



# Science + Technology

## IN CONGRESS

December  
2001

### Cloudy Future for Space Station as NASA Gets New Chief

In a move that throws doubt on the future of the International Space Station (ISS), President Bush has appointed Sean O'Keefe, formerly deputy director of the Office of Management and Budget (OMB), to be the new administrator of the National Aeronautics and Space Administration (NASA). The Senate confirmed the nomination on December 20.

The appointment was announced just a week after O'Keefe appeared at a November 7 House Science Committee hearing to defend a report criticizing the space station's financial management. He came under fire from some committee members for saying that NASA should focus its current efforts on maintaining a 3-person crew on the station and not expanding its capacity to the 7-member crew originally envisioned for the ISS.

At his Senate confirmation hearing, O'Keefe received unanimous support from members of the Commerce Committee's Subcommittee on Science, Technology, and Space, but the concerns expressed by the House Science Committee members were echoed loudly by Sens. Bill Nelson (D-FL) and Kay Bailey Hutchison (R-TX). Both hail from states that are home to NASA centers critical to the space station program.

Debate over ISS has heated up since NASA announced last spring that the

project, which was already several years behind schedule and billions of dollars over budget, was facing another \$4 billion cost overrun. In conjunction with OMB, NASA created the ISS Management and Cost Evaluation Task Force to assess the program's financial footing. The task force, which was chaired by former Martin Marietta president A. Thomas Young, released a November 1 report which was the topic of the Science Committee hearing. Young testified alongside O'Keefe, who was

representing OMB and strongly endorsed the report.

The report found that "[t]he assembly, integration, and operation of the [station's] complex systems have been conducted with extraordinary success, proving the competency of the design and the technical team," but that when it comes to financial management, the ISS program has "inadequate methodology, tools, and controls." Further, the report concluded that the current pro-

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### Counterterrorism R&D Rises in FY 2002

In response to the terrorist attacks of September 11 and anthrax attacks through the U.S. mail, Congress and President Bush approved \$1.5 billion for terrorism-related research and development (R&D) in fiscal year (FY) 2002 appropriations. Counterterrorism R&D, funded by 11 different federal agencies, is nearly triple the FY 2001 level of \$579 million (see table on page 2). This is a drastic change from the initial budget request of \$555 million that the Bush Administration proposed for the current year. Roughly half the final \$1.5 billion comes from regular FY 2002 appropriations, and half from emergency appropriations in a \$40 billion post-September 11 response fund.

The original request was quickly overtaken by national events. The initial increases proposed after September 11, however, were modest. Although Congress and the President approved a \$40 billion emergency fund in September (Public Law 107-38) to increase military funding needs and disaster relief, R&D was not originally included in the president's plans for allocating the monies.

Of the \$40 billion, the president was given sole authority to allocate \$20 billion, while the president and Congress had to allocate the remaining funds through the appropria-

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*"If you succeed [in expanding the space station], you will be my hero. If not, I will be all over you."*  
— Sen. Kay Bailey Hutchison

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## Counterterrorism R&D

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tions process. Of the president's \$20 billion, nothing was allocated to R&D. In the request for the remaining funds, only a few million dollars would have gone to counterterrorism R&D.

The Senate, however, pushed to include more than \$800 million for counterterrorism R&D, but was delayed in drafting its version of the bill because it insisted on expanding the total price tag to \$35 billion. The threat of a presidential veto hastened the Senate to squeeze the \$35 billion down to \$20 billion before attaching it to the defense appropriations bill.

During conference, the Senate prevailed in most of its emergency R&D plans, and the final bill contained \$711 million for R&D. Counterterrorism R&D thus took a big leap from \$579 million in FY 2001 to nearly \$1.5 billion in FY 2002.

Summaries of agency counterterrorism R&D portfolios follow.

The U.S. Department of Agriculture's only terrorism-related R&D was a small dedicated bioterrorism effort and a portion of its activities in the Agricultural Research Service. An infusion of \$113 million in emergency R&D funds, however, will dramatically change that. Of the increase, \$73 million is allocated for construction of an animal biocontainment facility, as well as security upgrades for laboratories.

