated through external evaluation conducted according to accepted professional standards.

4ED2 Develop at least 3 ethnic-focused space exploration teaching tools in FY04 that target Hispanic/Latino, African American, and Native American K-12 students in order to improve student proficiency in STEM. Identify institutions/schools, that enroll at least 60% of the targeted population to implement these tools no later than FY05. Progress will be validated through external evaluation conducted according to accepted professional standards.

4ED3 Support the achievement of education objectives as established by state and local education authorities through the coordinated application of NASA assets, conducting activities for educators and students as requested. Progress will be assessed through a standards-based, external evaluation, validated by an external panel.

##### OUTCOME 6.2.1: More students from diverse communities motivated to pursue careers in STEM

4ED4 Provide educational assistance, through competitive scholarships and fellowships to at least 400 undergraduate and 200 graduate students from diverse communities to pursue degrees in STEM disciplines. A longitudinal database will be developed to track career development paths.

##### OUTCOME 6.3.1: Improve quality of STEM instruction

4ED5 Engage K-12 educators in the Educator Astronaut Program to provide unique teaching resources to the STEM teaching profession. Progress will be validated through external evaluation conducted according to accepted professional standards.

4ED6 Establish engaging, interactive web-based teaching resources for educators that support STEM instruction. Progress will be assessed using standards-based evaluation techniques.

4ED7 Provide opportunities for minority institutions to enhance their capacity to prepare both pre-service and in-service teachers to teach mathematics and science. Program effectiveness will be measured by tracking the number of teachers who obtain certification to teach mathematics and science and who are then employed to teach.

4ED8 Provide financial resources and NASA research data to enable interdisciplinary teams from university teacher education programs to develop innovative courses for pre-service teachers. Outcomes will be evaluated by university faculty and graduate students through a multi-faceted protocol.

##### OUTCOME 6.4.1: More students prepared to enter the STEM workforce

4ED9 Provide education and research opportunities to a diverse cohort of students and faculty in STEM disciplines that support human resources needs of the science and technology workforce (NASA, contractors, and/or universities). A longitudinal database to track students' career paths will be used to determine the number of graduates from NASA student programs who enter the science and technology workforce (NASA, contractors, and/or universities).

4ED10 Provide Minority Institutions with information and technical assistance on strategies that enhance STEM program development, management, and sustainability. Progress toward the outcome will be reviewed by an external panel.

4ED11 Develop partnerships and programs that strengthen research in NASA-related fields that enhance academic and research infrastructure at Minority Institutions. Progress toward the outcome will be reviewed by an external panel.

4ED12 Involve universities in states underrepresented in their share of competitively awarded grants, in NASA related research. An evaluation of the quality of research results will be conducted.

**THEME: Education Programs (ED)**

**PERFORMANCE MEASURES (continued)**

Annual Performance Goals (continued)	
<p><u>OUTCOME 7.1.1: Improve the capacity of science centers, museums, and other institutions through the development of partnerships, to translate and deliver engaging NASA content</u></p>	
4ED13	<p>Establish a collaboration with the Association of Science and Technology Centers, in addition to partnerships with at least five major science centers or museums. Provide the science centers and museums with mechanisms to motivate students to pursue STEM subjects and to share with the public NASA's research, mission, and discoveries.</p>

**INDEPENDENT REVIEWS**

Types of Review	Performer	Last Review	Next Review	Purpose
NEPER	Westat	1-Jul-02	N/A	External panel review of Program, requested by OMB.
Program Review	External panel	N/A	30-Apr-03	Review/evaluate Programs according to new direction.

**BUDGET**

Budget Authority (\$millions)	FY02	FY03	Change	FY04	Comments
<b>Education Programs</b>	<b>227.3</b>	<b>143.7</b>	<b>+26.1</b>	<b>169.8</b>	
<u>Education</u>	<u>142.6</u>	<u>61.6</u>	<u>+16.7</u>	<u>78.3</u>	
Base Program	142.6	61.6	+3.0	64.6	
New Initiative			+13.7	13.7	
<u>Minority University</u>	<u>84.7</u>	<u>82.1</u>	<u>+9.4</u>	<u>91.5</u>	
Base Program	84.7	82.1	-4.3	77.8	
New Initiative			+13.7	13.7	

Note: For all formats, the FY 02 column reflects the FY 2002 Congressional Operating Plan letter dated 9/30/02. The FY 03 column reflects the FY 2003 Presidents Budget Submit (PBS) as Amended. The Change column includes both programmatic and full cost adjustments. FY 2004 column is in full cost.

