Workforce Development for Teachers and Scientists

Funding Profile by Subprogram

(dollars in thousands)

	FY 2009 Current Appropriation	FY 2009 Current Recovery Act Appropriation[a]	FY 2010 Current Appropriation	FY 2011 Request
Workforce Development for Teachers and Scientists				
Student Programs	5,628	+12,500	13,078	22,700
Educator Programs	6,342	0	5,750	6,400
Program Administration and Evaluation	1,613	0	1,850	6,500
Total, Workforce Development for Teachers and Scientists	13,583	+12,500	20,678	35,600

Public Law Authorizations:
Public Law 95–91, "Department of Energy Organization Act of 1977"
Public Law 101–510, "DOE Science Education Enhancement Act of 1991"
Public Law 103–382, "The Albert Einstein Distinguished Educator Fellowship Act of 1994"
Public Law 109–58, "Energy Policy Act of 2005"
Public Law 110–69, "America COMPETES Act of 2007"

Program Overview

Mission

The mission of the Workforce Development for Teachers and Scientists (WDTS) program is to contribute to the national effort that will ensure that DOE and the Nation have a sustained pipeline of highly skilled and diverse science, technology, engineering, and mathematics (STEM) workers.

Background

DOE and its predecessor organizations have a 60-year history of training and educating scientists, mathematicians, and engineers in the U.S. These highly skilled workers are a key element of the Department's research enterprise and are supported through research grants and contracts at universities, the DOE national laboratories, and the private sector. This commitment to supporting the Nation's scientific and technical workforce has produced tens of thousands of leading scientists, engineers, and technicians who have dedicated their careers to solving national security, energy, and environmental challenges, while pursuing answers to many of the most important scientific questions in physics, chemistry, biology, and other areas of basic science.

DOE's 17 national laboratories provide tremendous opportunities and resources for STEM training and education. The national laboratory system offers a unique learning environment with access to world-class scientists who serve as research mentors to students and access to cutting-edge scientific instrumentation and facilities unavailable at universities or industry. On an annual basis, more than 250,000 K–12 students, 22,000 K–12 educators, 4,000 undergraduate interns, 3,000 graduate students, and 1,600 post-doctoral employees participate in education or training programs at the DOE national laboratories.

[a] The Recovery Act Appropriation column reflects the allocation of funding as of September 30, 2009.

WDTS leverages the unique capabilities at DOE's national laboratories to sponsor workforce training and education programs that motivate students and educators to pursue careers that will contribute to the Office of Science's mission in discovery science and science for national need. WDTS programs build a sustained pipeline for individuals to pursue STEM fields by rewarding and recognizing students from middle school through graduate school for their participation in science and technology in areas of importance to the Office of Science and to DOE. WDTS has launched the DOE Office of Science Graduate Fellowship Program to support U.S. graduate students pursuing degrees in areas of basic science and engineering important to the DOE mission and increased its support for undergraduate internships.

WDTS encourages the participation of under-represented populations at Minority Serving Institutions (MSIs) and other under-represented institutions through the WDTS Faculty and Student Teams (FaST) and Science Undergraduate Laboratory Internship (SULI) programs. Recruitment for minorities and women is strengthened through the building of partnerships with women and minority-serving scientific professional societies.

Subprograms

WDTS is organized into 3 subprograms: Student Programs, Educator Programs, and Program Administration and Evaluation.

- *Student Programs* focuses on encouraging middle school through graduate students to enter STEM careers and retaining them in the scientific and technical workforce.
- *Educator Programs* focuses on professional development experiences for middle school, high school, community college, and undergraduate educators.
- *Program Administration and Evaluation* develops and deploys evaluation methods for WDTS programs, provides the framework for developing outreach programs to public and private sector organizations, and supports the federal Science of Science Policy (SoSP) initiative.

Benefits

WDTS programs provide students and educators a pathway to STEM careers in scientific disciplines relevant to DOE's mission in energy, environment, national security, and scientific discovery, as well as careers at the Department and its national laboratories. These initiatives benefit society and promote the long-term health of our Nation by improving the STEM content knowledge of U.S. students, increasing the skills and capabilities of STEM educators, and creating a skilled and diverse scientific and technical workforce ready for high-wage job opportunities in emerging technical fields such as sustainable energy production.

