DIRECTORATE FOR EDUCATION AND HUMAN RESOURCES (EHR)

$911,200,000
+$38,440,000 / 4.4%

EHR Funding
(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 ARRA Actual	FY 2010 Enacted/ Annualized FY 2011 CR[1]	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
Division of Research on Learning in Formal and Informal Settings (DRL)	$260.49	-	$260.00	$264.09	$4.09	1.6%
Division of Human Resource Development (HRD)[2]	138.49	-	138.91	159.96	21.05	15.2%
Division of Graduate Education (DGE)[3]	181.43	15.00	181.44	191.73	10.29	5.7%
Division of Undergraduate Education (DUE)	292.35	-	292.41	295.42	3.01	1.0%
Total, EHR	**$872.77**	**$15.00**	**$872.76**	**$911.20**	**$38.44**	**4.4%**

Totals may not add due to rounding.

[1] A full-year 2011 appropriation for this account was not enacted at the time the budget was prepared; therefore, this account is operating under a continuing resolution (P.L. 111–242, as amended). The amounts included for 2011 reflect the annualized level provided by the continuing resolution.

[2] In FY 2012, Research in Disabilities Education and Research on Gender in Science and Engineering program funding responsibilities are transferred from HRD to DRL. Funding for all years is shown in the FY 2012 structure for comparability.

[3] Funds appropriated through ARRA in FY 2009, totaling $15.0 million, were obligated by DGE in FY 2010 for the Science Masters Program.

About EHR

NSF's strategic goals of transforming the frontiers of science and innovating for society require a scientifically literate populace and a scientific workforce prepared for innovation. With this budget request EHR continues its national leadership role in advancing an innovation agenda for science, technology, engineering, and mathematics (STEM) education that provides foundational building blocks, stimulates use-inspired research and translation, and addresses national priorities. In an exciting and shifting landscape for learning, new technologies allow STEM learning to occur anywhere, anytime, and by anyone. The lines between formal education and outside-of-school learning are blurred; and today's preparation of the workforce must ensure the diversity, creativity, and experience needed for tomorrow's scientific innovations. EHR programs support the research and development activities that enable the U.S. to respond positively to the challenges posed by such innovations.

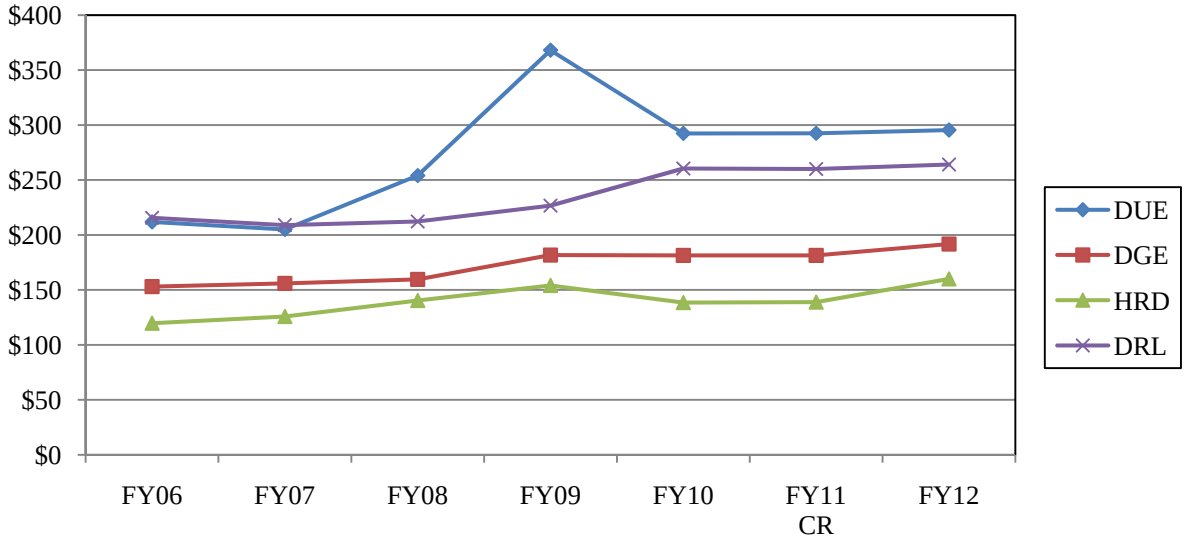
Three broad national priorities drive the EHR FY 2012 Request:

- Improving K-12 STEM student and teacher learning, with more dramatic results in student outcomes ;
- Building a diverse and highly qualified STEM workforce, at a more rapid pace in areas of national need; and
- Advancing evaluation methods, designs, and approaches to ensure strategic investment.

NSF/EHR is the lead federal agency providing funding for research and development (R&D) in STEM education. For FY 2012, EHR proposes a realigned portfolio of programmatic investments intended to catalyze the design and implementation of the most promising education models, and to stimulate cutting-edge research and evaluation to better understand STEM learning programs, models, and resources. A second priority for EHR, the development of tomorrow's STEM workforce, is also an essential building block of the Administration's *Strategy for American Innovation.* In FY 2012, EHR proposes new directions for workforce development at all educational levels in order to ensure the diversity and

experience needed for tomorrow's scientific innovations and to continue to build capacity in educational institutions, particularly minority serving institutions and community colleges. Finally, EHR is committed to a strong focus on evaluation, to both learn from evaluation of its programs and to support research that will build evaluation knowledge, theory, and instruments. In addition, these efforts will be coordinated with planning for the NSF-wide assessment and evaluation.