	Indicates budget numbers in Full Cost.
	Indicates changes since the FY 2003 Presidents Budget Submit.
	FY 2002 and FY 2003 are not in full cost.

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<b>THEME:</b>	Education Programs (ED)
<b>EDUCATION:</b>	Minority University Program

**PURPOSE**

Objectives	Reference 2003 Strategic Plan	Performance Measures
6.1; 6.2; 6.3; 6.4; 7.1		4ED2; 4ED4; 4ED7; 4ED9; 4ED10; 4ED11; 4ED13

NASA's outreach to minority institutions through its Minority University Research and Education Program (MUREP) will expand the Agency's research base through continued investment in minority institutions' research and academic infrastructure; will contribute to the development of the science, technology, engineering, and mathematics pipeline; and inspire the next generation of explorers.

**OVERVIEW**

The NASA MUREP achieves its objectives by employing a comprehensive and complementary array of strategies, which include (1) developing new research and education collaborations and partnerships with the NASA Strategic Enterprises, other government agencies and interested parties; (2) encouraging opportunities for faculty to conduct NASA research early in their careers; (3) providing incentives for students to enter and remain in mathematics, science and technology disciplines; (4) establishing measurable program goals and objectives; and (5) developing and implementing evaluations to assess the effectiveness and outcomes of the programs and financial performance, thereby improving program delivery and results.

For more information, go to: <http://mured.nasaprs.com/>

**PROGRAM MANAGEMENT**

The Minority University Program responsibility is maintained at NASA Headquarters, with local implementation at each NASA Center. Enterprise official is Dr. Adena Loston, Associate Administrator for Education at HQ. This program is exempted from compliance with NPG7120.5B.

**TECHNICAL COMMITMENT**

The baseline for this technical commitment was established in the FY03 President's budget. The Minority University Program is a comprehensive program of opportunities for students/faculty in minority-serving institutions. The following represents the current base program elements as well as a new initiative:

Technical Specifications	FY04 President's Budget	Change from Baseline
Institutional Science, Engineering, Technology	This activity is designed to achieve a broad-based, competitive aerospace research capability among the Nation's minority institutions and is conducted in cooperation with the NASA Enterprises.	--
Principal Investigators	This activity increases the participation of faculty and other professionals in conducting NASA research, research training, and/or administration.	--
Partnerships	This activity enhances the academic infrastructure in specific NASA-related disciplines with a focus on interdisciplinary collaborations.	--
Math & Science Education	This activity increases the participation and achievement of socially and economically disadvantaged and/or disabled students in the fields of science, technology, engineering, and mathematics at all levels of education.	--
New Initiative	Incorporates two major strategies to ensure Agency success in inspiring the next generation of explorers: 1) expand the pool of students entering the STEM pipeline through programs such as the Educator Astronaut and NASA Explorer Academies/Institutes; and 2) increase the number of individuals entering the STEM workforce through programs such as the Scholarship for Service.	Increase number of students in STEM pipeline and workforce

Schedule	FY04 President's Budget	Change from Baseline
Schedule of program activity to be determined pending Program Review recommendations; to be completed in FY 2003.		

**THEME:** Education Programs (ED)  
**EDUCATION:** Minority University Program

**ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS**

Data current as of 1/18/2003

Minority University Program activities are conducted with a wide range of minority educational institutions and minority-serving organizations through competitive research announcements, cooperative agreement notices, and other procurement vehicles.