WDTS programs provide students with the tools and knowledge needed to make an informed choice about STEM education and career options. Competitions, internships, fellowships, and other activities are designed to introduce students to world class scientific content and research environments. Students engage in science directly tied to societal challenges, such as energy and climate change.

Program Planning and Management

In FY 2010, the WDTS program planning and management activities were restructured to include:

- Rigorous evaluation of all WDTS programs, including a longitudinal workforce study and the development of six leading indicators that drive program improvement efforts: quality, scientific and technical content knowledge, leverage, competition with reward, retention, and diversity.

- Expansion of efforts to provide STEM professional development opportunities for undergraduate faculty as a way to increase the participation of under-represented minorities and women in DOE programs.
- Continued implementation of the DOE Office of Science Graduate Fellowship program in FY 2010–2011 through the addition of a second cohort of Fellows.

WDTS participates on the Education Subcommittee of the National Science and Technology Council (NSTC), which is managed by the White House Office of Science and Technology Policy (OSTP). Through the NSTC subcommittee and other venues, WDTS engages with the National Science Foundation (NSF), National Aeronautics and Space Administration (NASA), Department of Defense (DOD), National Institutes of Health (NIH), and other Federal agencies to develop interagency efforts in science education.

In FY 2010, the WDTS program will be reviewed by a Committee of Visitors (COV). The Basic Energy Sciences Advisory Committee (BESAC) has been charged to commission a COV subcommittee to examine WDTS business processes for their effectiveness and efficiency. The COV will also assess the quality of the WDTS portfolio, including its breadth and depth and national and international standing. The Office of Science conducts COV reviews of major programs every three years to ensure program quality.

Coordination of Education/Workforce Development Activities

WDTS coordinates with other DOE program offices to develop workforce and science education efforts. These efforts leverage existing WDTS capabilities and resources, particularly those developed within the DOE national laboratory system. WDTS has established several programs and supporting infrastructure dedicated to STEM education and workforce efforts (an online application system, outreach efforts, etc.) that have generated interest throughout the agency. As a result, other DOE programs often consult with WDTS as they launch new efforts or propose partnerships that leverage resources.

In FY 2009, WDTS worked with several programs as they developed workforce training and education initiatives. For example, the Office of Energy Efficiency and Renewable Energy (EERE) was encouraged to hire an Einstein Fellow to provide needed educational technical expertise for their efforts; the National Nuclear Security Administration (NNSA) consulted with WDTS as they developed a Faculty and Student Teams effort; and the Office of the Chief Human Capital Officer consulted with WDTS as they developed a STEM outreach effort in California.

In addition, WDTS provides support for K–12 educator professional development and undergraduate internship opportunities at all three NNSA laboratories, the National Renewable Energy Laboratory (EERE), Idaho National Laboratory (Office of Nuclear Energy), and the Savannah River Ecology Laboratory (Office of Environmental Management).

Budget Overview

In FY 2011, WDTS increases funding for the DOE Office of Science Graduate Fellowship program to support a second cohort of students who will pursue advanced science and engineering degrees in fields of basic research relevant to the DOE mission. Fellowships are awarded on a competitive basis and each award is for a period of three years contingent on the Fellow's progress.

Funding in Evaluation Studies is increased in FY 2011 to support the federal Science of Science Policy initiative focused on developing improved data, tools, and methods to assess the effectiveness of investments in science.

WDTS increases funding for the Academies Creating Teacher Scientists (ACTS) as part of an overall strategy to expand research and training opportunities and efforts to provide scientific and technical content to diverse and under-represented populations. Support for the FaST, Community College Institutes (CCI), Outreach, and Workforce Studies programs is also maintained in FY 2011.

Student Programs

Funding Schedule by Activity

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Student Programs			
Science Undergraduate Laboratory Internship	3,009	4,000	4,150
Community College Institute of Science and Technology	266	800	600
Pre-Service Teachers	220	428	450
National Science Bowl®	2,033	2,350	2,100
High School Engineering	0	500	400
DOE Office of Science Graduate Fellowship	100	5,000	15,000
Total, Student Programs	5,628	13,078	22,700

Description

The Student subprogram encourages and enables students from middle school through graduate school to pursue education and training, and ultimately career interests, in science, mathematics, and engineering important to the Office of Science and DOE mission.

Through the National Science Bowl®, WDTS provides experiences to inspire middle and high school students to continue and focus on STEM education and careers. Undergraduate students are provided with mentor-intensive research opportunities at the DOE national laboratories to enhance content knowledge in science and mathematics, while also developing investigative expertise. The DOE Office of Science Graduate Fellowship (DOE SCGF) program sponsors fellowships for talented students pursuing advanced degrees in areas of basic research important to the DOE mission.