EHR Subactivity Funding
(Dollars in Millions)



The Administration has made education reform a top priority: "… countries that out-educate us today will out-compete us tomorrow. And so we want every citizen to have the skills and training they need in a global economy – from the day that you're born through whatever career you may choose." (President Obama, Carnegie Mellon University, June 2, 2010). This request is responsive to the President's goals and to recent key reports with strong recommendations about how to improve STEM education, such as *Prepare and Inspire: K-12 Education in Science, Technology, Engineering, and Mathematics Education* (President's Council of Advisors on Science and Technology, 2010). EHR will play a fundamental role in support of the President's goal of preparing 100,000 STEM teachers by expanding the research evidence about quality education for effective STEM teaching along with increasing the quantity. In FY 2012, EHR will explore across NSF – in conjunction with the field and other key agencies – the best structures and emphases for NSF's education and learning portfolio going forward. This is likely to result in further realignment within EHR and other education programs supported by NSF to enable more integrated, coherent, and impactful STEM learning and education investments.

Appropriation Language

For necessary expenses in carrying out science, mathematics 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, ~~$892,000,000~~*$911,200,000,* to remain available until September 30, ~~2012~~*2013*.

Education and Human Resources
FY 2012 Summary Statement
(Dollars in Millions)

	Enacted/ Request	Carryover/ Recoveries	Expired	Total Resources	Obligations Incurred/Est.
FY 2010 Appropriation	$872.76	$0.05		$872.81	$872.77
FY 2009 ARRA	100.00			100.00	85.00
FY 2010 ARRA	-	15.00		15.00	15.00
FY 2010 Enacted/Annualized FY 2011 CR	872.76	0.04		872.80	872.80
FY 2012 Request	911.20			911.20	911.20
$ Change from FY 2010 Enacted/Annualized FY 2011 CR					$38.40
% Change from FY 2010 Enacted/Annualized FY 2011 CR					4.4%

Totals may not add due to rounding.

Explanation of Carryover

Within the **Education and Human Resources (EHR)** appropriation, $44,070 was carried over into FY 2011 for projects that were not ready for obligation in FY 2010. Obligation of these funds is expected by the second quarter of FY 2011.

FY 2012 Summary by Division

- As EHR's primary R&D division, the Division of Research on Learning in Formal and Informal Settings (DRL) has a mission that includes promoting innovative research, development, and evaluation of learning and teaching across all ages and STEM disciplines by advancing cutting-edge knowledge and practices in both formal and informal learning settings. DRL's role in the larger context of Federal support for education research and evaluation is to be a catalyst for change, and to ensure that tomorrow's innovations are being developed today. DRL programs advance theory, method, measurement, development, and application in STEM education. DRL's FY 2012 Request will continue to support: the development of innovative resources, models, and tools for K-12 STEM education; fundamental research on learning; engaging experiences that support lifelong STEM learning; cyberlearning; teacher learning; research on national STEM education priorities; and evaluation studies and activities aimed at strategic STEM education investments. Specifically, a $10.0 million increase in Program and Project Evaluation (PPE) will fund enhanced EHR-wide activities to strengthen evaluation and improvement of STEM education programs.

  The new Teacher Learning for the Future (TLF) program will provide R&D awards to further understanding of the preparation and continuing education of STEM teachers, as the structure of formal education changes, as new technologies are developed, and as new science emerge. TLF will be housed in DRL and co-managed with DUE. As a crucial component of the Administration's innovation strategy, the 2012 Budget proposes an investment of $100 million through the Department of Education and the National Science Foundation to prepare effective STEM teachers for the classroom. The TLF program will coordinate closely with the Department of Education's Teacher Pathways program, which has $80 million specifically set aside to scale programs that recruit the nation's top undergraduates into STEM teaching. TLF will improve our understanding of what

makes a great STEM teacher, and how to best train, support, and retain highly effective STEM teachers.

The Research and Evaluation on Education in Science and Engineering (REESE) program will incorporate the substantive focus of two programs currently in the Division of Human Resource Development – Research in Disabilities Education (RDE) and Research on Gender in Science and Engineering (GSE) – in order to bring more coherence to the directorate's research programs (see crosswalk table at the end of this section).

- The Division of Human Resource Development (HRD) serves as a focal point for NSF's agency-wide commitment to promoting excellence in STEM education and research through broadening participation of underrepresented minorities and minority-serving institutions, women, and persons with disabilities. In FY 2012, EHR proposes to realign HRD into two main areas: Broadening Participation at the Core (BPAC) and Research and Education Infrastructure (REI). BPAC will further efforts toward synergy with an overarching, comprehensive framework that will amplify and expand targeted investments in minority-serving institutions. In FY 2012, HRD will maintain the Historically Black Colleges and Universities Undergraduate Program (HBCU-UP), Louis Stokes Alliances for Minority Participation (LSAMP), and Tribal Colleges and Universities Program (TCUP) separately within this comprehensive framework. Additionally, a new pilot program, Transforming Broadening Participation through STEM (TBPS), will be launched under BPAC to engage the field in new approaches to broadening participation that can reach particular populations such as Hispanic-serving institutions.

  ADVANCE, the Alliances for Graduate Education and the Professoriate (AGEP), and Centers of Research Excellence in Science and Technology (CREST) form the Research and Education Infrastructure (REI) area. Research on Gender in Science and Engineering (GSE) and Research in Disabilities Education (RDE) move to DRL as components of the REESE program and will be jointly managed by HRD and DRL, so that the substantive focus on gender and persons with disabilities remains core within HRD (see crosswalk table at the end of this section).