**Changes since FY03 Pres. Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	42%	Full & Open Competition	62%	Industry	TBD
Cost Reimbursable	0%	Sole Source	38%	Government	TBD
Fixed Price	0%		100%	NASA Intramural	TBD
Grants	40%			University	TBD
Other	18%	Sci Peer Review	100%	Non Profit	TBD
	100%	* as % of FY02 direct procurement			TBD

Future Acquisitions - Major	Selection	Goals
Research Announcements	TBD	100% Sci Peer Review, 100% Grants/Cooperative Agreements.

**AGREEMENTS**

*Internal:* The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Education.

*External:* Executive Order 13256: HBCU (Dated February 12, 2002); Executive Order 13320: Educational Excellence for Hispanic Americans (Dated October 12, 2001); and Executive Order 13270: Tribal College and Universities (Dated July 3, 2000).

*Changes since FY 2003 President's Budget:* None.

**INDEPENDENT REVIEWS**

Data current as of 1/18/2003

Types of Review	Performer	Last Review	Next Review	Purpose
Site reviews at each award location	TBD	Periodic	Periodic	Review/evaluate program progress.
Program review	External panel	N/A	30-Apr-03	Review/evaluate Programs according to new direction.

**BUDGET**

Budget Authority (\$ in millions)	FY02	FY03	FY04	Comments
FY 2004 President's Budget (Minority University Program)	84.7	82.1	91.5	
Institutional Science, Engineering & Tech	29.1	31.1	30.7	
Principal Investigator	7.5	8.5	11.6	
Partnerships	16.5	13.4	8.5	
Math & Science Education	31.6	29.1	27.0	
New Initiatives			13.7	New Initiative.
<b>Changes since FY 03 Pres. Budget</b>	<b>0.0</b>	<b>0.0</b>	<b>+9.4</b>	<b>Reason for Change:</b>
Institutional Science, Engineering & Tech			-0.4	Internal agency reallocation for New Initiative.
Principal Investigator			+3.1	Reallocation to new initiative.
Partnerships			-4.9	Internal agency transfer for New Initiative.
Math & Science Education			-2.1	Internal agency transfer for New Initiative.
New Initiatives			+13.7	

Indicates budget numbers in Full Cost.

Indicates changes since the FY 2003 Presidents Budget Submit.

FY 2002 and FY 2003 are not in full cost.

<b>THEME:</b>	Education Programs (ED)
<b>EDUCATION:</b>	Education

**PURPOSE**

Objectives	Reference 2003 Strategic Plan	Performance Measures
6.1; 6.2; 6.3; 6.4; 7.1		4ED1; 4ED3; 4ED4; 4ED5; 4ED6; 4ED8; 4ED9; 4ED12; 4ED13

To inspire the next generation of explorers, NASA will use an integrated, focused approach to improve student proficiency in science, technology, engineering, mathematics disciplines, motivate more students to explore those areas, work to improve the way educators teach STEM-related subjects, improve the capacity of higher education to provide for NASA and the Nation's technological workforce needs, and improve the capacity of the informal education community.

**OVERVIEW**

The Education Program brings students and educators, K-16+, into the NASA mission and research as participants and partners. NASA provides the opportunity for a diverse group of students and educators to directly interact with NASA's scientists and engineers, facilities, and research and development activities. The participants benefit from the opportunity to become involved in R&D endeavors, gain an understanding of the breadth of NASA's activities, and return to the classroom with enhanced knowledge and skills -- all to inspire the next generation into STEM related careers. Education Programs are categorized as student programs, teacher/faculty preparation and enhancement, curriculum support/dissemination, state based, and educational technology. In FY 2004, two new initiatives are underway: Educator Astronaut Program, Explorer Academies.

For more information go to: [www.education.nasa.gov](http://www.education.nasa.gov)

**PROGRAM MANAGEMENT**

The Education Program responsibility is maintained at NASA Headquarters, with local implementation at each NASA Center. The Enterprise official is Dr. Adena Loston, Associate Administrator for Education at HQ. This program is exempted from compliance with NPG7120.5B.