Selected FY 2009 Accomplishments

- FY 2009 program evaluation validated that undergraduate research experiences at the DOE national laboratories significantly increased a student's interest in pursuing a STEM career and that their content knowledge in STEM fields of importance to DOE increased as a result of the experience. These evaluation findings confirmed the WDTS approach to STEM workforce development, which relies heavily upon mentored research experiences.
- WDTS sponsored the second annual Science and Energy Research Challenge (SERCh) in November 2009: a rigorous scientific poster competition for undergraduate students participating in DOE research projects at the national laboratories and universities. This competition highlighted the extraordinary quality of research and exposed the faculty at their home institutions to DOE and the research enterprise it supports. One hundred undergraduate students and 45 supporting faculty participated in this competition.
- In FY 2009, WDTS, partnering with the California State University (CSU) system, helped support the CSU "Science Teacher and Researcher" program. This innovative program brings together the long-standing success of the WDTS Pre-Service Teachers program with CSU's emerging K-12 STEM educator professional development program to build a life-long learning and support system

for K-12 educators. Forty pre-service educators supported by CSU participated in the second year of the implementation of the model which, through evaluation, has proven successful in its goals.

- Evaluations performed on 600 scientific abstracts produced by undergraduate students confirm that these WDTS-supported students are participating in highly technical research projects under the close supervision of a senior laboratory scientist. The evaluations also provide a leading indicator that WDTS undergraduate programs are succeeding in their goal of promoting effective mentor/protégé relationships.

Detailed Justification

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Science Undergraduate Laboratory Internship	**3,009**	**4,000**	**4,150**

Science Undergraduate Laboratory Internship (SULI) supports a diverse group of students at DOE's National Laboratories in individually mentored research experiences. Students spend an intensive 10–16 weeks working under the individual mentorship of resident scientists, produce a peer-reviewed abstract and research paper, and attend seminars on science careers and how to become part of the scientific community.

Goals and outcomes are measured based on students' research papers and abstracts, pre- and post-surveys, and an annual evaluation by a group of peers, both within and outside of DOE. An undergraduate student journal is published annually with selected full length peer-reviewed research papers and all abstracts of SULI students. Full research papers published in the journal are presented by the student authors at a poster competition at the annual meeting of the American Association for the Advancement of Science. An annual competition first held in 2008, the Science and Energy Research Challenge (SERCh), recognizes the 15 best posters produced by SULI students through a rigorous and peer reviewed selection process.

In FY 2009, a total of 341 SULI students were supported by WDTS. An additional 35 students were sponsored by NSF. WDTS will support an estimated 570 SULI students in FY 2010 and 590 students in FY 2011. In FY 2010, 100 of these undergraduates will be paired with college faculty as part of the WDTS Faculty and Student Teams (FaST) program. In FY 2011, 120 of these SULI undergraduates will participate in FaST.

Community College Institute of Science and Technology	**266**	**800**	**600**

The Community College Institute (CCI) of Science and Technology, which provides a mentored research internship at a DOE national laboratory for highly motivated community college students, is designed to address DOE's workforce shortages, particularly at the skilled technician level for DOE mission critical areas, such as "green technology" deployment and scientific instrumentation. CCI students spend an intensive 10–16 weeks working under the individual mentorship of resident scientists, produce an abstract and formal research paper, and attend professional enrichment activities, workshops, and seminars on career options and how to become part of the scientific community, and enhance their professional skills.

Goals and outcomes are measured based on students' research papers and abstracts, pre- and post-surveys, and external evaluation. An undergraduate student journal was created to publish selected full research papers and all student abstracts.

(dollars in thousands)

FY 2009	FY 2010	FY 2011

In FY 2009, 52 students directly participated in this internship. Eleven additional students were sponsored by NSF. WDTS will support an estimated 115 CCI students in FY 2010 and 85 students in FY 2011.