- The Division of Graduate Education (DGE) leads NSF's efforts to attract the most talented U.S. students into graduate studies and to promote excellence in graduate education to prepare the Nation's leading scientists and engineers of the future. DGE's FY 2012 Request reflects its commitment to supporting U.S. graduate students and innovative graduate traineeship programs that prepare tomorrow's leaders in STEM. The Graduate Research Fellowship program will award 2,000 new fellowships, maintaining the doubling of the number of new awards as achieved in FY 2010. In FY 2012 NSF will increase the cost of education (COE) allowance from $10,500 to $12,000 and integrate international opportunities into the fellows' graduate education to support their development as global leaders of tomorrow. FY 2012 funding for the Integrative Graduate Education and Research Traineeship (IGERT) program will provide continued support for training programs that integrate innovation into the development of graduate students.

  The GK-12 program is being eliminated and will not hold a new competition in FY 2012 or subsequent years. FY 2011 funds, from both R&RA and EHR, will be used to cover FY 2011 and part of FY 2012 out-year commitments. The remaining out-year commitments will be funded by EHR. Other programs, such as IGERT and Math and Science Partnership (MSP) will consider introducing the promising practices identified through evaluation of the GK-12 program into their solicitations. See the division narrative for more detail.

- DUE's FY 2012 Request will support the division's mission to be the NSF focal point for transforming undergraduate STEM education to meet the needs of the 21st century. DUE will

continue to meet its objectives to strengthen the science and engineering workforce and prepare all undergraduate students for an increasingly technological global society. DUE will make additional investments in increasing and developing the scientific and technical workforce via the STEM Talent Expansion Program (STEP) and the Federal Cyber Service: Scholarship for Service/Cybercorps (SfS) programs. DUE will increase its efforts to engage the community college sector.

A new program, Widening Implementation and Demonstration of Evidence-based Reforms (WIDER), will be housed in DUE and co-managed with DRL. WIDER will fund research on how to achieve widespread sustainable implementation of evidence–based undergraduate instructional practices to improve student outcomes, based in part on demonstration models of such practices.

The National STEM Education Distributed Learning (NSDL) program will be eliminated in FY 2012. Its core agenda, to assure the availability and utility of electronic resources for education, will be subsumed as part of the larger agenda of Cyberlearning Transforming Education (CTE).

Division of Human Resource Development (HRD) Realignment

(Dollars in Millions)

Proposed FY 2012 Structure			FY 2011 Structure											Total, FY 2012 Structure
			HRD										DRL	
			Undergraduate/Graduate Student Support					Opportunitites for Women and Persons with Disabilities			Research and Education Infrastructure			
			Total	*HBCU-UP*	*LSAMP*	*TCUP*	*Pilot for Comprehensive Broadening Participation of Undergraduates in STEM (CBP-US)*	ADVANCE	*GSE*	*RDE*	AGEP	CREST	REESE	
HRD	Broadening Participation at the Core (BPAC)	Science & Engineering Workforce for Tomorrow	$111.10											**$111.10**
		Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)		*32.00*										***$32.00***
		Louis Stokes Alliances for Minority Participation (LSAMP)			*44.75*									***$44.75***
		Tribal Colleges and Universities Program (TCUP)				*14.35*								***$14.35***
		Transforming Broadening Participation through STEM (TBPS)					*20.00*							***$20.00***
	Research and Education Infrastructure	ADVANCE						1.58						**$1.58**
		Alliances for Graduate Education and the Professoriate (AGEP)									16.75			**$16.75**
		Centers for Research Excellence in Science and Technology (CREST)										30.53		**$30.53**
													Total, FY 2012 Structure for HRD	**$159.96**
DRL		Research and Evaluation on Education in Science and Engineering (REESE)											54.72	**$54.72**
		Research in Disabilities Education (RDE)							*6.50*					***$6.50***
		Research on Gender in Science and Engineering (GSE)								*10.50*				***$10.50***
													Total, FY 2012 Structure for DRL - REESE	**$54.72**

Major Investments

EHR Major Investments

(Dollars in Millions)

Area of Investment	FY 2010 Omnibus Actual	FY 2010 ARRA Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)	-	-	-	$20.00	$20.00	N/A
Teacher Learning for the Future (TLF)	-	-	-	20.00	20.00	N/A
Community Colleges and Two-Year Institutions	65.00	-	75.00	100.00	25.00	33.3%
Project and Program Evaluation (PPE)	12.10	-	12.00	22.00	10.00	83.3%

- Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) is a new program proposed for FY 2012, with a goal of moving improved undergraduate STEM education practices to scale. This program will support research on how to achieve widespread sustainable implementation of improved undergraduate instructional practices and student outcomes at major universities, as well as demonstration models. Competitive proposals will target the teaching of a majority of undergraduate courses and the instructional practices of faculty in a department, for STEM departments at an institution. This program will also support activities to address improvements in the student educational experience not tied to specific courses. Data to be collected will include, but not necessarily be limited to, impacts on student learning and completion rates, faculty teaching practices, impacts on institutional evaluation, and incentive practices for faculty. Data will be collected on organizational policies and structures that either encourage or inhibit the desired changes. DUE will serve as the lead division for this new program, which will be co-managed by DRL. There is strong interest in engagement from across NSF.

- Teacher Learning for the Future (TLF) is a new research program proposed for FY 2012 that will focus on the potential to improve the training of pre-service, in-service, and future generations of teachers as the structure of formal education changes, as technologies enable teaching practices not yet envisioned, as new science is developed, and as boundaries between in-school and out-of-school learning blur. TLF will re-establish the centrality of NSF in discovering, studying, and promoting pathways for STEM teacher learning through research. Complementing the support of new tools for cyberlearning, the TLF program will focus on the needs of the next generation of STEM teachers. The program will be housed in DRL and co-managed with DUE. In this effort, the TLF program will coordinate closely with the Department of Education's Teacher Pathways program, which has $80 million specifically set aside to replicate and then scale programs that recruit the nation's top undergraduates into STEM teaching.

