EDUCATION AND HUMAN RESOURCES $816,220,000

The FY 2007 Budget Request for the Directorate for Education and Human Resources (EHR) is $816.22 million, an increase of $19.53 million, or 2.5 percent, over the FY 2006 Current Plan of $796.69 million.

Education and Human Resources Funding
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Experimental Program to Stimulate Competitive Research (EPSCoR)	$93.35	$98.72	$100.00	$1.28	1.3%
Research on Learning in Formal and Informal Settings (DRL)	238.76	215.16	215.00	-0.16	-0.1%
Undergraduate Education (DUE) [1]	237.52	211.71	196.80	-14.91	-7.0%
Graduate Education (DGE)	154.75	153.02	160.57	7.55	4.9%
Human Resource Development (HRD) [1]	119.16	118.08	143.85	25.77	21.8%
Total, EHR [2]	$843.54	$796.69	$816.22	$19.53	2.5%

Totals may not add due to rounding.

[1] FY 2005 Actual and FY 2006 Current Plan reflect proposed FY 2007 structure of programs. See text for additional detail.

[2] Excludes $25.95 million in obligations in FY 2005, and an estimated $100.0 million in FY 2006 and FY 2007 from H-1B Nonimmigrant Petitioner Fees.

NSF, in accordance with the NSF Act of 1950, is the principal federal agency charged with promoting science and engineering (S&E) education. In support of this mission, EHR promotes the development of a diverse and well-prepared workforce of scientists, technicians, engineers, mathematicians and educators and a well-informed citizenry who have access to the ideas and tools of science and engineering. EHR supports education, research, and infrastructure development in all S&E disciplines. The purpose of these activities is to enhance the quality of life of all citizens and the health, prosperity, welfare and security of the Nation and to build the science, technology, engineering and mathematics (STEM) workforce of the 21st century.

EHR Subactivity Funding
(Dollars in Millions)
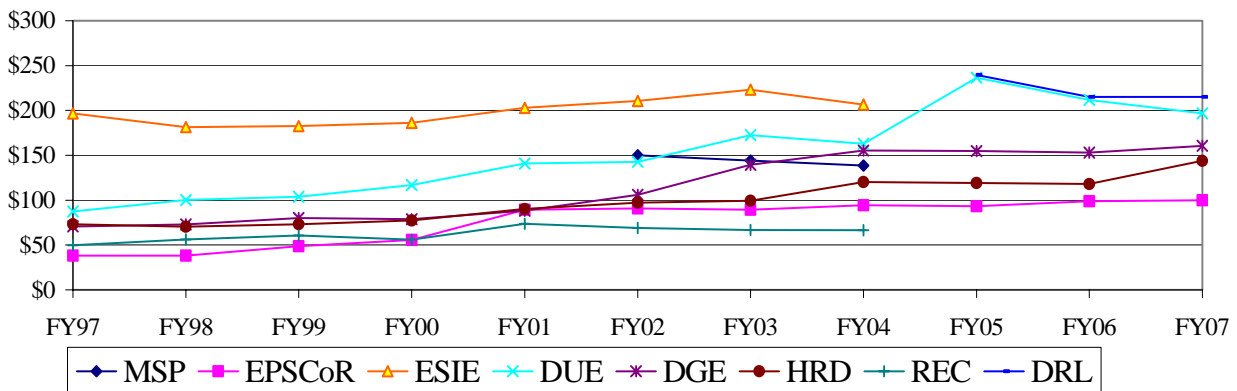
<u>Appropriation Language</u>

EDUCATION AND HUMAN RESOURCES

For necessary expenses in carrying out science and engineering education and human resources programs and activities pursuant to the National Science Foundation Act of 1950, as amended (42 U.S.C. 1861-1875), including services as authorized by 5 U.S.C. 3109, authorized travel, and rental of conference rooms in the District of Columbia, ~~807,000,000~~*$816,220,000,* to remain available until September 30, ~~2007: *Provided*, That to the extent that the amount of this appropriation is less than the total amount authorized to be appropriated for included program activities, all amounts, including floors and ceilings, specified in the authorizing Act for those program activities or their subactivities shall be reduced proportionally~~*2008*.   *(Science Appropriations Act, 2006.)*

Education and Human Resources
Budgetary Resources Summary
(Dollars in Millions)

	Enacted / Request	Rescission	Carryover / Recoveries	Lapsed	Total Resources	Obligations Incurred / Estimated
FY 2005 Actual	848.21	-6.79	2.70	-0.18	843.94	843.54
FY 2006 Current Plan	807.00	-10.31	0.40	-	797.09	797.09
FY 2007 Request	816.22	-	-	-	816.22	816.22
$ Change from FY 2006	9.22				19.13	
% Change from FY 2006	1%				2%	

Totals may not add due to rounding.

<u>Explanation of Carryover</u>

Within the EHR appropriation $401,829 was carried forward into FY 2006. This includes $298,210 for efforts related to Hurricane Katrina, and $100,000 for the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring program (PAESMEM).

RELEVANCE

NSF's Directorate for Education and Human Resources is the principal source of federal support for strengthening S&E education. EHR programs support technological innovation to enhance economic competitiveness and new job growth. EHR addresses the workforce needs of the Nation and ensures a scientifically literate population and a robust supply of qualified experts.

Critical challenges face the Nation's S&E educational system. How can we ensure that adequate numbers of K-12 teachers are sufficiently knowledgeable in science or mathematics? How do we motivate high school students to enroll in physics or chemistry classes, or to complete enough mathematics to be ready to study science or engineering at the college level? How do we make it so the individuals who obtain baccalaureate or graduate degrees in S&E fields fully reflect the Nation's diverse population?

EHR activities strengthen U.S. education at all levels and help ensure continued U.S. economic and research preeminence. These activities respond to the need expressed in the recent National Science

Board report, *The Science and Engineering Workforce: Realizing America's Potential*, "to ensure our country's capacity in S&E in an increasingly competitive and changing global labor market."

The EHR portfolio focuses on four goals:
- Prepare the next generation of S&E professionals and attract and retain more Americans in S&E careers.
- Develop a robust research community that can conduct rigorous research and evaluation that will support excellence in S&E education and will integrate research and education.
- Broaden participation (individuals, geographic regions, types of institutions, S&E disciplines) and close achievement gaps in all S&E fields.
- Increase the technological, scientific, and quantitative literacy of all Americans so that they can exercise responsible citizenship and live productive lives in an increasingly technological society.

For each of these goals, key programmatic strategies have been developed. The FY 2007 Budget Request provides support for a broad range of educational activities:

- K-12 programs focus on funding research on the development of effective S&E instructional materials as well as teacher preparation and professional development. In addition, they support research and development on effective materials that promote scientific and technological literacy for learners of all ages.
- Undergraduate programs focus on: developing courses, curricula and laboratory experiences for two- and four-year colleges and universities, expanding the Nation's S&E talent, addressing federal workforce needs for cybersecurity specialists, fostering S&E education capacity at minority-serving institutions, and promoting the participation and advancement of women and minority students in the S&E enterprise.
- Graduate programs provide support to attract and prepare U.S. students for S&E careers.
- Evaluation and research on education are emphasized throughout the EHR portfolio to inform improvements in educational practice.
- EPSCoR's goal is to maximize the potential inherent in a state's science and technology resources and use those resources as a foundation for economic growth.
- Math and Science Partnerships bridge K-12 and higher education through a focus on the engagement of disciplinary faculty in K-12 activities.

Summary of Major Changes by Division   *(Dollars in Millions)*

FY 2006 Current Plan, EHR…………..………………………………………………...............$796.69

Experimental Program to Stimulate Competitive Research (EPSCoR)   +$1.28
EPSCoR will continue its Research Infrastructure Improvement (RII) component and will also fund two Strength-Based Research Collaboratives (SBRC) in FY 2007. SBRC funding will increase by $2.0 million over the FY 2006 Current Plan (the EPSCoR increase of $1.28 million, along with $720,000 of reallocated funds within EPSCoR.)

Research on Learning in Formal and Informal Settings (DRL)   -$0.16
DRL will be created in FY 2006 through the merger of the former Elementary, Secondary and Informal Education (ESIE) division and the Research, Evaluation and Communication (REC) division.

Undergraduate Education (DUE)   -$14.91

Support for the Math and Science Partnership (MSP) program, which will become part of DUE in FY 2006, decreases by $17.18 million. Funding will be continued for all existing MSP projects including new awards for Institute Partnerships made in FY 2006; and for data collection, evaluation, and dissemination. Funding for the Course, Curriculum, and Laboratory Improvement (CCLI) program decreases by $2.63 million, as the program is transformed and introduces phases to help prioritize efforts. Support increases for the other curriculum, laboratory and instructional development programs – Robert Noyce Scholarship program, STEM Talent Expansion Program (STEP), and the National STEM Education Digital Library (NSDL). Support increases for the workforce development programs – Advanced Technological Education (ATE), Federal Cyber Service: Scholarship for Service (SfS), and Excellence Awards in Science & Engineering (EASE).

Graduate Education (DGE)   +$7.55

Funding will increase for the three flagship graduate programs. In comparison to the FY 2006 Current Plan, this increase will support an additional 25 U.S. doctoral students in IGERT; an additional 65 graduate students in GRF; and an additional 50 doctoral students in the GK-12 program.