The Department of Defense's major effort in counterterrorism R&D is DARPA's Biological Warfare Defense program. Though funding declines from \$167 million in FY 2001 to \$147 million in FY 2002, most other counterterrorism R&D programs receive increases. This brings the DOD total to \$353 million in FY 2002, an increase of 50 percent.

The Department of Energy (DOE) develops counterterrorism technologies, and performs research in radiation detection, and chemical and biological detectors. In addition to funding for its ongoing work, DOE received emergency funds to upgrade security at its laboratories, and \$78 million for nonproliferation R&D to combat potential nuclear terrorism.

In the Department of Health and Human Services (HHS), the Centers for Disease Control and Prevention (CDC) maintains a laboratory specifically to combat bioterrorism. Because of the CDC's higher public profile,

it received more than \$1 billion in emergency funds. CDC counterterrorism R&D climbs from \$37 million in FY 2001 to \$130 million in FY 2002, mostly to boost security and to fund research on bioterrorism threats, particularly anthrax.

The National Institutes of Health (NIH), also a part of HHS, funds research on bioterror agents, focusing on genomics, infrastructure, and the design and testing of diagnostics and vaccines. NIH counterterrorism R&D jumps from \$50 million to \$293 million, including \$155 million in emergency appropriations for construction of a new biosafety laboratory and for bioterrorism R&D.

The Federal Aviation Administration received a boost from \$55 million to \$100 million for airport security.

The Environmental Protection Agency (EPA) received \$176 million in counter-

terrorism funds, of which an estimated \$70 million will go to R&D and R&D facilities, including drinking water vulnerability assessments, and anthrax decontamination work.

The National Aeronautics and Space Administration (NASA) received \$109 million in counterterrorism funds, mostly to upgrade security. An estimated \$33 million in R&D funds will go to information security and counterintelligence work.

It remains to be seen how much of the FY 2002 emergency R&D funding will become a permanent part of agencies' R&D portfolios, and how much will be a one-time appropriation responding to the unique circumstances of this past year. ●●●

— Kei Koizumi

AAAS R&D Budget and Policy Program

[www.aaas.org/spp/R&D](http://www.aaas.org/spp/R&D)

Federal Counterterrorism R&D (Budget authority in millions of dollars.)					
	FY 2001 Estimate	FY 2002 Request	FY 2002 Approved	Change FY 01-02 Amount	Percent
Agriculture	52	42	<b>195</b>	143	276.4%
(Agri. Research Service)	49	38	<b>191</b>	143	294.6%
(APHIS)	3	3	3	0	0.0%
Commerce (NIST)	4	4	<b>10</b>	6	151.8%
Department of Defense	235	243	<b>353</b>	118	50.1%
Department of Energy	68	56	<b>194</b>	126	184.7%
(NNSA)	63	49	<b>109</b>	46	72.1%
(Other Defense programs)	5	7	<b>85</b>	80	1634.7%
Environmental Protection Agency	0	0	<b>70</b>	70	--
Health and Human Services	116	128	<b>451</b>	335	288.2%
(AHRQ)	0	0	0	0	--
(CDC)	37	23	<b>130</b>	93	256.0%
(FDA)	0	5	<b>20</b>	20	--
(NIH)	50	93	<b>293</b>	244	489.9%
(Office of Secretary)	30	8	<b>8</b>	(23)	-75.0%
Justice	43	24	<b>71</b>	28	65.3%
(FBI)	7	7	<b>7</b>	0	0.0%
(Office of Justice Programs)	36	17	<b>64</b>	28	77.8%
Nat'l Aeronautics and Space Admin.	0	0	<b>33</b>	33	--
State	5	6	<b>6</b>	1	24.0%
Transportation	55	51	<b>101</b>	47	85.2%
(FAA)	55	50	<b>100</b>	46	84.0%
(FTA)	0	1	<b>1</b>	1	700.0%
Treasury	1	1	<b>1</b>	0	0.0%
<b>Total Terrorism R&amp;D</b>	<b>579</b>	<b>555</b>	<b>1,484</b>	<b>905</b>	<b>156.5%</b>