Pre-Service Teachers **220** **428** **450**

The Pre-Service Teachers (PST) program, a partnership with NSF, prepares undergraduate students for a K–12 STEM education career. This effort addresses the national need to improve the content knowledge of STEM educators prior to entering the teaching workforce and to improve the retention rate of those educators once they enter the field (which has a 50% dropout rate during the first five years). Students spend an intensive 10 weeks working under the mentorship of a master teacher and a DOE laboratory scientist to help maximize the building of content knowledge and skills through the research experience. They also produce an abstract and educational module related to their research; an optional research paper, poster, or oral presentation; and attend professional enrichment activities, workshops, and seminars that help students apply what they learn to their academic program and the classroom. Goals and outcomes are measured based on students' abstracts, education modules, pre- and post-surveys, and external evaluation.

In FY 2009, 6 DOE national laboratories hosted 29 participating students. In FY 2010, WDTS funding supports 60 students and 7 master teachers at 7 DOE national laboratories. In FY 2011, the increase in funding will support 63 students and 7 master teachers at 7 DOE national laboratories.

National Science Bowl® **2,033** **2,350** **2,100**

The National Science Bowl® is an internationally recognized, prestigious academic event for high school and middle school students. It has attained its level of recognition and participation through a grass-roots design, and encourages the voluntary participation of more than 7,000 professional scientists, engineers, and educators from across the Nation. Students answer questions on topics in astronomy, biology, chemistry, mathematics, and physics in a highly competitive, Jeopardy®-style format.

In its 20-year history (1991–2010), more than 250,000 students from across the Nation have participated in regional and national competitions and have been encouraged to pursue careers in mathematics and science. The National Science Bowl® provides students and educators with a forum to receive recognition for their talent and hard work by solving academic problems in selected fields of science and math, in addition to their participation in various hands-on science challenges. In 2011, both the high school and middle school teams that win their regional events will attend the four-day national finals held in Washington, D.C. During this time, the students participate in a day of scientific seminars and science discovery activities with the students "doing" science, with the event culminating in an academic competition. Middle school teams participate in the model hydrogen fuel cell car competition. WDTS funding provides all of the travel and lodging expenses for each winning team attending the national event, seminar speakers, trophies, awards, and equipment for the various hands-on and interactive science activities and events.

The number of regional events remains relatively constant from one year to the next with 67 to 70 high school and 36 to 40 middle school teams participating in the national competition in recent years. About 22,000 middle and high school students participate at the regional and national competitions each year, along with more than 7,000 coaches and volunteers.

	(dollars in thousands)		
	FY 2009	FY 2010	FY 2011
High School Engineering	**0**	**500**	**400**

The High School Engineering activity (formerly the Real World Design Challenge [RWDC]) originated out of the National Science Bowl® high school engineering competition. The National Science Bowl® focuses on basic research knowledge, but for 5 years high school students also participated in an engineering challenge (typically a model fuel cell car event) as part of the competition. In FY 2010, WDTS is reviewing options to determine the most effective way to promote engineering education at the high school level, focusing on the sciences and technologies sponsored by DOE. Emphasis will be made on increasing under-represented population participation.

DOE Office of Science Graduate Fellowship	**100**	**5,000**	**15,000**

WDTS is implementing the DOE Office of Science Graduate Fellowship (DOE SCGF) program in FY 2010 with an initial cohort of approximately 160 graduate students. Approximately 80 graduate student fellowships are being supported through funding provided by the Recovery Act, and an additional 80 students are being supported by FY 2010 appropriated funds. The goal of the Fellowship is to encourage talented students to pursue research-focused graduate studies in physics, chemistry, biology, mathematics, computer science, engineering, and environmental science—areas of basic research important to the DOE mission. Applicants must be U.S. citizens pursing graduate studies at a U.S. accredited college or university. Awards are competitively selected on the basis of merit review of applications against established merit review criteria. The Fellowship provides up to three years of support for a graduate student, including a stipend for tuition and fees, an annual stipend for living expenses, and a research stipend that can be used for costs associated with the student's research and for travel to conferences and DOE scientific user facilities.

Program evaluation will include pre- and post-surveys of students, as well as longitudinal studies that determine whether students continue to pursue careers in scientific and technical fields. The FY 2011 funding will support a new cohort of 170 graduate fellows, creating a total of two cohorts (including fellows supported by Recovery Act funding) of 330 fellows.