Human Resource Development (HRD)   +$25.77

Support increases significantly for HRD's programs, all of which emphasize broadening participation in the science and engineering workforce. Many HRD programs are focal points for linking activities in NSF's EHR Directorate with NSF's R&RA directorates to strengthen collaborations that integrate research and education. The demand for these programs exceeds NSF's recent capacity. Support for these highly successful and respected programs will aid in addressing the S&E workforce needs of the Nation to ensure a scientifically literate population and a robust supply of qualified experts across all fields.

Subtotal, Changes   +$19.53

FY 2007 Request, EHR ………………….…….……………………………………….......$816.22

Summary of Major Changes in Directorate-Wide Investments   *(Dollars in Millions)*

FY 2006 Current Plan, EHR…………..………….….……………………………….............…$796.69

Advancing the Frontier   -$6.87

Support for the Research and Evaluation on Education in Science and Engineering (REESE) program, which will be created in FY 2006 through the realignment of the portfolio of the former REC division, will decrease by $6.87 million. Support is reallocated to the Discovery Research K-12 program. REESE will support cutting-edge, innovative, and experimental advances in learning and education across the S&E disciplines as well as research on evaluation and modeling activities that will enable researchers and educators to understand what works in educational innovations and, most importantly, why it works, in what contexts, and for whom. REESE will support activities most likely to lead to long-term improvements in the Nation's S&E educational enterprise.

Broadening Participation in the S&E Enterprise   +$32.48

   EHR will significantly increase funding for programs supporting NSF's efforts in
   Broadening Participation in the S&E Enterprise:
   - Robert Noyce Scholarship program (Noyce) increases by $1.0 million to
     $9.77 million.
   - Advanced Technological Education (ATE) increases by $990,000 to $45.92 million.
   - Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)
     increases by $4.53 million to $29.71 million.
   - Informal Science Education (ISE) increases by $2.94 million to $65.64 million.
   - The Louis Stokes Alliances for Minority Participation (LSAMP) program increases by
     $4.66 million to $39.66 million and support for Alliances for Graduate Education and
     the Professoriate (AGEP) increases by $4.45 million to $18.95 million.
   - The Program for Gender Equity (PGE) increases by $1.28 million to $10.96 million.
   - Research in Disabilities Education (RDE) increases by $660,000 to $5.77 million.
   - The Tribal Colleges and Universities Program (TCUP) increases by $3.15 million to
     $12.42 million.
   - Centers of Research Excellence in Science and Technology (CREST) increases by
     $7.04 million to $24.94 million. Two to four new CREST Centers will be initiated.
   - Experimental Program to Stimulate Competitive Research (EPSCoR) increases by
     $1.28 million to $99.65 million.
   - Science, Technology, Engineering and Mathematics Talent Expansion Program
     (STEP) increases by $500,000 to $26.07 million.

Facilities and Infrastructure, including Cyberinfrastructure   +$0.50

   Support for the National STEM Education Digital Library (NSDL) will increase.

Bolstering NSF's K-12 Education Portfolio

Discovery Research K-12 (DR-K12)   +$10.71

   DR-K12 will be created in FY 2007 through the merger of EHR's three formal K-12
   education programs – Teacher Professional Continuum (TPC), Instructional Materials
   Development (IMD) and Centers for Learning and Teaching (CLT). Although the DR-
   K12 program will maintain the pre-existing focus on students, teachers, and schools, it
   will offer researchers and educators increased flexibility to work either in topical areas or
   across broad new domains to seek answers to the grand challenges facing K-12
   education. DR-K12 will focus on applied research and development, building on the
   cutting-edge, experimental research supported by REESE, and handing off innovations to
   states and districts for large-scale implementation.

Math and Science Partnership Program.   -$17.18

   Support will be continued for existing projects. No new awards will be made.

Other

   - GK-12, GRF and IGERT.   +$7.55
   - The new Excellence Awards in S&E (EASE) program combines the Presidential Awards   +$2.41
     for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM),
     Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST)
     and Distinguished Teaching Scholars (DTS) programs to provide more effective
     administration of these activities and improve intra-agency cooperation.
   - Scholarships for Service / Cybercorps.   +$0.50

- Academies for Young Scientists is a pilot program to be initiated in FY 2006. Since this activity is a demonstration project in FY 2006, no funds are requested in FY 2007.   -$6.94
- Course, Curriculum and Laboratory Improvement.   -$2.63
- Final funding in FY 2006 for Higher Education Centers for Learning and Teaching.   -$1.00

Subtotal, Changes   +$19.53

FY 2007 Request, EHR ………………………………………………………….......$816.22

NSF-WIDE INVESTMENTS

In FY 2007, the EHR Directorate will support research and education efforts related to broad, Foundation-wide investments in a number of areas, including NSF's multidisciplinary priority areas and the Administration's interagency R&D priorities.

EHR NSF-wide Investments

(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Cyberinfrastructure	$20.27	$15.02	$15.52	$0.50	3.3%
International Polar Year	-	-	2.00	2.00	N/A
Mathematical Sciences	2.85	2.20	1.09	-1.11	-50.5%
National Nanotechnology Initiative	3.16	2.90	3.00	0.10	3.4%
Networking and Information Technology R&D	4.06	3.75	3.90	0.15	4.0%

EHR's **cyberinfrastructure** support totals $15.52 million, an increase of $500,000 over the FY 2006 Current Plan, and funds the National STEM Education Digital Library, an online network of learning environments and resources for STEM education at all levels in both formal and informal settings.

EHR will provide $2.0 million in FY 2007 for activities related to the **International Polar Year**. EHR will support IPY's education and outreach goals by engaging the public through projects such as museum exhibits, large format films and television and radio documentaries.   In addition, EHR will work to develop field experiences in polar research for college students as well as K-12 educators and help teachers bring polar research to their classrooms.

FY 2007 support for the **Mathematical Sciences** priority area totals $1.09 million, a decrease of $1.11 million from the FY 2006 Current Plan, as this priority area transitions into the core. It will provide continuing support for mathematical sciences education activities.

FY 2007 **National Nanotechnology Initiative** (NNI) support totals $3.0 million, an increase of $100,000 over the FY 2006 Current Plan. It will provide continuing support for nanoscience education activities.

FY 2007 support for **Networking and Information Technology R&D** (NITRD) totals $3.90 million, an increase of $150,000 over the FY 2006 Current Plan. It will provide continuing support for information technology education activities.

Additional detail may be found in the NSF-wide Investment chapter.

QUALITY

EHR maximizes the quality of the research and education it supports through the use of a competitive, merit-based review process. Project evaluation is required, with projects reporting their progress and impact through annual and final reports to NSF. In addition, external program evaluations are conducted for EHR-managed activities.

To ensure the highest quality in processing and recommending proposals for awards, EHR convenes Committees of Visitors, composed of qualified external evaluators, to review each program every three years. These experts assess the integrity and efficiency of the processes for proposal review and provide a retrospective assessment of the quality of results of NSF's investments.

The Directorate also receives advice from the Education and Human Resources Advisory Committee (EHRAC) on such issues as: the mission, programs, and goals that can best serve the scientific community; how EHR can promote quality graduate and undergraduate education in S&E; and priority investment areas in S&E education research. The EHRAC meets twice a year and members represent a cross section of S&E disciplines; a cross section of institutions including industry; broad geographic representation; and balanced representation of women and underrepresented minorities.

PERFORMANCE

The table below shows the strategic planning and evaluation framework for activities funded through the Education and Human Resources appropriation. This framework was established in the NSF Strategic Plan for FY 2003-2008. The Advisory Committee for GPRA Performance Assessment assesses NSF's strategic outcome goals annually. The investment categories are assessed using the Program Assessment Rating Tool (PART). Additional information on these activities is available in the Performance Information section of this document.

Directorate for Education and Human Resources
By Strategic Outcome Goal and Investment Category
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Ideas					
Fundamental Science and Engineering	$59.96	$48.06	$41.19	-$6.87	-14.3%
Centers Programs	-	-	-	-	N/A
Capability Enhancement	108.68	116.27	124.59	8.32	7.2%
	168.64	164.33	165.78	1.45	0.9%
Tools					
Facilities	-	-	-	-	N/A
Infrastructure and Instrumentation	17.77	15.02	15.52	0.50	3.3%
Polar Tools. Facilities and Logistics	-	-	-	-	N/A
Federally Funded R&D Centers	-	-	-	-	N/A
	17.77	15.02	15.52	0.50	3.3%
People					
Individuals	175.07	170.92	179.97	9.05	5.3%
Institutions	110.94	107.43	105.29	-2.14	-2.0%
Collaborations	363.41	328.99	339.66	10.67	3.2%
	649.42	607.34	624.92	17.58	2.9%
Organizational Excellence	7.72	10.00	10.00	-	-
Total, EHR	**$843.54**	**$796.69**	**$816.22**	**$19.53**	**2.5%**

Totals may not add due to rounding.