- Funding for community colleges will be a priority across EHR in FY 2012, building on EHR's long history in this area. As President Obama has stated about community colleges, "They may not get the credit they deserve, they may not get the same resources as other schools, but they provide a gateway to millions of Americans to good jobs and a better life….These are places where young people can continue their education without taking on a lot of debt. These are places where workers can gain new skills to move up in their careers." (White House Summit on Community Colleges, October 5, 2010). In addition to a continued focus on community colleges through DUE's Advanced

Technological Education (ATE) program, in FY 2012, the Transforming Undergraduate Education in Science, Technology, Engineering and Mathematics (TUES) program in DUE and undergraduate programs in HRD (namely, LSAMP and TCUP), will provide support to this important segment of the higher education spectrum. Other EHR programs that will contribute to this effort include SfS, STEP, TLF, MSP, and Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM).

- The Project and Program Evaluation (PPE) program, an EHR-wide initiative housed in DRL, will fund evaluation, synthesis, and comparison studies designed to increase knowledge of effective practices in STEM learning and education, and program evaluation. EHR will continue to evaluate its programs on a regular basis, working through a newly-formed directorate-wide coordination group in consultation with experts both inside and outside of NSF, including research methodologists, evaluators, NSF's Division of Science Resources Statistics (SRS), and other agencies. Solicitations calling for research and development in evaluation theory, methods, and tools will be expanded in FY 2012. Under this EHR-wide arrangement, the directorate will build coherent directorate-level systems for program and thematic evaluation, including engaging with the U.S. Department of Education on issues of mutual interest.

Program Evaluation and Performance Improvement

The Performance Information chapter provides details regarding the periodic reviews of programs and portfolios of programs by external Committees of Visitors and directorate Advisory Committees. Please see this chapter for additional information.

EHR programs require project-level evaluations that are used for both formative and summative input to the projects and also for informing NSF programs and divisions about important findings. In addition, program evaluations are ongoing to assess program quality and impact, and the results of these formative and summative evaluation activities are essential to the continued shaping of program and portfolio directions and emphases. In FY 2012, program evaluation and planning activities are scheduled for the Advanced Technological Education (ATE), Cyberlearning Transforming Education (CTE), Math and Science Partnership (MSP), Promoting Research and Innovation in Methodologies for Evaluation (PRIME), STEM Talent Expansion Program (STEP) and Transforming Undergraduate Education in STEM (TUES) programs. See the Performance Information section for additional information.

To ensure the quality of EHR's processes for handling proposals and recommending proposals for awards, EHR convenes Committee of Visitors (COV) comprised of expert external evaluators to review all programs on a three-year rotating basis. In FY 2012, COV reviews are scheduled for REESE and DR-K12 in DRL; ATE, TUES, STEP, and NSDL in DUE; GRF in DGE; and RDE and GSE in HRD.

Number of People Involved in EHR Activities

	FY 2010 Actual Estimate	FY 2010 ARRA Estimate	FY 2010 Enacted/ Annualized FY 2011 CR Estimate	FY 2012 Estimate
Senior Researchers	7,909	148	8,130	8,040
Other Professionals	2,562	40	2,570	2,600
Postdocs	321	-	470	330
Grad Students	8,142	100	8,645	8,270
Undergrads	9,807	-	5,365	9,970
K-12 Teachers	59,136	-	62,150	60,100
K-12 Students	84,844	-	82,470	86,230
Total, Number of People	172,721	288	169,800	175,540

DIVISION OF RESEARCH ON LEARNING IN FORMAL AND INFORMAL SETTINGS (DRL)

$264,090,000
+$4,090,000 / 1.6%

DRL Funding
(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
DRL	**$260.49**	**$260.00**	**$264.09**	**$4.09**	**1.6%**
Knowledge Building					
Research and Evaluation on Education in Science & Engineering (REESE)[1]	64.16	63.50	54.72	-8.78	-13.8%
Research in Disabilities Education (RDE)	*[6.92]*	*[6.50]*	*[6.50]*	-	-
Research on Gender in Science and Engineering (GSE)	*[11.57]*	*[11.50]*	*[10.50]*	*[-1.00]*	*[-8.7%]*
Project and Program Evaluation (PPE)	12.10	12.00	22.00	10.00	83.3%
Lifelong Learning					
Informal Science Education (ISE)	65.85	66.00	68.14	2.14	3.2%
Resources, Models, and Tools					
Discovery Research K-12 (DR-K12)	118.38	118.50	99.23	-19.27	-16.3%
Teacher Learning for the Future (TLF)	-	-	20.00	20.00	N/A

Totals may not add due to rounding.

[1] In FY 2012, Research in Disabilities Education and Research on Gender in Science and Engineering program funding responsibilities are transferred from HRD to DRL. Funding for all years is shown in the FY 2012 structure for comparability.

DRL invests in research, evaluation, and development to improve the learning and teaching of STEM by all citizens. The division's programs build the knowledge base on STEM learning by learners of all ages and in all learning settings, including formal schooling, out-of-school programs, and the full range of everyday or designed learning environments, such as museum exhibits. The division is organized in three areas: Knowledge Building; Lifelong Learning; and Resources, Models, and Tools. These groupings provide intellectual direction and operational coordination for the division's programs and activities. The division's investment priorities are shaped by such ongoing educational challenges as reaching *all* learners with substantive opportunities to engage in STEM anywhere and anytime and bringing effective STEM learning innovations to scale. In addition, DRL is committed to developing and studying cutting-edge learning technologies, blurring the boundaries between formal and informal learning settings, and creating methodological tools for assessing learning impacts in a variety of forms.