OMB data from OMB's *Annual Report to Congress on Combating Terrorism*, August 2001. FY 2002 Approved figures are AAAS estimates of R&D in enacted FY 2002 appropriations bills, including emergency funds appropriated in Public Law 107-38 and allocated in appropriations bills. Figures include conduct of R&D and R&D facilities. Figures do not include non-R&D counterterrorism activities. December 26, 2001.

# New Program for Math & Science Teachers Gets Little Funding

After nearly a year of negotiations, Congress passed a sweeping education reform bill in December which included the creation of a new program for math and science teachers. But passage just a few days later of the appropriations bill that funds federal education programs left it with scarce funding.

One of President Bush's first priorities upon his election was reform of federal K-12 education programs, which he hoped to carry out through reauthorization of the Elementary and Secondary Education Act (ESEA). In December 2000, he convened a

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*Good math and science education  
"is of critical importance to our  
Nation's future competitiveness."*

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bipartisan meeting of key members of the congressional education committees, and by early 2001 he had released a reform proposal entitled "No Child Left Behind." Both the House and Senate went on to pass bipartisan ESEA reauthorization bills modeled after this proposal, and after long and difficult negotiations, a conference committee produced a final bill (H.R. 1) which the president plans to sign into law in January.

Among the programs eliminated by the bill is the Eisenhower Professional Development program, which provided opportunities for K-12 teachers to expand their knowledge and expertise. In fiscal 2001, the Eisenhower program received \$485 million, \$250 million of which was set aside for programs aimed specifically at math and science teachers.

The new bill replaces Eisenhower with a broad "Teacher Quality" program, which provides grants to states for a wide array of purposes relating to teacher quality, including professional development programs. However, the bill also includes a new program aimed specifically at math and science education, which will fund partnerships between state and local education agencies and institutions of higher education. The partnerships are designed to conduct professional development programs for math and science teachers, as well as several other types of activities to improve

math and science teaching.

This new program was strongly supported by the scientific, education and business communities, which argue that the scientific literacy of the nation's workforce is essential to national security and economic prosperity. They point to the labor shortage that has existed in the high-tech sector in recent years and the prevalence of foreign students in U.S. graduate programs as evidence that math and science education programs in the U.S. are particularly in need of improvement.

However, the fiscal 2002 appropriations bill for the Departments of Labor, Health and Human Services, and Education (H.R. 3061), which passed Congress shortly after the ESEA bill, allocated \$2.85 billion for the broad teacher quality initiative but just \$12.5 million for the math and science partnerships, far short of the \$450 million authorized by ESEA and advocated by proponents of the program.

The conference report acknowledges that good math and science education "is of critical importance to our Nation's future competitiveness," and agrees that "math and science professional development opportunities should be expanded," but relies on the states to fund such programs within the teacher quality program. "The conferees strongly urge the Secretary [of Educa-

tion] and States to utilize funding provided by the Teacher Quality Grant program, as well as other programs funded by the federal government, to strengthen math and science education programs across the Nation," the report states.

A similar program has also been created within the National Science Foundation (NSF), as proposed in President Bush's original reform plan, and was provided with \$160 million for the current year. However, the NSF grants will be distributed through a nationwide competition, and are not likely to achieve the balance or scope of the \$450 million program envisioned by the ESEA authors.

Also included in NSF's fiscal 2002 budget are two pilot education programs funded at \$5 million apiece. One is based on legislation known as the "Tech Talent" bill (S. 1549) authored by Sen. Joseph I. Lieberman (D-CT) which would provide grants to colleges and universities that pledge to increase the number of math, science and engineering majors they graduate. The other is based on a proposal by Rep. Sherwood L. Boehlert (R-NY) included in H.R. 1858 which will provide scholarships to undergraduate students majoring in math, science or engineering who pledge to teach for two years following their graduation. ●●●

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## Report Language on Evolution Attached to Education Bill

The conference report accompanying the education reform bill passed by Congress in December (H.R. 1, see above article) includes language regarding the teaching of evolution, replacing a "sense of the Senate" clause that had included similar wording and was dropped from the bill itself.