**Recent Research Highlights**

NSDL Logo

► **Learning Resources Without Walls: Professional Development Workshops for Katrina-Affected Teachers:** In December 2005, the National Science Digital Library (NSDL), in partnership with the Digital Library for Earth System Education (DLESE) offered free online professional development workshops to K-12 science and math teachers in hurricane-impacted schools, as well as to those teaching hurricane-displaced students. The idea was that online resources, such as those offered by NSDL and DLESE, could help offset the scarcity of textbooks and other basic teaching materials in affected communities. The workshops provided practical ideas for finding and using digital library resources, with a particular emphasis on strategies that are easy to implement in storm-stressed classrooms and in distance learning courses being offered to displaced students. Through the use of web and phone conferencing, Susan Van Gundy and Robert Payo of NSDL and Lynne Davis of DLESE provided an overview of the nature of digital libraries and strategies for implementing these resources in classroom teaching and curriculum development. (DUE)

► **Cyber-War Exercises Add Value to Undergraduate Computer Security Curricula:** Building on an earlier NSF-supported project at the Indiana University of Pennsylvania, educators at the University of Wisconsin, Eau Claire, have developed the Computational Laboratory for Information and Computer Security, or CLICS. Funded by NSF's Course, Curriculum, and Laboratory Improvement program, CLICS is a two day "cyber-war exercise" that gives undergraduate students hands-on
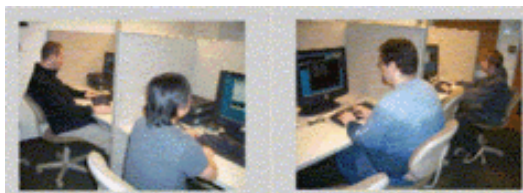
Students engaged in the CLICS cyber war exercise: attack... and... defend. *Credit: Andrew Phillips*

experience with the issues, strategies, and tools involved in computer security and information assurance. The Cyber-war exercises involve students in real-world, team-based efforts to harden their systems, detect intrusions and respond in real time – without threatening the wider campus network. The exercises are not only fun, but turn the theory of computer security into real-world practice. (DUE)
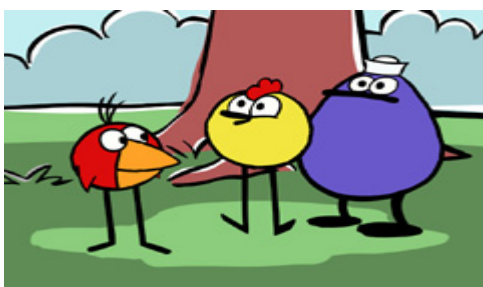
Friends Chirp, Peep, and Quack.
Credit: WGBH

► **"Peep and the Big Wide World" Engages Preschool Children in Science Exploration:** Peep and the Big Wide World (PEEP), a daily, half-hour television series with accompanying web and outreach activities for 3- to 5-year-olds, gives wings to the innovative idea of teaching science to preschoolers.   Airing on TLC and the Discovery Kids Channel, the TV series is tied for the top-rated program for children 2-5 in the weekday morning time block. Less than a year into its broadcast, moreover, PEEP is meeting its goals: the Goodman Research Group has found that children exposed to PEEP act in ways that are significantly more scientifically grounded than those who are not. When presented with materials to manipulate and explore, for example, they are more likely by a margin of 71% to 22% to initiate asking a question to be explored. Children exposed to PEEP are also more likely to use problem-solving strategies (76% versus 34%), and more likely to solve the problems that they initiate (74% versus 31%). The series is also reaching parents, providing them with information on how to extend their children's science learning in everyday situations. And PEEP is impacting the field of informal science education, as well, by giving preschool educators resources and training in how to nurture young children's science learning. PEEP is achieving this impact in part through its community of collaborators. Partners include educational organizations (e.g., 4-H, the National Education Association, Parents as Teachers), libraries (American Library Association), museums (via the Boston Children's Museum), and promotional media outlets.   This network helps promote the series' educational goals across different platforms while maximizing resources, extending impact, and reaching underserved audiences. (DRL)

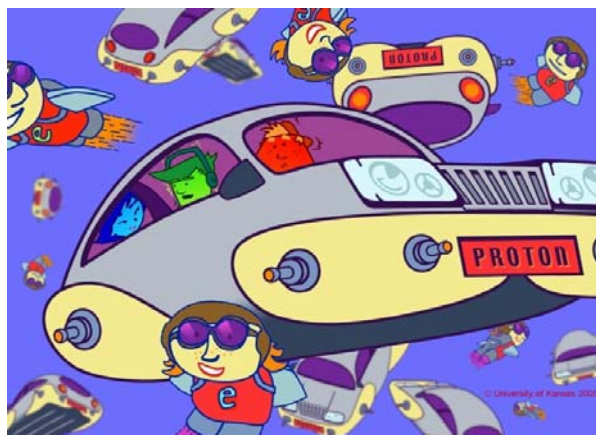► **North Carolina LSAMP Project produces 900 new STEM graduates a year:** The state of North Carolina has experienced an increase in new STEM graduates as a result of the North Carolina LSAMP project. Led by North Carolina A&T State University, the NC-LSAMP is a partnership of eight North Carolina colleges and universities, and has received funding since 1992. The project is charged with increasing the quantity and quality of underrepresented minority students receiving bachelor's degrees in STEM disciplines. In one year, 2003 to 2004, NC-LSAMP reported an increase in students enrolled in STEM majors of 7 percent (5858 to 6259), and graduated 891 students in STEM fields. In addition, the newly instituted "Bridge to the Doctorate" initiative is in high gear supporting over two dozen graduate students in a broad range of science and engineering disciplines. (HRD)

► **IGERT Students Participate in Local, State and International Efforts on Sustainability in Alaska:** In an effort to translate scientific discovery into policy and action at local, state, and international levels, IGERT students at the University of Alaska, Fairbanks, are assessing the sustainability of high-latitude regions, and working to discover how to reduce the vulnerability of these regions to both ecological and social change. Two of the students have participated in an international effort, sponsored by the Swedish Royal Academy of Agriculture and Forestry, to synthesize current knowledge on sustainability; the papers that resulted have been published in an international journal (Ambio) geared to policy makers. Another student contributed to the polar chapter of the UNESCO-sponsored Millennium Assessment, which is investigating the impacts of global change on human well-being. Two

IGERT student La'ona DeWilde is participating in the first comprehensive analysis of human impacts on fire regime resulting from changes in ignition and suppression to provide a basis for modifying fire management strategies. *Credit: Terry Chapin*

more students participated in the synthesis of research on Sustainability of Arctic Communities. Three others played leading roles in developing state resource-management policies that enhance sustainability. (These included a revision of the coastal-zone management plan; development of state legislation to enhance carbon sequestration rather than timber harvest; and an assessment of the success of sustainable management of the Tongass National Forest for a report to the U.S. Congress.) Finally, four students worked with Native village councils or with the Alaska Native Science Commission to develop plans to assess changes in the subsistence resource base for Native Alaskans. (DGE)

The Quarked™ project animation drawing of Ushi (up quark), Danny (down quark), and Harold (up quark) in the proton SUV (Subatomic Universe Vehicle). *Copyrighted and permission granted by KU Center for Research, Inc.*

► **Quarked™: An Interactive Multimedia Education Project:** The Quarked™ project is seeking to create an entertaining multimedia experience about quarks aimed at children ages 7-12, but accessible to all ages including adults. The educational goals of the project are to introduce quarks and the people who work with them into the common language of kids; investigate how young people are introduced to and grasp the scientific world of the unseen and abstract; and to demystify subatomic physics, while changing the perception that science is difficult and inaccessible. Already under development are a half-hour animated TV series, an interactive web site (www.quarked.org), museum programs, and educational outreach activities. The television show is based upon animated high-schoolers who tackle everyday problems through science. The stories address kid-centric issues and present science encountered in the everyday world. The facilitated shows feature hands-on activities and games for children and their families and are designed for use at science museums, schools, and libraries. (EPSCoR)

► **The Drexel University Noyce Scholarship Program (DUNS):** With support from NSF's Robert Noyce Scholarship Program, Drexel University is recruiting science, engineering, and mathematics majors who are committed to teaching mathematics and science in the School District of Philadelphia. Recruitment efforts are focused on the Community College of Philadelphia, the Philadelphia Alliance for Minority Participation, and the Center for Civic Engagement at Drexel University. The first cohort of 15 recipients, 43% of whom are minority students, includes nine undergraduate chemistry majors and six STEM professionals ("career-changers"). The program provides strong teacher preparation addressing content knowledge, pedagogical knowledge, learner knowledge and technology integration. Mentoring and induction activities provide support to the new teachers. To broaden the exposure of students to teaching, the Noyce Seminar Series provides a venue for Noyce Scholars to interact with teacher leaders, teacher scientists, and experts who are leaders in pedagogy, science and mathematics teaching or scientists with a penchant for teaching. The seminar series has addressed topics such as *Promoting Girls' Inclusion in Mathematics and Science*; *Teaching Math and Science in Philadelphia*; and *Physics on Fifth Avenue*. Noyce Scholars report that their experience in the program has contributed to an increased

understanding of the use of technology in the classroom and an increased ability to identify problems and implement action / solutions in teaching situations. (DUE)

Drexel University Noyce Scholarship Program

► **Cyberinfrastructure Creates Middle-School Scientists:** Cyberinfrastructure offers significant promise for changing K-12 classrooms across the nation. An innovative effort that demonstrates its capabilities is being developed by the Center for Embedded Networked Sensing Education (CENSei) at the University of California-Los Angeles. CENSei's web-supported curricular materials allow middle school students to explore scientific data collected from embedded sensors deployed in Southern California ecosystems. CENSei draws on the expertise of education researchers, natural scientists, information scientists, and teachers to overcome the challenges students face in using scientifically rich data. They are investigating how use of an appropriate interface and support for student inquiry can lead to learning in data rich sensor environments. CENSei capitalizes on NSF's investment in the Center for Embedded Network Sensing, a Science and Technology Center. (DRL)

Students at the Center for Embedded Networked Sensing Education (CENSei) at the University of California-Los Angeles.