STEM program evaluation design, research, and implementation is a high priority for the Division in FY 2012. Divisional plans will expand programmatic activity to enrich the tools, methods, and designs available for innovation in the evaluation of STEM learning and workforce programs and projects. In addition, DRL will assume a key role within EHR for building capacity and expertise in STEM education program evaluation and will be deeply engaged in collaborations with the U.S. Department of Education and other agencies in the planning and implementation of cross-agency evaluation efforts in STEM teacher professional development.

Knowledge Building

- Research and Evaluation on Education in Science and Engineering (REESE).
  In FY 2012 the REESE program ($54.72 million) will realign funding priorities to incorporate emphases in research in disabilities education and gender in science and engineering. This results from the proposed move of the RDE and GSE programs out of the Division of Human Resource Development (HRD) and into DRL to group all of the EHR basic research activities together in a single cluster (see page EHR – 6 for a diagram of the realignment). REESE will collaborate with HRD in FY 2012 on a solicitation to include RDE and GSE activities. The expanded REESE program will be managed jointly by DRL and HRD to strengthen and capitalize on the synergies among these complementary areas, and to ensure a continued focus on using research on broadening participation in HRD investments.
- Project and Program Evaluation (PPE).
  PPE increases by $10.0 million to a total of $22.0 million in FY 2012. PPE will fund research, evaluation, synthesis, and comparison studies designed to improve evaluation of STEM education and workforce programs, as well as STEM education program evaluation. Solicitations calling for research and development in evaluation theory, methods, and tools will be expanded in FY 2012. Program and portfolio evaluation activities will be subsumed within new, coherent EHR-wide program evaluation frameworks and structures. Planning for the joint NSF-Institute of Education Sciences evaluation of mathematics professional development has been underway and the study will move to implementation in FY 2012. NSF's investment will include PPE resources.

Lifelong Learning

- Informal Science Education (ISE).
  ISE receives a total investment of $68.14 million in FY 2012. This includes a $3.74 million investment to support Connecting Researchers and Public Audiences (CRPA), which increases opportunities for NSF-funded researchers to engage the public using cutting-edge evidence-based communication techniques. This will utilize platforms that support the Communicating Science Broadly activity funded through Integrative Activities (IA). In addition, ISE will place emphasis on projects that strengthen connections between the research and practice communities and between the formal and informal learning communities. Evaluation plans will be developed to assess impact of CRPA, in conjunction with experts in communication and public understanding.

Resources, Models, and Tools

- Discovery Research K-12 (DR-K12).
  DR-K12 will be supported at $99.23 million. High priorities for the program continue to be creating and studying new generations of cyber-enabled learning materials, providing anywhere and anytime learning resources for teachers and students, advancing assessment of student STEM knowledge and skills, and understanding the issues and requirements for effective scale-up of successful approaches. With DRL assuming lead responsibility for TLF, the DRK-12 program can be re-focused to emphasize resources, models, and tools for K-12 students. Aspects of DRK-12 that have focused on recruitment and development of teacher learning will be addressed in TLF.
- Teacher Learning for the Future (TLF).
  TLF is a new $20.0 million research program proposed for FY 2012. It will catalyze new lines of research and development needed for rapid improvement of the preparation and continued professional learning of the STEM teachers of tomorrow. TLF will support concept development and prototype proposals, to encourage research about new modes of teacher learning. It will also fund implementation and evidence-building proposals, where demonstration projects will be designed, implemented, and studied. Finally, TLF will competitively fund research synthesis and evaluation networks to help knowledge accumulate and be ready for use to improve teacher education. TLF will provide the needed research base to support efforts across government to help ensure quality in

implementing the President's goal of preparing 100,000 STEM teachers in the next ten years. EHR will use the implementation of TLF, together with the proposed Widening Implementation and Demonstration of Evidence-based Reforms (WIDER) program, as an opportunity to design a set of linked evaluation studies of EHR programs. Common instruments will be used for periodic data-gathering across several programs aimed at reforming undergraduate STEM education. In addition, the TLF program will coordinate closely with the Department of Education's Teacher Pathways program, which has $80 million specifically set aside to scale programs that recruit the nation's top undergraduates into STEM teaching. Research undertaken in the TLF program will improve our understanding of what makes a great STEM teacher.

DIVISION OF HUMAN RESOURCE DEVELOPMENT (HRD) $159,960,000 +$21,050,000 / 15.2%

HRD Funding
(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
HRD[1]	**$138.49**	**$138.91**	**$159.96**	**$21.05**	**15.2%**
Broadening Participation at the Core	**89.96**	**90.10**	**111.10**	21.00	23.3%
Historically Black Colleges and Universities Undergraduate Program (HBCU-UP)	32.06	32.00	32.00	-	-
Louis Stokes Alliances for Minority Participation (LSAMP)	44.55	44.75	44.75	-	-
Tribal Colleges and Universities Program (TCUP)	13.35	13.35	14.35	1.00	7.5%
Transforming Broadening Participation through STEM (TBPS)	-	-	20.00	20.00	N/A
Research and Education Infrastructure	**48.53**	**48.81**	**48.86**	**0.05**	**0.1%**
Alliances for Graduate Education and the Professoriate (AGEP)	16.73	16.75	16.75	-	-
Centers of Research Excellence in Science and Technology (CREST)	30.32	30.53	30.53	-	-
ADVANCE	1.48	1.53	1.58	0.05	3.3%

Totals may not add due to rounding.