The federal government has historically left many aspects of education policy to state and local governments, and Congress is usually particularly careful to avoid any involvement in curriculum issues, which often provoke controversy at the local level. However, during debate on the education bill in June, the Senate passed a "sense of the Senate" amendment proposed by Sen. Rick Santorum (R-PA) dealing with the way evolution is taught in schools. The resolution stated that "where biological evolution is taught, the curriculum should help students to understand why this subject generates so much continuing controversy."

While the resolution appears uncontroversial on its face, the statement was hailed by anti-evolution groups as a major victory, and criticized by scientific organizations. Proponents view it as an endorsement of the teaching of alternatives to evolution in science classes, and consider it a vindication of a 1999 decision by the Kansas Board of Education

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# Senate Postpones Action on Cloning Ban

Supporters of a ban on human cloning that passed the House last July failed to force Senate action on the bill, but Senate Majority Leader Thomas A. Daschle (D-SD) has agreed to allow consideration of the ban early in the next session.

While the issue of human cloning has been the subject of much public debate since the birth of the cloned sheep Dolly was announced in 1997, Congress had not taken any action on the issue until this year. Then, on July 31, the House of Representatives voted to criminalize all forms of human cloning, whether for reproductive or research purposes. The bill (H.R. 2505), authored by Rep. Dave Weldon (R-FL), passed by a vote of 265-162 after an alternative measure (H.R. 2608) offered by Rep. Jim Greenwood (R-PA) was rejected by a similar margin.

The action was praised by many religious conservatives, as well as some environmental groups concerned about the impact of biotechnology, but criticized by some scientists for being too broad and stifling potentially life-saving research. The bill is supported by President Bush and passed the House shortly before his oval office address on the related issue of human embryonic stem cell research.

While the vast majority of scientists oppose human cloning resulting in a live birth, some support the cloning of human embryos if used strictly for scientific research. These distinct types of cloning are commonly referred to as "reproductive" and "therapeutic" cloning. The Greenwood bill, which was supported by the biotech industry, would have allowed therapeutic cloning and prohibited reproductive cloning.

Proponents of the Weldon bill raised two primary objections to the Greenwood approach: that a line between cloning for research and reproductive purposes would be difficult to enforce; and that it is immoral to create an embryo only to destroy it for use in research. Greenwood supporters countered that a ban on implantation of a cloned embryo would be no more difficult to enforce than a ban on cloning an embryo; and that the moral status of an embryo is less than that of a full human being and must be weighed against the potential benefits of research.

After successfully shepherding the bill

through the House, advocates of the Weldon legislation pushed for Senate passage of the companion measure (S. 790) sponsored by Sen. Sam Brownback (R-KS), but the issue shifted to the back burner after September 11. Nonetheless, when the appropriations bill that funds the Department of Health and Human Services (HHS) reached the floor of the Senate in late October, Sen. Brownback attempted to add the ban as an amendment.

Some senators objected to this tactic, however, citing a need for more time to study and debate the issue. Sen. Brownback dropped his amendment after Sen. Daschle agreed to bring up the ban as a free-standing bill in February or March of 2002. As part of the agreement, Sens. Tom Harkin (D-IA) and Arlen Specter (R-PA), chairman and ranking member of the Labor-HHS Appro-

priations Subcommittee, agreed to drop a paragraph on stem cell research opposed by the president, and promised to hold hearings on human cloning.

For much of 2001, public discussion of cloning had taken a back seat to that of stem cell research. Embryonic stem cells, which are extracted from four-day-old embryos, are primitive cells which can theoretically develop into virtually any type of cells in the human body, from blood cells to skin cells. Researchers in the private sector have conducted experiments on such cells after extracting them from excess embryos left over from fertility treatments.