Teachers are enthusiastic about the FAU Summer Institute.

► **Math and Science Partnership: Teacher Quality and Summer Teacher Institutes:** Improving teacher quality in mathematics and science education, K-12, is a key goal of the Math and Science Partnership (MSP) program. For many Partnerships, the venue of choice for working with teachers is the Summer Institute. Along with an intense focus on subject-matter expertise, the MSP *Institute Partnerships: Teacher Institutes for the 21st Century* emphasize leadership development for teacher participants to become school- and district-based intellectual leaders in mathematics and the sciences. Many of these experienced teachers will acquire a formal credential as a result of their completion of an Institute. Graduates of the Florida Atlantic University Teacher Institute, for example, will receive a master's degree that includes a newly developed strand for middle school mathematics teaching. MSP Summer Institutes respond to the differentiated needs of the teachers they serve. In its work with inservice teachers in central Appalachia, the *Appalachian Mathematics and Science Partnership* (AMSP), a Comprehensive Partnership, reports significant gains with teachers in the project's innovative 2005 summer Algebra Institutes. Pre- and post-test scores for middle and high school algebra teachers document gains of 24% and 18% for reasoning/problem solving and pedagogical content knowledge, respectively, in the southwest Virginia summer institute; 20% and 13% in these same domains in the Tennessee algebra institutes; and 13% and 23% in the Whitesburg, Kentucky, institutes. (DUE)

► **Talking Tablet Teaches Mathematics:** With the goal of helping teachers provide individualized instruction to students with disabilities—and to do so in the same classroom as students without disabilities— NSF-funded researchers and educators have successfully demonstrated a computer-based learning system for mathematics that can accommodate both visually impaired and sighted students. The system uses text enlargement on normal displays for low vision students, a Talking Tactile Tablet for blind students, and normal displays for fully sighted students. In addition, the system develops a model for each student's understanding of mathematical concepts, and then uses

Talking Tactile Tablet

Student using Talking Tactile Tablet.

those models to provide problem-solving advice to students regardless of their visual acuity. The student models have been validated in a pilot test of 50 students, and the system is now being tested with over 300 blind, visually impaired, and fully sighted students. (DRL)

Other Performance Indicators

The table below shows the number of people that participate in EHR funded activities.

Number of People Involved in EHR Activities

	FY 2005 Estimate	FY 2006 Estimate	FY 2007 Estimate
Senior Researchers	5,500	4,800	4,800
Other Professionals	2,200	1,700	1,800
Postdoctorates	290	160	200
Graduate Students	3,400	3,400	3,540
Undergraduate Students	19,000	14,000	15,000
K-12 Students	10,500	8,000	9,000
K-12 Teachers	73,000	59,000	60,000
Total Number of People	113,890	91,060	94,340

INFORMATION ON EHR ORGANIZATIONAL EXCELLENCE FUNDS

Appropriated funds are used both for program support and for program management. The following table provides detail on funds in each of these two categories by program. Throughout this chapter, program level funding information reflects only program support. Funds for program management are shown under the Organizational Excellence strategic outcome goal. Funding totals for EHR divisions include program management costs.

EHR Program and Program Management Funding

(Dollars in Millions)

	FY 2007		
	Total Funding	**Program Funding**	**Program Management Funding**
Experimental Program to Stimulate Competitive Research	**$100.00**	**$99.65**	**$0.35**
Research on Learning in Formal and Informal Settings	**215.00**	**210.90**	**4.10**
Discovery Research K-12	107.00	104.07	2.93
Informal Science Educaion	66.00	65.64	0.36
Research and Evaluation on Education in S&E	42.00	41.19	0.81
Undergraduate Education	**196.80**	**193.86**	**2.94**
Course, Curriculum, and Laboratory Improvement	34.00	33.30	0.70
Advanced Technological Education	46.50	45.92	0.58
Scholarships for Service/Cybercorps	11.00	10.80	0.20
Noyce Scholarships	10.00	9.77	0.23
STEM Talent Expansion Program	26.50	26.07	0.43
National STEM Education Digital Library	16.00	15.52	0.48
Excellence Awards in S&E	6.80	6.78	0.02
Math and Science Partnership	46.00	45.70	0.30
Graduate Education	**160.57**	**159.40**	**1.17**
Graduate Teaching Fellows in K-12 Education	47.00	46.80	0.20
Graduate Research Fellowships	88.57	88.03	0.54
Integrative Graduate Education and Research Traineeships	25.00	24.57	0.43
Human Resource Development	**143.85**	**142.41**	**1.44**
Historically Black Colleges and Universities - Undergraduate Program	30.00	29.71	0.29
Louis Stokes Alliances for Minority Participation	40.00	39.66	0.34
Tribal Colleges and Universities Program	12.85	12.42	0.43
Alliances for Graduate Education and the Professoriate	19.00	18.95	0.05
Program for Gender Equity	11.00	10.96	0.04
Research in Disabilities Education	6.00	5.77	0.23
Centers of Research Excellence in Science and Technology	25.00	24.94	0.06
Total, Education and Human Resources	**$816.22**	**$806.22**	**$10.00**

INFORMATION ON EHR REALIGNMENT

FY 2006 Realignment: In FY 2006 EHR plans to merge the Elementary, Secondary and Informal Education (ESIE) and Research, Evaluation and Communication (REC) divisions into the Division of Research on Learning in Formal and Informal Settings (DRL). The REC programs will join together to become the Research and Evaluation on Education in Science and Engineering (REESE) program, building on the existing REC portfolio of the Research on Learning and Education (ROLE) and the Evaluative Research and Evaluation Capacity Building (EREC) programs. Funding for the Interagency Education Research Initiative (IERI) is also incorporated into REESE. In FY 2006, NSF also proposes to move the Math and Science Partnership (MSP) program to the Division of Undergraduate Education (DUE). This proposal does not change any programmatic arrangements of the MSP but simply moves all programs and associated staff from the EHR Office of the Assistant Director to DUE. The MSP budget line item and its associated funding will remain discrete within the DUE budget.

FY 2007 Realignment: In FY 2007 EHR will maintain the new division structure created in FY 2006 and in addition will create the Discovery Research K-12 (DR-K12) program, which is the combination of three programs: Instructional Materials Development (IMD), Teacher Professional Continuum (TPC), and Centers for Learning and Teaching (CLT). While this new program will maintain the strengths of these three existing programs, it will be capable of addressing a series of well-defined "grand challenges" in K-12 education.

Also included in the DRL division are the existing Informal Science Education (ISE) program and the new Research and Evaluation on Education in Science and Engineering (REESE) program.

The NSF Director's Distinguished Teaching Scholars (DTS) program returns in FY 2007 as a track within a new awards program in DUE: Excellence Awards in Science and Engineering (EASE). The EASE program will also contain tracks for the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST, formerly in DRL) and the Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM, formerly in HRD).

The following tables provide additional funding details related to the realignment.

Education and Human Resources Funding in FY 2005 Structure
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
EPSCoR	$93.35	$98.72	$100.00	$1.28	1.3%
DUE	154.24	144.14	145.60	1.46	1.0%
MSP	79.06	63.18	46.00	-17.18	-27.2%
DGE	154.75	153.02	160.57	7.55	4.9%
ESIE	182.49	170.29	177.60	7.31	4.3%
REC	60.01	48.87	42.00	-6.87	-14.1%
HRD	119.64	118.47	144.45	25.98	21.9%
Total, EHR	$843.54	$796.69	$816.22	$19.53	2.5%

Education and Human Resources
FY 2006 Current Plan in FY 2007 Structure
(Dollars in Millions)

FY 2007 Structure	FY 2006 Structure					Total, FY 2007 Structure
	EPSCoR	DUE	DGE	DRL	HRD	
EPSCoR	98.72					98.72
DUE		207.32		4.00	0.39	211.71
DGE			153.02			153.02
DRL				215.16		215.16
HRD					118.08	118.08
Total, FY 2006 Structure	$98.72	$207.32	$153.02	$219.16	$118.47	$796.69

EXPERIMENTAL PROGRAM TO STIMULATE COMPETITIVE RESEARCH

$100,000,000

The FY 2007 Budget Request for the Experimental Program to Stimulate Competitive Research (EPSCoR) is $100.0 million, an increase of $1.28 million, or 1.3 percent, over the FY 2006 Current Plan of $98.72 million.