Total, Student Programs	**5,628**	**13,078**	**22,700**

Explanation of Funding Changes

	FY 2011 vs. FY 2010 ($000)
Science Undergraduate Laboratory Internship	
The number of students participating in this program increases by 20 in FY 2011, from 570 in FY 2010 to a total of 590 in FY 2011.	+150
Community College Institute of Science and Technology	
The number of students participating in this program decreases by 30 from 115 in FY 2010 to 85 in FY 2011.	-200

	FY 2011 vs. FY 2010 ($000)
Pre-Service Teachers	
The number of students participating in this program increases by 3 in FY 2011, from 60 in FY 2010 to 63 students.	+22
National Science Bowl®	
Support is decreased due to lower costs associated with kits needed for the middle school solar car competition.	-250
High School Engineering	
Support is decreased due to a restructuring of WDTS support for the former Real World Design Challenge activity.	-100
DOE Office of Science Graduate Fellowship	
A new cohort of 170 Fellows will be funded in FY 2011, joining the first cohort of 80 from FY 2010 and 80 supported by the Recovery Act.	+10,000
Total Funding Change, Student Programs	**+9,622**

Educator Programs

Funding Schedule by Activity

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Educator Programs			
Academies Creating Teacher Scientists	4,130	3,750	4,200
Faculty and Student Teams	1,212	1,000	1,200
Albert Einstein Distinguished Educator Fellowship	1,000	1,000	1,000
Total, Educator Programs	6,342	5,750	6,400

Description

Improving the ability of educators at all levels to serve as mentors and teach science content is one of the most effective ways to increase the size and quality of the STEM workforce. Mentored laboratory research experiences are an effective approach to meet this goal. WDTS has built programs at the K–12 and undergraduate levels that focus on increasing educator knowledge of DOE science and technology content, programs and missions, providing them with the resources that enable them to be successful in the classroom. The Academies Creating Teacher Scientists (ACTS) program is the platform from which WDTS launches its long-term relationships with K–12 educators. The Faculty and Student Teams (FaST) program is WDTS's premier mechanism to bring under-represented faculty and students into the mainstream of DOE's research enterprise. The Albert Einstein Distinguished Educator Fellowship benefits Federal agencies and Congressional offices because these outstanding educators provide their real-world classroom expertise and advice to national policy makers.

Selected FY 2009 Accomplishments

- ACTS participants in FY 2009 reported in evaluation surveys that their content knowledge in physics, chemistry, and geophysics increased by more than 20%, on average: a key indicator that the program is succeeding in embedding key science content into K–12 classrooms.
- In FY 2009, WDTS significantly increased support for students and faculty through the FaST program, enabling an additional 30 faculty and 120 students from under-represented institutions to participate in mentored research projects at DOE national laboratories. Faculty and students reported in evaluation surveys that their scientific content knowledge, ability to conduct research, and understanding of how to pursue a research career increased as a result of the FaST experience.

Detailed Justification

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Academies Creating Teacher Scientists	**4,130**	**3,750**	**4,200**

ACTS requires a 3-year commitment by educators to participate in this program. Each educator spends an intensive 4–8 weeks annually at DOE national laboratories working under the mentorship of master educators and laboratory scientists to build content knowledge, research skills, and a lasting connection with the scientific community through the research experience. Master educators, who are expert K–12

educators and adept in both scientific research and scientific writing, act as liaisons between the mentor scientists and the educator participants. This helps the educators transfer the research experiences to their classrooms. Participants receive an $800 per week stipend plus travel and housing expenses while at DOE national laboratories.

The program includes self-identification of science content gaps by the educator participant, pre- and post-surveys that benchmark the progress of each participant, and a requirement for successful development of a professional development plan by each educator. Program impact is determined through review of the surveys and development plans, national laboratory self-appraisals, evaluation of impact on local STEM education and student achievement, and the ultimate retention of the educators in STEM K–12 education.

DOE ACTS funded 229 educators in FY 2009 and will fund 212 educators (140 continuing and 72 new) and 14 master teachers in FY 2010. The FY 2011 request funds a total of 238 educators (212 continuing and 26 new) and provides master teachers at each participating laboratory.

Faculty and Student Teams **1,212** **1,000** **1,200**

Faculty and Student Teams (FaST) provides an opportunity for faculty and students from under-represented colleges and universities to work on a mentor-intensive science research project at a DOE national laboratory. Faculty members are encouraged to return to the laboratory in subsequent summer terms. The program has two key components: faculty professional development designed to encourage faculty with limited research experience to develop grant proposals and participate in DOE research programs and student cohorts who accompany the faculty member and participate in a mentored research effort. FaST activities at DOE national laboratories are also being conducted in collaboration with the NSF.