[1]In FY 2012, Research in Disabilities Education and Research on Gender in Science and Engineering ~~P~~program funding responsibilities are transferred from HRD to DRL. Funding for all years is shown in the FY 2012 structure for comparability.

In FY 2012, EHR proposes to realign HRD into two main themes (see page EHR – 6 for a diagram of the realignment): Broadening Participation at the Core (BPAC) and Research and Education Infrastructure (REI).

Broadening Participation at the Core (BPAC)

- In FY 2012, HRD will build on existing portfolio activities and launch Broadening Participation at the Core (BPAC), an overarching, comprehensive framework that will amplify and expand targeted investments in HBCUs, TCUs, other minority-serving institutions, and institutions with strong missions to support broadening participation, in coordination with other EHR programs such as ATE and STEP. BPAC will highlight emerging and exciting new directions in disciplinary and interdisciplinary science as key resources for attracting and retaining students from groups traditionally underrepresented in STEM. It will take into account the lessons learned and evidence base from previous investments and will recognize the emerging contexts and cultures of particular groups, institutions, and disciplines. The BPAC goal is to transform education practice and learning opportunities at the undergraduate level to broaden participation and to engage undergraduate students with frontier research in emerging fields to retain them in STEM majors. Within this activity HRD will expand its efforts to involve community colleges. An additional $20.0 million is requested in BPAC in FY 2012 for a pilot program, Transforming Broadening Participation through STEM (TBPS). This new program will seek innovative solutions for broadening participation in STEM at the undergraduate level in anticipation of tomorrow's changing demographics, including increased engagement with Hispanic-serving institutions.

The Research and Education Infrastructure (REI)

- The REI cluster will include ADVANCE, the Alliances for Graduate Education and the Professoriate (AGEP), and the Centers of Research Excellence in Science and Technology (CREST). Requesting $48.86 million in FY 2012, these programs will support the transformation of institutional academic and research infrastructures to expand opportunities for underrepresented groups in STEM disciplines at the graduate, post-doctorate, and professoriate levels.

DIVISION OF GRADUATE EDUCATION (DGE) $191,730,000
+$10,290,000 / 5.7%

(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 ARRA Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
DGE	**$181.43**	**$15.00**	**$181.44**	**$191.73**	**$10.29**	**5.7%**
Graduate Research Fellowship (GRF)	102.47	-	102.58	134.61	32.03	31.2%
Graduate STEM Fellows in K-12 Education (GK-12)	48.86	-	49.00	26.95	-22.05	-45.0%
Integrative Graduate Education and Research Traineeship Program (IGERT)	30.11	-	29.86	30.17	0.31	1.0%
Science Masters Program (SMP)	-	15.00	-	-	-	N/A

Totals may not add due to rounding.

DGE supports U.S. graduate students and innovative graduate programs to prepare tomorrow's leaders in science, technology, engineering and mathematics. DGE meets this objective through a portfolio of three graduate education programs that vary in their designs and in the options and opportunities provided to graduate students.

- Graduate Research Fellowship (GRF).
  The FY 2012 Request, $134.61 million, supports 2,000 new GRF fellows and maintains the doubling of new awards achieved in FY 2010. Within this budget, a planned international activity ($2.0 million), jointly led by DGE and the Office of International Science and Engineering (OISE), will allow fellows to integrate international opportunities into their graduate education for development as global leaders of tomorrow. To maintain the competitiveness and fiscal integrity of the GRF program, the cost of education (COE) level will be increased in FY 2012 from $10,500 to $12,000. The new COE level is consistent with the America COMPETES Reauthorization Act of 2010. NSF will also begin implementing a multi-year plan to address inflationary pressures on the long-stagnant GRF stipend level, including initial funding in FY 2012 for a stipend increase to $32,000 that will be fully implemented in FY 2013. Additional stipend increases are planned beyond FY 2013.
- Graduate STEM Fellows in K-12 Education (GK-12).
  Graduate STEM Fellows in K-12 Education (GK-12) was initiated in 1999, and during the subsequent years more than 300 projects have been funded throughout the Nation. NSF is terminating the GK-12 program in FY 2012 because the program has achieved its goal of providing models for potential adopters; recent evaluation findings suggest that the effects of this program's fellowship experience in improving the trainees' research skills are mixed and the program design limits the ability of participants to gain enough in-depth experience in K-12 teaching to impact pupil learning. Remaining out-year commitments will be funded by EHR. DGE will use the experience gained from ten years of funding the GK-12 program to call for innovation in graduate traineeship experiences through other programs.
- Integrative Graduate Education and Research Traineeship (IGERT).
  FY 2012 funding for IGERT ($30.17 million) will provide continued support for training programs that integrate preparation for research and innovation into the development of graduate students. Special emphasis in FY 2012 will be placed on how such areas as preparation for innovation, institutional integration, advanced manufacturing education, and communicating with students, teachers, and the public can be infused within the IGERT program.