Experimental Program to Stimulate Competitive Research Funding

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
EPSCoR Funding	$93.35	$98.72	$100.00	$1.28	1.3%

About EPSCoR:

EPSCoR has the mission of assisting the Foundation in its statutory function "to strengthen research and education throughout the United States and to avoid undue concentration of such research and education." Hence, the primary goals of the EPSCoR program are 1) to stimulate sustainable improvements in the R&D capacity and competitiveness within the major research universities of the designated EPSCoR jurisdictions, and 2) to advance scientific and engineering capabilities in these jurisdictions for discovery, innovation and overall knowledge-based prosperity. NSF's EPSCoR program currently operates in 25 states plus the Commonwealth of Puerto Rico and the Territory of the Virgin Islands. The States are: AL, AK, AR, DE, HI, ID, KS, KY, LA, ME, MS, MT, NE, NV, NH, NM, ND, OK, RI, SC, SD, TN, VT, WV, and WY.

EPSCoR's programmatic objectives are to:
- Catalyze key research themes and related activities within and between EPSCoR jurisdictions that empower knowledge generation, dissemination and application;
- Activate effective jurisdictional and regional collaborations among academic, government, and private sector stakeholders that advance scientific research, promote innovation and provide multiple societal benefits; and
- Broaden participation in science and engineering by institutions, organizations, and people within and between EPSCoR jurisdictions.

These preceding goals and objectives are strongly aligned with the major actions that have been recommended recently by the National Academies' Committee on Prospering in the Global Economy of the 21st Century. That is, the programmatic objectives are designed to stimulate further scientific and engineering prowess in the twenty-seven EPSCoR jurisdictions. EPSCoR's perspective is that these jurisdictions have significant unused potential for contributing to the Nation's technological-based discovery, innovation and related competitive productivity. This is based on the statistical facts that the twenty-seven EPSCoR jurisdictions contain over 20 percent of the U.S. population and ~25 percent of our secondary institutions of higher education, but are only engaged in ~10 percent of the Nation's funded R&D enterprise.

In general, 55 percent of the funds for the EPSCoR investment portfolio are available for new awards and activities. The remaining 45 percent will be used to fund awards made in previous years. Within the total budget for EPSCoR of $100.0 million, $350,000 supports program management activities. Program funding is $99.65 million.

EPSCoR Priorities for FY 2007:

To pursue its goals/objectives the EPSCoR Office during FY 2007 will employ a portfolio of four complementary investment strategies:

Research Infrastructure Improvement (RII) Grants – Research Infrastructure Improvement Grants are 36-48 month awards of up to $9.0 million total to support infrastructure improvements in research areas selected by the jurisdiction's EPSCoR governing committee as having the best potential to improve future R&D competitiveness. Successful awards will build the core strength and capacity needed to develop collaborative methods for the solution of important problems having both regional and national importance.

Strength-Based Research Collaborative (SBRC) Grants – SBRC awards are 48 month awards of up to a total of $12.0 million to support collaborative groups of scientists and/or engineers focusing on targeted research topics identified by the jurisdictions' EPSCoR governing committees as having regional significance and national importance. SBRC investigator teams may be composed of scientists and/or engineers from either the same or multiple jurisdictions. Successful awards will build and utilize the capacity already developed in the jurisdiction(s) and will lead to innovation and a new level of amplified competitiveness for the collaboration and the whole region.

Co-Funding – Joint support may be provided for meritorious proposals submitted to the Foundation. Co-funding is an internal NSF funding mechanism that does not involve any action on the part of the proposer. EPSCoR co-funding is available to programs in all directorates and offices that fund awards.

Outreach – Financial support is provided for outreach visits by NSF staff to inform the EPSCoR research community about NSF priorities, programs, and policies and to more fully acquaint NSF staff with the R&D resources and potential residing within EPSCoR jurisdictions.

Changes from FY 2006:

Recent goals of EPSCoR have been to a) increase research capacity in participating jurisdictions by competitive infrastructure improvement (RII and RII-like) programs and b) to increase numbers of awards and participants in the EPSCoR jurisdictions by a combination of outreach and proposal co-funding. In general, this capacity-building approach has been successful. Therefore, the EPSCoR program is now poised to enter it next strategic phase entitled "Trajectory toward Sustainable Science-based Success" (i.e., EPSCoR TS^3). The EPSCoR TS^3 concept is based on the implementation of highly complementary investment programs that leverage both infrastructure *capacity* and human *capability* into sustainable research and innovation *competitiveness* for the participating jurisdictions. The RII program expanded in FY 2006 to offer synergistic SBRCs opportunity to take advantage of improved research *capacity* derived from RII projects. The SBRC opportunity will provide jurisdictions with the ability to enhance research *capability* and hence, build greater *competitiveness*.

During FY 2007 the EPSCoR Office expects to provide $61.0 million to fund a combination of new and continuing RII awards. In addition, the Office plans to fund two SBRC awards for a total of $6.0 million. Hence, the RII/SBRC program will require a total of $67.0 million, which represents an increase of $2.0 million over the FY 2006 Current Plan. The increase of $1.28 million in the FY 2007 budget will be allocated to RII/SBRC. Co-funding of proposals submitted from EPSCoR jurisdictions to other research and educational programs at NSF will be funded at $29.0 million. EPSCoR co-funding of SBIR/STTR proposals will be supported at $2.7 million. Approximately $1.3 million will be used to support Outreach activities, workshops, conferences, and various office operational functions. Support for co-funding, new SBIR/STTR projects, and outreach and other activities is similar to the level in the FY 2006 Current Plan.

RESEARCH ON LEARNING IN FORMAL AND INFORMAL SETTINGS $215,000,000

The FY 2007 Budget Request for the Division of Research on Learning in Formal and Informal Settings (DRL) is $215.0 million, a decrease of $160,000, or 0.1 percent, from the FY 2006 Current Plan of $215.16 million.

Research on Learning in Formal and Informal Settings Funding
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Research on Learning in Formal and Informal Settings	$238.76	$215.16	$215.00	-$0.16	-0.1%
Major Components:					
Discovery Research K-12	113.69	93.36	104.07	10.71	11.5%
Informal Science Education (ISE)	62.75	62.70	65.64	2.94	4.7%
Research and Evaluation on Education in S&E	59.36	48.06	41.19	-6.87	-14.3%
NSF Academies for Young Scientists	-	6.94	-	-6.94	-100.0%
Urban Systemic Program	0.15	-	-	-	N/A

About DRL:

In FY 2006, two EHR divisions, Elementary, Secondary, and Informal Education (ESIE) and Research, Evaluation and Communication (REC), will be combined into the Division of Research on Learning in Formal and Informal Settings. This realignment consolidates the science, technology, engineering, and mathematics (STEM) education research, development, and evaluation programs into a single coherent entity and enhances the management of these activities while building on existing strengths. DRL will focus on research on learning at all levels and in both formal and informal settings with a strong, but not exclusive, emphasis on K-12. It will support both basic and applied research on STEM learning at all levels.

DRL programs will directly assist NSF to address several key issues: the need to recruit and retain highly qualified teachers with strong content and pedagogical knowledge in the STEM disciplines; the need to develop, test, and implement K-12 curriculum materials modeled on world-class standards; and the need to enlarge the pipeline of students interested in and educated for careers in STEM fields as well as to educate a more scientifically literate citizenry.

In FY 2007 the Instructional Materials Development (IMD), Teacher Professional Continuum (TPC), and Centers for Learning and Teaching (CLT) programs will be combined to form the Discovery Research K-12 (DR-K12) program. In FY 2006 the Research on Learning and Education (ROLE), Evaluative Research and Evaluation Capacity (EREC), and Interagency Education Research Initiative (IERI) programs will be combined into the Research and Evaluation on Education in Science and Engineering (REESE) program.

In general, 37 percent of the DRL portfolio is available for new awards and activities. The remaining 63 percent funds awards made in previous years. Within the total budget for DRL of $215.0 million, $4.10 million supports program management activities. Program funding is $210.90 million.

DRL Priorities for FY 2007:

DRL's major priorities include the DR-K12 and REESE programs as well as continued emphasis on informal education and evaluation activities.

Research and Evaluation on Education in Science and Engineering (REESE) supports basic and applied research and evaluation that enhances STEM learning and teaching. It supports two types of research – synthesis studies and empirical proposals. Synthesis studies identify areas where the knowledge base in either evaluation or research is sufficiently robust to support strong scientific claims, identify areas important to education research and practice, and propose rigorous methods for synthesizing findings and drawing conclusions. Empirical proposals identify areas that have the potential for advancing discovery and innovation at the frontiers of STEM learning.

Discovery Research K-12 (DR-K12) will build on the programmatic strengths of three existing programs – IMD, TPC, and CLT. Discovery research comprises research, development, and evaluation activities through which knowledge is generated and applied with some immediacy to improve STEM learning and teaching. Discovery Research lies between the long-term, higher-risk research generated by REESE and the large-scale implementation of tested innovations. The merger of the three programs will increase flexibility and agility, focus the resources needed to address acknowledged Grand Challenges in K-12 STEM education, and encourage innovative thinking from the field while continuing to build on the solid foundations of DRL's portfolio.

Informal Science Education (ISE) will continue to emphasize projects that advance informal STEM education nationally and build on lessons learned from education research. Priority is placed on projects that strengthen infrastructure; engage underserved audiences, including young children and older adults; incorporate inquiry in after-school programs; involve the public in the scientific process; and apply new technologies to informal learning.