Surveys and other evaluation studies have revealed that faculty support of students at the DOE national laboratories is particularly important for Minority Serving Institutions (MSIs), which are primarily teaching institutions and generally do not have the ability to support research activities at their home institutions. The FaST program enables the MSIs to build faculty research capabilities, encourages cohorts of diverse students to participate in DOE research, and improves the retention and recruitment of under-represented populations in the DOE system.

Beginning in FY 2010, all of the undergraduate students participating in FaST are supported on FaST teams will instead be supported through the SULI and CCI programs. The FaST budget request supports faculty participation. WDTS will support 50 faculty in FY 2010 and will support at least 60 faculty in FY 2011.

Albert Einstein Distinguished Educator Fellowship **1,000** **1,000** **1,000**

The Albert Einstein Distinguished Educator Fellowship for K–12 STEM educators brings classroom and education expertise to Congress, DOE, and other Federal agencies' education and outreach activities. These educators provide practical insights and real-world perspectives to policy makers and program managers. The Einstein Fellowship is also a valuable professional development opportunity for the educators because they return to the education field with knowledge of Federal programs and resources and an improved understanding of national education policies.

WDTS manages the Einstein Fellowship on behalf of the Federal government and encourages participation by other Federal agencies. In FY 2010, a total of 23 fellows participated in the program:

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
3 fellows at DOE, 4 in Congress, and 16 at other Federal agencies, including NSF, NASA, NOAA, and NIH. Of these, 6 were directly supported by WDTS.			
Evaluation of the Einstein Fellowship program is conducted through longitudinal surveys of past participants, surveys of current participants, and reviews by external experts.			
The FY 2011, WDTS request will directly support 6 fellows. The funding will also augment stipends and health insurance for the participants.			
Total, Educator Programs	**6,342**	**5,750**	**6,400**

Explanation of Funding Changes

	FY 2011 vs. FY 2010 ($000)
Academies Creating Teacher Scientists	
The number of educators participating in DOE ACTS increases by 26 in FY 2011, from 212 in FY 2010 to 238.	+450
Faculty and Student Teams	
The number of faculty supported by DOE increases by 10 in FY 2011, from 50 in FY 2010 to 60 in FY 2011.	+200
Total Funding Change, Educator Programs	**+650**

Program Administration and Evaluation

Funding Schedule by Activity

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Program Administration and Evaluation			
Laboratory Equipment Donation Program	75	240	200
Evaluation Studies	220	200	5,200
Technology Development and On-Line Application	441	400	300
Outreach	302	610	400
Workforce Studies	575	300	300
Mentor Program	0	100	100
Total, Program Administration and Evaluation	1,613	1,850	6,500

Description

The Program Administration and Evaluation subprogram provides the data, analysis, and other resources required for effective WDTS program management and delivery. Analytical/evaluation studies are used to ensure the efficiency and effectiveness of WDTS programs. Non-financial resources, such as laboratory equipment and on-line applications, enable WDTS performers and participants to effectively participate in WDTS programs. In addition, WDTS has initiated a number of outreach efforts with universities, professional societies, the private sector, and other Federal agencies designed to fully leverage the WDTS investment in workforce development and STEM education programs.

Selected FY 2009 Accomplishments

- WDTS developed a consistent evaluation effort in FY 2009 that aligned programmatic goals to 6 leading indicators of success (retention, diversity, quality, content knowledge, competition with reward, and leveraging) and enabled WDTS to set uniform expectations for program management and success. A rigorous review process of undergraduate research abstracts was undertaken in FY 2009 that revealed inconsistencies in program management of the flagship SULI program and led to program changes, such as new scoring rubric for scientific abstracts, to improve the overall quality of the abstracts and effectiveness of the SULI, CCI, and PST programs.
- WDTS implemented a competitive solicitation process in FY 2009 for all of WDTS's DOE national laboratory-based programs, linked to WDTS's 6 leading indicators and overall evaluation processes. The result is an allocation of WDTS resources in FY 2010 that will be tied to program effectiveness at the DOE National Laboratories.
- In FY 2009, WDTS, in partnership with the DOE Office of Scientific and Technical Information (OSTI), successfully piloted the *ScienceEducation.gov* web portal, which provides a single location for students and faculty to identify content, experiments and other materials that originate from WDTS and the DOE national laboratories. The new website utilizes "web 2.0" technology to identify best practices based on community views and also utilizes a sophisticated new search protocol that enables students and educators to identify content by grade level based on state standards.