DIVISION OF UNDERGRADUATE EDUCATION (DUE)

$295,420,000
+$3,010,000 / 1.0 %

DUE Funding
(Dollars in Millions)

	FY 2010 Omnibus Actual	FY 2010 Enacted/ Annualized FY 2011 CR	FY 2012 Request	Change Over FY 2010 Enacted Amount	Change Over FY 2010 Enacted Percent
DUE	**$292.35**	**$292.41**	**$295.42**	**$3.01**	**1.0%**
Curriculum, Laboratory and Instructional Development	**63.29**	**63.46**	**73.47**	**10.01**	**15.8%**
Transforming Undergrad Ed in STEM (TUES) [was CCLI]	41.60	41.71	47.97	6.26	15.0%
National STEM Education Distributed Learning (NSDL)	16.19	16.25	-	-16.25	-100.0%
Climate Change Education (CCE)	5.49	5.50	5.50	-	-
Widening Implementation and Demonstration of Evidence-based Reforms (WIDER)	-	-	20.00	20.00	N/A
Workforce Development	**116.20**	**115.73**	**128.73**	**13.00**	**11.2%**
Advanced Technological Education (ATE)	64.51	64.00	64.00	-	-
Excellence Awards in Science and Engineering (EASE)	5.18	5.20	5.20	-	-
Federal Cyber Service: Scholarship for Service/Cybercorps (SFS)	14.87	15.00	25.00	10.00	66.7%
STEM Talent Expansion Program (STEP)	31.64	31.53	34.53	3.00	9.5%
Teacher Education	**112.86**	**113.22**	**93.22**	**-20.00**	**-17.7%**
Robert Noyce Scholarship Program (NOYCE)	54.93	55.00	45.00	-10.00	-18.2%
Math and Science Partnership (MSP)	57.93	58.22	48.22	-10.00	-17.2%

Totals may not add due to rounding.

DUE is the NSF focal point for transforming undergraduate STEM education to meet the needs of the 21st century. DUE's objectives are to strengthen the science and engineering workforce and prepare all undergraduate students for an increasingly technological global society. DUE programs emphasize innovation and ongoing improvement in curricula, teaching procedures, and laboratories, so that the next generation is continuously learning with the tools and methods of inquiry used by working professionals. Collaborations are encouraged among institutions and across sectors (higher education, industry, and K-12). So that best practices penetrate deeply into the undergraduate education community, DUE provides support for faculty development, new instructional materials, reform of courses, laboratories, and curricula, and assessment of outcomes. DUE also requires that projects build on available evidence about teaching and learning and that projects generate findings to enrich the knowledge base. This emphasis on transforming undergraduate education will be expanded through the Widening Implementation and Demonstration of Evidence-based Reforms program, proposed for FY 2012.

In addition to its core activity of improvement in undergraduate curriculum and teaching practice, DUE contributes directly to the development of the scientific and technical workforce via the Advanced Technological Education (ATE) and the Federal Cyber Service: Scholarship for Service (SfS) programs. The STEM Talent Expansion Program (STEP) further supports the Nation's technical workforce by increasing the number of students completing STEM degrees. DUE also has a significant investment in STEM teacher education through the MSP and NOYCE programs. To complement these programmatic activities, a new teacher education program, Teacher Learning for the Future (TLF), is proposed for FY 2012, to be based in DRL and co-led by DUE.

In FY 2011 DUE will collaborate with HRD to increase outreach to community colleges and in FY 2012, EHR will implement a systematic means to track community college investments. A combination of

programs (ATE, STEP, SfS, TLF, MSP, S-STEM, and BPAC in HRD) will invest $100.0 million in community colleges in FY 2012.

Curriculum, Laboratory, and Instructional Development

- Transforming Undergraduate Education in STEM (TUES).
  TUES increases by $6.26 million. The additional resources will be utilized to enhance efforts to engage community colleges.
- National STEM Education Distributed Learning (NSDL).
  In FY 2012, the NSDL program will be eliminated based in part upon recent evaluation findings that point to the challenges of sustaining such a program in the face of changing technology and the ways educators now find and use classroom materials. The key research and development elements of its agenda – to assure the availability and utility of digital objects for learning – will be subsumed as part of the agenda of other programs, mainly the multi-directorate Cyberlearning Transforming Education (CTE) effort.

  In 2009, a working group convened jointly by the Advisory Committees for EHR and the Office of Cyberinfrastructure advised the NSF to make investments that would launch cyberlearning as a field of study in a way analogous to its investment in nanotechnology. Several core program solicitations in EHR now call attention to the centrality of cyberlearning (e.g., DRK-12, TUES, and ITEST); and others will move in this direction (e.g., MSP). In FY 2012, preparing the next generation of teachers to be confident of a cyberlearning environment will have its own visible support as part of the TLF initiative. These core programs within EHR will fund studies of the impact of cyberlearning approaches on teacher behavior and student learning, and will also support the ongoing work of engaging teachers with cyberlearning.

- Widening Implementation and Demonstration of Evidence-based Reforms (WIDER).
  WIDER is a new program proposed for FY 2012 to bring evidence-based undergraduate STEM education practices and curricular innovations to scale. This program will support research on how to achieve widespread sustainable implementation of undergraduate instructional practices leading to improved student outcomes in STEM at major universities through demonstration models. Competitive proposals will target the teaching of a majority of undergraduate STEM courses and the teaching practices of a majority of the faculty in a department for many STEM departments at the institution. Proposals also may include improvements in students' education experiences not tied to specific courses, such as effective advising, mentoring, and use of cohorts. Data will be collected on student learning outcomes and completion rates, description of faculty teaching practices, institutional evaluation, incentive practices and policies for faculty, and documentation of organizational policies and structures. Baseline data-gathering about the state of instruction and curriculum at awardees' institutions will be required. WIDER will be housed in DUE and co-managed by DRL. There is strong commitment from across NSF for engagement with all directorates and offices in WIDER so that particular disciplinary emphases, priorities, and opportunities can be reflected.