Evaluation is a strong focus of EHR/DRL. Emphases include the planning and oversight for third-party evaluations of EHR programs and thematic STEM evaluation studies; providing evaluation technical assistance throughout EHR and NSF as well as providing training opportunities and tools to build capacity in the field. EHR's evaluation team coordinates data collection efforts for performance monitoring and responding to GPRA and other federal reporting requirements; disseminates broader information and evaluation findings to various stakeholders; and addresses directorate-wide knowledge management concerns for improved productivity.

Changes from FY 2006:

- The FY 2007 request for **DR-K12** is $104.07 million, an increase of $10.71 million over the FY 2006 Current Plan of $93.36 million. This will allow the program to expand its investments in research, development, and evaluation activities in FY 2007.

- FY 2007 funding for **ISE** is $65.64 million, an increase of $2.94 million over the FY 2006 Current Plan of $62.70 million. This will result in 3-5 additional awards in FY 2007.

- The FY 2007 request for **REESE** is $41.19 million, a decrease of $6.87 million over the FY 2006 Current Plan of $48.06 million. IERI funding ($5.0 million) ended in FY 2006. The remaining decrease of $1.87 million will result in fewer education research and evaluation research efforts within REESE in FY 2007.

- The FY 2007 request for Academies for Young Scientists is zero, a decrease of $6.94 million from the FY 2006 Current Plan. This activity is planned as a demonstration project in FY 2006; no funds are requested in FY 2007 to allow for evaluation of FY 2006 activities. As directed by Congress, EHR will initiate a K-8 pilot program using funds in the FY 2006 EHR appropriation (approximately $7.0 million) and funds from H-1B Non-immigrant Petitioner fees (approximately $7.0 million). The initiative will call for proposals to develop stimulating, intensive STEM learning experiences that engage K-8 students; develop sustainable, district-based partnership demonstration projects; and promote strategies that further develop skills in K-8 STEM teachers.

- In FY 2007 the Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST) program will move to the Division of Undergraduate Education as part of the new Excellence Awards in Science and Engineering (EASE) program.

UNDERGRADUATE EDUCATION $196,800,000

The FY 2007 Budget Request for the Division of Undergraduate Education (DUE) is $196.80 million, a decrease of $14.91 million, or 7.0 percent, from the FY 2006 Current Plan of $211.71 million.

Undergraduate Education Funding

(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Curriculum, Laboratory and Instructional Development	$94.48	$88.13	$86.50	-$1.63	-1.8%
Workforce Development	63.98	60.40	64.30	3.90	6.5%
Math and Science Partnership	79.06	63.18	46.00	-17.18	-27.2%
Total, DUE	**$237.52**	**$211.71**	**$196.80**	**-$14.91**	**-7.0%**
Selected Programs:					
Advanced Technological Education	44.48	44.93	45.92	0.99	2.2%
Robert Noyce Scholarship Program	7.57	8.77	9.77	1.00	11.4%
Scholarship for Service	13.66	10.30	10.80	0.50	4.9%
STEM Talent Expansion Program	24.53	25.57	26.07	0.50	2.0%

Totals may not add due to rounding.

About DUE:

DUE is the NSF focal point for excellence in undergraduate STEM education. DUE programs emphasize innovative development and quality improvement in (a) learning, teaching, curricula, laboratories, and (b) the workforce for our 21st century. DUE leads and leverages support for projects that foster inquiry-based learning for a broad spectrum of undergraduate students. This includes those majoring in STEM disciplines, prospective K-12 teachers, technicians for industry, and citizens generally educated for the increasingly technological global society. The emphasis is on 2- and 4-year colleges and universities. DUE improves STEM learning through research into effective methods in educational pedagogy for STEM disciplines, development of faculty, support for new instructional materials, and the reform of courses, laboratories, and curricula. The result is the increase in quality and quantity of the science and engineering workforce.

In general, 72 percent of the DUE portfolio is available for new awards and activities; the remaining 28 percent funds awards made previously. Each year DUE receives over 2,300 proposals and expects to fund approximately 230 new awards in FY 2007 – about 10 percent of proposals received. Within the total budget for DUE of $196.80 million, $2.94 million supports program management activities. Program funding is $193.86 million.

DUE Priorities for FY 2007:

The Curriculum, Laboratory, and Instructional Development Programs are transforming many areas in undergraduate education. DUE is responding to the challenge of reduced funding by transforming its core program of CCLI based on a cyclic model of innovation that includes knowledge production and improvement of practice.

- The **Course, Curriculum, and Laboratory Improvement** (CCLI) program strengthens the Nation's high-quality undergraduate STEM education by supporting research and innovation in undergraduate STEM teaching and learning, new learning materials, faculty expertise, assessment, and evaluation. It supports the innovative educators who build the STEM workforce.

- The **Robert Noyce Scholarship Program** encourages talented STEM undergraduate students and postgraduate professionals to become K-12 mathematics and science teachers. It offers scholarships to juniors and seniors majoring in mathematics, science or engineering, and stipends for science, mathematics, or engineering professionals in the workforce seeking to become teachers. Projects help recipients obtain certification and become math and science teachers in high-need K-12 schools.

- The **STEM Talent Expansion Program** (STEP) supports colleges and universities to increase the number of U.S. citizens and permanent residents receiving associate or baccalaureate degrees in established or emerging STEM fields. It also supports educational research on associate or baccalaureate degree attainment in STEM.

- The **National STEM Education Digital Library** (NSDL) is an online network of learning environments and resources for STEM education at all levels in both formal and informal settings. The national digital library program supports projects that provide stewardship for the content and services needed by major communities of learners or that develop services to support users, collection providers, and integration efforts, and enhance the impact, efficiency, and value of the library.

- The **Federal Cyber Service: Scholarship for Service** (SfS) program builds a cadre of professionals in the federal sector with the skills required to protect the Nation's critical information infrastructure. Scholarships provide full tuition, fees, and stipends in exchange for service in federal agencies after graduation. Capacity building grants improve the quality of academic programs and increase the number of information assurance and computer security professionals.

- **Advanced Technological Education** (ATE) emphasizes two-year colleges and supports improvement in technician education in the science- and engineering-related fields that drive the Nation's economy. The ATE program supports the design and implementation of new curricula, courses, laboratories, educational materials, opportunities for faculty and student development, and collaboration among educational institutions and partners from business, industry, and government. The program also supports articulation between two-year and four-year programs for K-12 prospective teachers in technological education and applied research relating to technician education.

- The **Math and Science Partnership (MSP)** program at NSF is a research and development effort for building capacity and integrating the work of higher education, especially its STEM disciplinary faculty, with that of K-12 to strengthen and reform science and mathematics education. MSP seeks to improve student outcomes in mathematics and science for all students, at all K-12 levels. MSP continues support for its existing portfolio of *Comprehensive Partnerships*, *Targeted Partnerships*, *Teacher Institutes for the 21st Century*, and *Research, Evaluation and Technical Assistance* (RETA) projects, including the new *Institutes* to be awarded with funds appropriated in FY 2006. The *Teacher Institutes for the 21st Century* reflect the enthusiasm and disciplinary spirit of the original NSF Institutes, while responding to 21st century needs for accomplished teachers with expertise in the intellectual substance of school mathematics and the sciences and in the special knowledge needed for their teaching. Graduates of the Institutes will be the mathematics/science specialists in grades K-5 and the curricular leaders of mathematics and the sciences in the secondary grades. In addition to the *Teacher Institutes for the 21st Century*, which stress intensive professional and leadership development for each teacher participant over multiple years, a number of the large *Comprehensive*

and Targeted Partnerships in the MSP portfolio include Summer Institutes designed to provide teacher enhancement of lesser intensity, thus serving the differentiated needs of teachers for improved subject-matter knowledge and pedagogical expertise.

- The Excellence Awards in Science & Engineering (EASE) will combine three programs designed to recognize excellence. The Distinguished Teaching Scholars (DTS) program will return in FY 2007. It recognizes individuals who contribute significantly to integrating their discipline scholarship and student education. The Presidential Awards for Excellence in Mathematics and Science Teaching (PAEMST), formerly in DRL, reward career excellence for elementary and secondary grade level teachers. The Presidential Awards for Excellence in Science, Mathematics, and Engineering Mentoring (PAESMEM), formerly in HRD, identify outstanding contributions that enhance participation of underrepresented groups in STEM.

Changes from FY 2006:

Curriculum, Laboratory, and Instructional Development Programs

- The FY 2007 request for **CCLI** is $33.30 million, a decrease of $2.63 million from the FY 2006 Current Plan of $35.93 million. Fewer new awards will be supported in FY 2007 as the program introduces phases that help prioritize efforts in this area.

- FY 2007 funding for the **Noyce Scholarship** program is $9.77 million, an increase of $1.0 million over the FY 2006 Current Plan of $8.77 million. This FY 2007 increase will fund two additional awards that support up to an additional 80 K-12 science and mathematics teachers.

- The FY 2007 request for **STEP** is $26.07 million, an increase of $500,000 over the FY 2006 Current Plan. This will permit one or two added awards over the approximately 20 expected in FY 2006.