**TECHNICAL COMMITMENT**

The baseline for this technical commitment was established in the FY03 President's budget. The Education Program is a comprehensive, national program of opportunities for students, faculty and state-based institutions. The following represents the current base program elements as well as a new initiative:

Technical Specifications	FY04 President's Budget	Change from Baseline
Student Support	Improve student proficiency in STEM by creating a culture of achievement educational programs, products and services based on NASA's unique missions, discoveries and innovations.	--
Teacher/Faculty Prep/Enhance.	Improve science, technology, engineering, and mathematics instruction with unique teaching tools and experiences compelling to teachers and students.	--
State-based	Use NASA's unique assets to support local, state, regional STEM education improvements through collaboration with stakeholders.	--
Educational technology	Research/develop products/services which facilitate the application of technology to enhance the educational process for formal/informal education.	--
New Initiative	Incorporates two major strategies to ensure Agency success in inspiring the next generation of explorers: 1) expand the pool of students entering the STEM pipeline through programs such as the Educator Astronaut, NASA Explorer Academies and Institutes; and 2) increase the number of individuals entering the STEM workforce.	Increase number of students in STEM pipeline and workforce.

Schedule	FY04 President's Budget
Educator Astronaut	
Announcement/recruitment	Jan 03 - Apr 03
Candidate selection	May 03 - Mar 04
EA training/preparation	Apr 04 - Jun 05
Core operations at JSC	Jul-05
NASA Explorer Academies	
Pilot program implemented	Jun 03

<b>THEME:</b>	Education Programs (ED)
<b>EDUCATION:</b>	Education

**ACQUISITION STRATEGY & PERFORMING ORGANIZATIONS**

Data current as of 1/18/2003

Education Program activities are conducted with a wide range of educational institutions and non-profit organizations through competitive program announcements, cooperative agreement notices, and other procurement vehicles. **Changes since FY 2003 President's Budget: None.**

Current Acquisitions	Actual *	Selection Method	Actual *	Performer	Actual *
Cooperative Agreements	9%	Full & Open Competition	46%	Industry	0%
Cost Reimbursable	0%	Sole Source	54%	Government	0%
Fixed Price	4%		100%	NASA Intramural	0%
Grants	82%			University	54%
Other	5%	Sci Peer Review	29%	Non Profit	46%
	100%	* as % of FY02 direct procurement			100%

Future Acquisitions - Major	Selection	Goals
1. Student program announcement	Spr 03	100% Full & Open Competition, Peer Review
2. Faculty program announcement	Spr 03	100% Full & Open Competition, Peer Review

**AGREEMENTS**

*Internal:* The program is not dependent on other NASA activities outside of the control of the Associate Administrator for Education.

*External:* Memoranda of Understanding with the following organizations: National Aerospace Education Alliance, Experimental Aircraft Association Aviation Foundation.

**Changes since FY03 Pres. Budget: None.**

**INDEPENDENT REVIEWS**

Data current as of 1/18/2003

Types of Review	Performer	Last Review	Next Review	Purpose
NEPER	Westat	1-Jul-02	N/A	External panel review of Program, requested by OMB.
Program review	External panel	N/A	30-Apr-03	Review/evaluate Programs according to new direction.

**BUDGET**

Budget Authority (\$ in millions)	FY02	FY03	FY04	Comments
<b>FY 2004 President's Budget (Education)</b>	<b>142.6</b>	<b>61.6</b>	<b>78.3</b>	
Student support	20.9	11.3	11.8	
Teacher/faculty	9.6	9.2	8.1	
State-based support	40.8	30.4	35.4	
Educational technology	69.7	9.1	7.6	
Evaluation	1.6	1.6	1.7	
New Initiative			13.7	
<b>Changes since FY 03 Pres. Budget</b>	<b>0.0</b>	<b>0.0</b>	<b>+16.7</b>	<b>Reason for Change:</b>
Student support			+0.5	Realignment of priorities
Teacher/faculty			-1.1	Reallocate to new initiative
State-based support			+5.0	Reallocate to new initiative
Educational technology			-1.5	Reallocate to new initiative
Evaluation			+0.1	Reallocate to new initiative
New Initiative			+13.7	Internal agency transfer of funds for new initiative

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