Workforce Development

- DUE will make increased investments in developing the scientific and technical workforce through both the STEM Talent Expansion Program (+$3.0 million to a total of $34.53 million) and the Federal Cyber Service Scholarship for Service (SfS) program (+$10.0 million to a total of $25.0 million). The increased resources for the STEP program will support additional STEP Centers, and the increased resources for the SfS program will support progress toward the program's target number of scholars.

Teacher Education

- Robert Noyce Scholarship Program (NOYCE)
  In FY 2012, $10.0 million from NOYCE will be reallocated to establish the new Teacher Learning for the Future (TLF) program housed in DRL. This reduction will result in fewer NOYCE awards; however, complementary, innovative projects will be supported by TLF. In this way NSF can continue to support research and innovation in teacher preparation programming in tandem with efforts to increase the STEM teacher workforce for tomorrow. The $45.0 million requested for NOYCE will continue to encourage talented STEM undergraduate and graduate students and professional to become K-12 mathematics and science teachers through scholarship and stipends.
- Math and Science Partnership (MSP).
  In FY 2012, $10.0 million from MSP will also be reallocated to establish the new TLF program. This reduction will result in fewer MSP awards but similar to NOYCE, complementary, innovative projects will be supported by TLF. The requested $48.22 million for MSP will support robust continuation of MSP's current focus on establishing partnerships from which NSF continually learns about effective practices for enhancement of STEM teacher preparation. In FY 2012, MSP will enhance efforts to engage community colleges.

H-1B NONIMMIGRANT PETITIONER FEES

$100,000,000
+$0 / 0%

In FY 2012, H-1B Nonimmigrant Petitioner Fees are projected to be $100.0 million, equal to the FY 2011 projection.

H-1B Nonimmigrant Petitioner Fees Funding

(Dollars in Millions)

	FY 2010 Actual	FY 2011 Estimate	FY 2012 Estimate	Change over FY 2011 Estimate Amount	Change over FY 2011 Estimate Percent
H-1B Nonimmigrant Petitioner Fees Funding	$96.81	$100.00	$100.00	-	-

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, which has now been renamed Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM). 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, through ITEST.

- **Low-income Scholarship Program: S-STEM.** Eligibility for the scholarships was expanded in 2006 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 was renamed in 2006 from CSEMS to Scholarships in Science, Technology, Engineering, and Mathematics (S-STEM).

  Since its inception the low-income scholarship program has received approximately 3,281 proposals from all types of colleges and universities and has made awards for 1,104 projects. Approximately 58,000 students have received scholarships ranging from one to four years, and many new grants have yet to award all their scholarships. In addition to scholarships, projects include student support activities featuring close involvement of faculty, student mentoring, academic support, curriculum development, and recognition of the students. Such activities are important in recruiting and retaining students in high-technology fields through graduation and into employment. S-STEM projects report much higher retention and graduation rates among scholarship students than among other STEM majors. Approximately 90 awards are anticipated in FY 2012, with an emphasis on increasing involvement of community colleges.

- **Mathematics, Science, or Engineering Enrichment Courses: ITEST**. The ITEST program invests in K-12 activities that address the current concern about shortages of STEM professionals and information technology workers in the U.S. and seeks solutions to help ensure the breadth and depth of the STEM workforce. ITEST funds education programs for students and teachers that emphasize mathematics, science, and engineering careers. The program supports the development, implementation, testing, and scale-up of models, STEM robotic projects, and research studies to improve the STEM workforce and build student's capacity to participate in the STEM workforce. The solicitation places emphasis on capturing and establishing a reliable knowledge base about the dispositions toward and knowledge about STEM workforce skills in U.S. students.

Since its inception, the ITEST program has received 1,541 proposals and funded over 200 projects that allow students and teachers to work closely 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 in order to identify the characteristics that engage a wide range of young people in STEM, especially those not successful in traditional school settings. Through a projected $191 million federal investment, ITEST impacts an estimated 216,000 students (grades K-12), 7,700 educators, and 2,300 parents and caregivers. In FY 2010, ITEST received 396 full proposals and funded 14 awards.

H-1B Financial Activities from FY 2000 - FY 2010

(Dollars in Millions)

	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	FY 2006	FY 2007	FY 2008	FY 2009	FY 2010
Receipts	**$48.61**	**$88.34**	**$61.04**	**$65.34**	**$0.57**	**$83.68**	**$105.32**	**$107.36**	**$104.43**	**$88.66**	**$91.22**
Unobligated Balance start of year	**$26.35**	**$49.89**	**$59.72**	**$63.45**	**$83.90**	**$29.10**	**$89.58**	**$98.19**	**$63.37**	**$50.83**	**$52.62**
Obligations incurred:											
Computer Science, Engineering, and Mathematics Scholarships	23.16	68.37	34.69	25.30	33.91	0.54	80.95	100.04	92.40	61.22	75.96
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	18.45	45.90	28.72	27.86	20.85
Total Obligations	**$25.06**	**$78.51**	**$57.31**	**$46.57**	**$57.28**	**$25.95**	**$99.40**	**$145.94**	**$121.12**	**$89.08**	**$96.81**
Unallocated Recoveries										2.20	3.12
Unobligated Balance end of year	**$49.89**	**$59.72**	**$63.45**	**$83.90**	**$29.10**	**$89.58**	**$98.19**	**$63.37**	**$50.83**	**$52.62**	**$50.15**

Totals may not add due to rounding.

[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.

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 former EHR 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.
- The Information Technology Experiences for Students and Teachers (ITEST) program was 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.

Explanation of Carryover

An amount totaling $50.15 million was carried over into FY 2011. NSF's carryover for H-1B funded programs consists of $40.63 million in S-STEM and $9.52 million in ITEST. All carryover funds are expected to be obligated during the second quarter of FY 2011.