- The FY 2007 request for **NSDL** is $15.52 million. This is an increase of $500,000 over the FY 2006 Current Plan of $15.02 million and will allow projects to expand the number of users in NSDL.

Workforce Development Programs

- FY 2007 funding for **SfS** is increased by $500,000 over the FY 2006 Current Plan to $10.80 million, which will support an approximate 10 percent increase in the number of active students.

- In FY 2007, funding for **ATE** is increased to $45.92 million from $44.93 million in the FY 2006 Current Plan. Two new additional projects or one additional center will be funded with this increase.

- Funding for the **Higher Education Centers for Learning and Teaching** ended with the $1.0 million in FY 2006 as the final continuing grant increment for this cross-directorate program.

- **EASE** will be funded at $6.78 million. This includes: the **DTS** program at $1.60 million, the **PAEMST** program at $4.58 million, and the **PAESMEM** program at $600,000.

Math and Science Partnership

- FY 2007 funding for **MSP** is decreased to $45.70 million from $62.88 million in FY 2006. This will provide support for (a) existing awards and (b) data collection, evaluation, knowledge management and dissemination.

GRADUATE EDUCATION $160,570,000

The FY 2007 Budget Request for the Division of Graduate Education (DGE) is $160.57 million, an increase of $7.55 million, or 4.9 percent, over the FY 2006 Current Plan of $153.02 million.

Graduate Education Funding
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Change over FY 2006 Percent
Graduate Education	$154.75	$153.02	$160.57	$7.55	4.9%
Major Components:					
Integrative Graduate Education and Research Traineeships (IGERT)	24.31	23.43	24.57	1.14	4.9%
Graduate Research Fellowships (GRF)	87.87	85.37	88.03	2.66	3.1%
Graduate Teaching Fellowships in K-12 Education (GK-12)	41.66	43.05	46.80	3.75	8.7%

About DGE:

DGE investments support graduate students and innovative graduate programs to prepare tomorrow's leaders in science and engineering. DGE support for science, technology, engineering, and mathematics (STEM) graduate education supports the creation of a diverse STEM workforce to meet the needs of the Nation in the 21st century. DGE accomplishes this by providing fellowships and traineeships, by supporting innovations in STEM graduate education to prepare students for the challenges of the new century, and by building stronger links between higher education and K-12 education. These efforts help strengthen U.S. education at all levels and help ensure continued U.S. economic and research preeminence.

DGE meets its objectives through three graduate education programs: the Integrative Graduate Education and Research Traineeship Program (IGERT), the Graduate Research Fellowship Program (GRF), and the Graduate Teaching Fellows in K-12 Education program (GK-12). Approximately 4,665 graduate fellowships and traineeships will be supported NSF-wide in FY 2007.

In general, 47 percent of the DGE portfolio is available for new awards and activities. The remaining 53 percent funds awards made in previous years. Within the total budget for DGE of $160.57 million, $1.17 million supports program management activities. Program funding is $159.40 million.

DGE Priorities for FY 2007:

- The **Integrative Graduate Education and Research Traineeship** program is an NSF-wide program administered by DGE. IGERT prepares U.S. doctoral students to lead the Nation in advancing knowledge in emerging areas of research and to pursue successful careers in academia, industry or the public sector. IGERT (institutional) awardees prepare doctoral students by integrating research and education in innovative ways that are tailored to the unique requirements of newly emerging interdisciplinary fields and new career options. IGERT campuses train students to be leading scientists and engineers in the 21st century, provide several trainees with international experiences,

and focus on broadening participation. Approximately 1,385 IGERT trainees will be supported across NSF in FY 2007.

- The **Graduate Research Fellowship** (GRF) Program strategically invests in intellectual capital, providing support to individuals who are pursuing graduate education. It prepares the most promising science, mathematics, and engineering students in the U.S. for a broad range of disciplinary and cross-disciplinary careers. It offers three years of financial support, which may be used by students over a five-year period, providing a flexible operational framework. In FY 2007, priorities include broadening participation in the applicant and awardee pools.

  Since 1952, over 41,000 U.S. students have received GRFs. In FY 2007 approximately 2,280 fellows will be supported, primarily with DGE funds. The Directorates for Engineering and Computer and Information Science and Engineering also provide support for the GRF program. Although at early stages of their careers, Fellows begin to build distinguished records of accomplishment.

- The **Graduate Teaching Fellows in K-12 Education** program (GK-12) supports fellowships and associated training that enable graduate students in NSF-supported STEM disciplines to acquire additional skills that will broadly prepare them for professional and scientific careers. Through interactions with teachers in K-12 schools, graduate students improve communication and teaching skills while enriching STEM instruction in these schools. Approximately 1,000 GK-12 fellows will be supported NSF-wide in FY 2007.

Changes from FY 2006:

Approximately 1,050 new awards will be made by DGE in FY 2006. IGERT and GK-12 awards are made to institutions and GRF awards are made to individuals. Increased funding in the FY 2007 request of $7.55 million that will be directed towards the following:

- **IGERT.** Each year IGERT receives more excellent proposals than can be funded. In the current FY 2006 competition, the IGERT program received 82 full proposals and expects to make approximately 24 awards. The FY 2007 request for IGERT within EHR is $24.57 million, an increase of $1.14 million over the FY 2006 Current Plan. This increase, along with R&RA funding, will support 25 additional U.S. doctoral students.

- **GRF.** In FY 2006, DGE received over 8,100 applications, and was able to award approximately 900 fellowships. The EHR FY 2007 request for GRF is $88.03 million, an increase of $2.66 million over the FY 2006 Current Plan. This increase, along with R&RA support from CISE and ENG, will provide support for an additional 65 graduate students.

- **GK-12.** Each year GK-12 receives more excellent proposals than can be funded. In the FY 2006 competition, the GK-12 program received 140 proposals, and will make approximately 27 awards. The EHR FY 2007 request for GK-12 is $46.80 million, an increase of $3.75 million over the FY 2006 Current Plan. This increase, along with R&RA support, will allow NSF to fund 50 additional doctoral students.

HUMAN RESOURCE DEVELOPMENT $143,850,000

The FY 2007 Budget Request for the Division of Human Resource Development (HRD) is $143.85 million, an increase of $25.77 million, or 21.8 percent, over the FY 2006 Current Plan of $118.08 million.

Human Resource Development Funding
(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Request	Change over FY 2006 Amount	Percent
Undergraduate/Graduate Student Support	$70.83	$70.51	$82.85	$12.34	17.5%
Research and Education Infrastructure	33.19	32.51	44.00	11.49	35.3%
Opportunies for Women and Persons with Disabilities	15.14	15.06	17.00	1.94	12.9%
Total, HRD	$119.16	$118.08	$143.85	$25.77	21.8%

About HRD:

HRD supports programs and activities that enhance the quantity, quality and diversity of individuals engaged in U.S. science, technology, engineering, and mathematics (STEM). HRD plays a central role in increasing opportunities in STEM education for individuals from historically underserved populations – particularly minorities, women and persons with disabilities – as well as the educators, researchers, and institutions dedicated to serving these populations.

In general, 39 percent of the HRD portfolio is available for new awards and activities. The remaining 61 percent funds awards made in previous years. Within the total budget for HRD of $143.85 million, $1.44 million supports program management activities. Program funding is $142.41 million.

HRD Priorities for FY 2007:

The FY 2007 Request places special emphasis on programs with a proven track record of broadening participation in the science and engineering workforce. Five highly successful programs are focal points for linking activities in EHR with NSF's R&RA directorates to strengthen collaborations that integrate research and education:

- Louis Stokes Alliances for Minority Participation (LSAMP),
- Alliances for Graduate Education and the Professoriate (AGEP),
- Centers of Research Excellence in Science and Technology (CREST),
- Tribal Colleges and Universities Program (TCUP), and
- Historically Black Colleges and Universities Undergraduate Program (HBCU-UP).

Changes from FY 2006:

In FY 2007 the Presidential Awards for Excellence in Science, Mathematics and Engineering Mentoring program will move to the Division of Undergraduate Education as part of the Excellence Awards in Science and Engineering program.

Undergraduate/Graduate Student Support
- **Louis Stokes Alliances for Minority Participation** (LSAMP) strengthen and encourage STEM

baccalaureate degree production of students from underrepresented populations by utilizing the knowledge, resources, and capabilities of a broad range of organizations. LSAMP will expand the number of alliances to enhance the geographical balance of its portfolio. The Bridge to the Doctorate (BD) initiative supports the initial two years of graduate study for selected LSAMP baccalaureate degree recipients. Twenty BD supplements are anticipated in FY 2007. LSAMP funding for FY 2007 is $39.66 million, an increase of $4.66 million over the FY 2006 Current Plan.

- **Historically Black Colleges and Universities-Undergraduate Program** (HBCU-UP) supports awards that enhance the quality of undergraduate STEM programs through curricular reform and enhancement, faculty development, research experiences for undergraduates, upgrade of scientific instrumentation, and improvement of research infrastructure. In FY 2007 HBCU-UP will also support targeted infusion projects to enhance innovative STEM programs and activities at HBCUs. HBCU-UP funding for FY 2007 is $29.71 million, a $4.53 million increase over the FY 2006 Current Plan.