Detailed Justification

	(dollars in thousands)		
	FY 2009	FY 2010	FY 2011
Laboratory Equipment Donation Program	**75**	**240**	**200**

The Laboratory Equipment Donation Program provides excess equipment to faculty at institutions of higher education for energy-related research. Through the Energy Asset Disposal System, DOE sites identify excess laboratory equipment. Colleges and universities can search for equipment of interest to them and apply via the website. DOE property managers approve or disapprove the applications. The equipment is free, but the receiving institution pays for shipping costs. In FY 2009, more than 400 individual pieces of surplus scientific equipment from DOE national laboratories with an original value of more than $9,000,000 were donated to U.S. universities through the Laboratory Equipment Donation Program.

WDTS expanded this program in FY 2010 to middle schools and high schools and will pay for shipping costs to those institutions.

Evaluation Studies	**220**	**200**	**5,200**

In FY 2011, the Office of Science will initiate a research program to assess the effectiveness of investments in science, consistent with the federal interagency Science of Science Policy (SoSP) initiative. The Office of Science has worked closely with the Office of Science and Technology Policy, the National Science Foundation and other Federal agencies in the development of the SoSP effort, including the development of *The Science of Science Policy: A Federal Research Roadmap*, published in November 2008, and partnering in several community workshops. Research awards in FY 2011 will be competitively awarded on the basis of peer review.

Technology Development and On-Line Application	**441**	**400**	**300**

Technology Development and Online-Application Systems provides for a new IT architecture, which is a 3-year endeavor, to enhance and maintain the WDTS application and electronic portfolio system. Funding in FY 2011 will support the third year of the new design of all of the websites, on-line applications, DOE ACTS education portfolios, Graduate Fellowship, and pre- and post-surveys that participants complete during their internship/fellowship experiences.

Outreach	**302**	**610**	**400**

Outreach provides information to WDTS program alumni (from competitions, undergraduate research internships, educator programs, etc.) to encourage their continued participation in WDTS programs; creates a common database of internship opportunities, fellowships, and other research-based educational opportunities offered by WDTS; assists in the coordination of outreach activities with other Federal agencies; and enhances communication about WDTS programs to the public. A major emphasis of the outreach effort is to increase the participation of under-represented groups and institutions in WDTS programs. WDTS has established relationships with major associations representing under-represented groups and has been working with other Federal agencies, including NSF, to develop cooperative programs that leverage WDTS funds. This enables WDTS to maintain outreach efforts despite reduced funding.

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Workforce Studies	**575**	**300**	**300**

Workforce Studies focus on the critical skill gaps, by scientific discipline, which may exist within the Office of Science Federal and national laboratory workforces. These studies are designed to be long-term sustained efforts that provide a baseline of data to effectively manage WDTS programs and set overall strategic direction. Full implementation in FY 2009–2010 will provide in-depth and systematic reviews of workforce requirements and help determine the long-term benefits of WDTS program investments by tracking the progress of STEM students and workers who participate in WDTS programs.

Mentor Program	**0**	**100**	**100**

The Mentor Program is implemented in FY 2010 and has two components: a professional development effort designed to recruit and train mentor scientists at DOE national laboratories and a recognition/rewards program that will provide incentives for mentor participation in WDTS programs. Scientist mentors are the key resource for WDTS programs and must be nurtured in a systematic manner to ensure a sufficient supply of mentors.

Total, Program Administration and Evaluation	**1,613**	**1,850**	**6,500**

Explanation of Funding Changes

	FY 2011 vs. FY 2010 ($000)
Laboratory Equipment Donation Program	
FY 2010 included a one-time increase to expand the program to high-need middle and high schools.	-40
Evaluation Studies	
Increased funding supports participation in the federal interagency Science of Science Policy initiative.	+5,000
Technology Development and On-Line Application	
A major development effort for WDTS on-line technologies occurred from FY 2009–2010 and will be completed in FY 2011. Funding reflects the level of development activity needed to complete the project and sustain the WDTS technology investments.	-100
Outreach	
Cooperative programs with other federal agencies leverage WDTS funding.	-210
Total Funding Change, Program Administration and Evaluation	**+4,650**

Supporting Information

Operating Expenses, Capital Equipment and Construction Summary

(dollars in thousands)

	FY 2009	FY 2010	FY 2011
Operating Expenses	13,583	20,678	35,600