- **Tribal Colleges and Universities Program** (TCUP) promotes the improvement of STEM instructional and community outreach programs, with an emphasis on the leveraged use of information technologies at Tribal Colleges and Universities, Alaska Native-serving institutions and Native Hawaiian-serving institutions. In FY 2007, TCUP will also support teacher education programs, as well as targeted projects to improve STEM programs at TCUs. TCUP funding for FY 2007 is $12.42 million, an increase of $3.15 million over the FY 2006 Current Plan.

Research and Education Infrastructure

- **Alliances for Graduate Education and the Professoriate** (AGEP) implement innovative models for increasing STEM Ph.D. attainment among students from underrepresented minority populations and encouraging those students to enter the professoriate. In FY 2007 AGEP will facilitate bridging of LSAMP BD fellows into AGEP, enhance recruitment of new enrollees, and enhance retention/advancement of AGEP participants. The projected impact is to increase by 30 percent annual new enrollment into AGEP institutions and annual minority Ph.D. production in AGEP alliances. AGEP institutions accounted for approximately 45 percent of the total minority Ph.D.s awarded in NSF-supported fields in 2004. AGEP funding for FY 2007 is $18.95 million, an increase of $4.45 million over the FY 2006 Current Plan.

- **Centers of Research Excellence in Science and Technology** (CREST) serve as hubs for conducting competitive research at minority institutions, including those that produce well-trained doctoral students in STEM. The HBCU Research University Science and Technology (THRUST) program (commonly known as RISE) strengthens the research capacity of doctoral degree granting Historically Black Colleges and Universities in STEM disciplines by investing in collaborative research, training, equipment and doctoral student support. CREST funding for FY 2007 is $24.94 million, an increase of $7.04 million over the FY 2006 Current Plan. This increase will be used to support 2 additional CREST centers and several THRUST sites.

Opportunities for Women and Persons with Disabilities

- The **Program for Gender Equity** (PGE) supports research, dissemination and adaptation projects that lead to change in education policy and practice with the aim of broadening female participation in STEM. PGE funding for FY 2007 is $10.96 million, a $1.28 million increase above the FY 2006 Current Plan. This increase will support large-scale implementation of proven best practices.

- The **Research in Disabilities Education** (RDE) program supports efforts to increase the participation and achievement of individuals with disabilities in STEM education and careers. RDE funding for FY 2007 is $5.77 million, an increase of $660,000 over the FY 2006 Current Plan, enabling support for an additional alliance.

H-1B NONIMMIGRANT PETITIONER FEES $100,000,000

The FY 2007 H-1B Nonimmigrant Petitioner Fees are projected to be $100.0 million, equivalent to the FY 2006 projection.

H-1B Nonimmigrant Petitioner Fees Funding

(Dollars in Millions)

	FY 2005 Actual	FY 2006 Current Plan	FY 2007 Estimate	Change over FY 2006 Amount	Percent
H-1B Nonimmigrant Petitioner Fees Funding	$25.95	$100.00	$100.00	-	-

Beginning in FY 1999, Title IV of the American Competitiveness and Workforce Improvement Act of 1998 (P.L. 105-277) established an H-1B Nonimmigrant Petitioner Account in the general fund of the U.S. Treasury for fees collected for each petition for alien nonimmigrant status. That law required that a prescribed percentage of funds in the account be made available to NSF for the following activities:

- Computer Science, Engineering, and Mathematics Scholarships (CSEMS). The program supported grants for scholarships to academically-talented, financially needy students pursuing associate, baccalaureate, or graduate degrees in computer science, computer technology, engineering, engineering technology, or mathematics. Grantee institutions awarded scholarships of up to $2,500 per year for two years to eligible students.

- Grants for Mathematics, Engineering, or Science Enrichment Courses. These funds provided opportunities to students for enrollment in year-round academic enrichment courses in mathematics, engineering, or science.

- Systemic Reform Activities. These funds supplemented the rural systemic reform efforts administered under the Division of Educational System Reform (ESR).

In FY 2001, Public Law 106-311 increased the funds available by increasing the petitioner fees. Also, the American Competitiveness in the 21st Century Act (P.L. 106-313) amended P.L. 105-277 and changed the way petitioner fees were to be expended.

- The CSEMS activity continued under P.L. 106-313 with a prescribed percentage of H-1B receipts. The maximum scholarship duration was four years and the annual stipend was $3,125. Funds for this scholarship program totaled 59.5 percent of the total H-1B funding for NSF.

- Private-Public Partnerships in K-12. P.L. 106-313 directed the remaining 40.5 percent of receipts toward K-12 activities involving private-public partnerships in a range of areas such as materials development, student externships, and mathematics and science teacher professional development.

- Information Technology Experiences for Students and Teachers (ITEST) developed as a partnership activity in K-12 to increase opportunities for students and teachers to learn about, experience, and use information technologies within the context of STEM, including Information Technology (IT) courses.

In FY 2005, Public Law 108-447 reauthorized H-1B funding. NSF was provided with 40 percent of the total H-1B receipts collected. Thirty percent of H-1B receipts (75 percent of the receipts that NSF receives) are to be used for the Low-income Scholarship Program. Ten percent of receipts (25 percent of

the receipts that NSF receives) are designated for support of the Grants for Mathematics, Science, or Engineering Enrichment Courses.

Low-income Scholarship Program. Eligibility for the scholarships was expanded from the original fields of computer science, engineering, and mathematics to include "other technology and science programs designated by the Director." The maximum annual scholarship award amount was raised from $3,125 to $10,000. NSF may use up to 50 percent of funds "for undergraduate programs for curriculum development, professional and workforce development, and to advance technological education." Because of the changes, the program has been renamed from CSEMS to Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM).

Since its inception the low-income scholarship program has received approximately 1,300 proposals from all types of colleges and universities and has made awards for 553 projects. Approximately 40,000 students have received scholarships ranging from one to four years. In addition to scholarships, projects include student support activities featuring close involvement of faculty, student mentoring, academic support, and recognition of the students. Such activities are important in recruiting and retaining students in high-technology fields through graduation and into employment.

ITEST Grants for Mathematics, Science, or Engineering Enrichment Courses. The ITEST program invests in K-12 activities, including informal education programs for middle and high school students and teachers that are intended to stimulate interest in high technology fields and that emphasize IT-intensive STEM subject areas. ITEST provides substantive learning opportunities that expand upon science experiences received as part of formal classroom instruction. The three categories of awards include: (1) *Youth Projects* for school-age children, grades 7-12; (2) *Comprehensive Projects* that include opportunities for STEM teachers to gain familiarity with IT that can be transported to their classrooms; and (3) the *ITEST Learning Resource Center* that serves as a national resource disseminating best practices, research on student learning, and strategies for project evaluation.

The ITEST portfolio consists of 53 local projects that allow students and teachers to work hand-in-hand with scientists and engineers on extended research projects, ranging from biotechnology to environmental resource management to programming and problem-solving. Projects draw on a wide mix of local resources, including universities, industry, museums, science and technology centers, and school districts. ITEST engages both informal and formal communities in order to identify the characteristics of informal settings – content and format – that make them successful for a wide range of young people, especially those not successful in traditional school settings. Through a $53.0 million federal investment, ITEST impacts 75,000 students (grades 6-12), 3,000 teachers and 1,300 parents / caregivers. Interest in ITEST continues. In FY 2006, ITEST expects to receive over 160 proposals, about the same as in FY 2005, with a success rate of about 15 percent.

In November 2005, Public Law 109-108 was signed and directed EHR to initiate a K-8 pilot program using funds in the FY 2006 EHR appropriation. EHR proposes to use approximately $7 million of funds from its formal K-12 programming and approximately $7 million of funds from H-1B nonimmigrant petitioner fees for this pilot. The initiative, Academies for Young Scientists, will call for proposals to develop stimulating, intensive STEM learning experiences that engage K-8 students; develop sustainable, district-based partnership demonstration projects; and promote strategies that further develop skills in K-8 STEM teachers. This activity is a demonstration project in FY 2006 and thus no funds are requested in FY 2007.

H-1B Financial Activities from FY 1999 - FY 2005						
(Dollars in Millions)						
	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Receipts	**$26.61**	**$48.61**	**$88.34**	**$61.04**	**$65.34**	**$0.57**	**$83.68**
Obligations incurred							
Computer Science, Engineering, and Mathematics Scholarships	0.26	23.16	68.37	34.69	25.30	33.91	0.54
Grants for Mathematics, Engineering or Science Enrichment Courses	-	0.20	4.22	5.83	16.27	-	-
Systemic Reform Activities	-	1.70	3.70	3.97	5.00	2.50	2.72
Private-Public Partnership in K-12[1]	-	-	2.22	12.82	-	20.87	22.69
Total Obligations	**$0.26**	**$25.06**	**$78.51**	**$57.31**	**$46.57**	**$57.28**	**$25.95**
Unobligated Balance end of year	$26.35	$49.89	$59.72	$63.45	$83.90	$29.10	$89.58

1/P.L 106-313 directs that 15 percent of the H-1B Petitioner funds go toward K-12 activities involving private-public partnerships in a range of areas such as materials development, student externships, math and science teacher professional development, etc.