The issues of stem cell research and cloning are closely linked. Researchers hope one day to use stem cells for tissue transplants, and one of the potential obstacles for such

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## Space Station *Continued from page 1*

gram plan for fiscal years 2002-6 is "not credible."

The task force recommended major changes in program management, and identified several areas for possible cost savings, including a reduction in shuttle flights to support the station from six to four per year. The panel also identified several steps to improve the program's scientific research, including better representation of the scientific community within the ISS program office.

At the House hearing, O'Keefe and Young refused to endorse the seven-person crew originally planned for the station as an "end state." Instead, they said NASA should produce a credible plan for achieving the "core complete" stage, which includes the three-person crew currently in place, before embarking on plans to expand. However, NASA has said that roughly 2.5 crew members are needed just to maintain the station, so with only three crew members, the time available for conducting research would be scarce. Indeed, the task force found that "[t]he U.S. Core Complete configuration ... as an end-state will not achieve the unique research potential of the ISS."

"[T]he approach the Task Force [recommends] ... seems to me to be a prescription for keeping the program in just the sort of limbo that the Task Force properly decries," said Rep. Ralph M. Hall (D-TX), ranking member of the Science Committee. "We should be explicit that we are committed to completing the Space Station with its long-planned 7-person crew capability." A three-person ISS, he said, is not worth the money.

Rep. Dave Weldon (R-FL) criticized the proposed reduction in shuttle flights and said it would lead to layoffs. "It looks like the administration is not a supporter of the manned space flight program," he declared.

Science Committee Chairman Sherwood L. Boehlert (R-NY), however, defended the task force as saying, "We're not going to buy you a Cadillac until we see that you can handle a Chevy." In fact, nearly every member praised the panel's efforts to help NASA control costs, if not its view of what ISS's goals should ultimately be.

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*"Costs for the horrendously mismanaged International Space Station have shot out of control, while its capabilities have shrunk."*

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## CONGRESSIONAL RESEARCH SERVICE

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*Copies of CRS reports for congressional use are available by calling 202/707-7132.*

- **Federal Research and Development for Counter Terrorism: Organization, Funding, and Options (RL31202)**  
This report addresses whether the federal government is prepared adequately to conduct and use R&D in order to generate scientific and technological advances to combat terrorism. It discusses existing agency organization and R&D funding levels, and highlights recommendations made in authoritative reports for improving the existing structure. The report also identifies issues that should be considered when assessing potential changes to counterterrorism R&D.
- **High Performance Computers and Export Control Policy: Issues for Congress (RL 31175)**  
This report addresses U.S. export policy and technologies such as high performance computers (HPCs) that may have both commercial and military applications outside of the U.S. It discusses existing regimes and regulations, both domestic and international, the existing benchmark for measuring whether HPCs should be exportable and whether that benchmark should be revised, and the national security and economic security implications of changing the existing regime.
- **Maritime Security: Overview of Issues (RS21079)**  
This report discusses how increased trade and economic globalization have benefited from efficiencies in maritime transportation and the liberalization of trade agreements. It highlights the drawbacks of these changes as facilitating the expansion of transnational crime and as a medium for terrorist activities. The report also summarizes an interagency report that analyzed the state of security in U.S. seaports.

## GENERAL ACCOUNTING OFFICE

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*Copies of GAO Publications are available online at [www.gao.gov](http://www.gao.gov) or by calling 202/512-6000.*

- **NASA: Status of Plans for Achieving Key Outcomes and Addressing Major Management Challenges (GAO-02-184)**  
The report provides a review of NASA's fiscal year 2002 performance plan for the selected key outcomes: to expand scientific knowledge of the Earth's system, to expand the commercial development of space, and to deploy and operate the International Space Station. It notes that NASA's annual performance goals appear to be objective and should help to measure progress toward the outcomes. However, the plan still does not explain the reasons for changes in performance goals.
- **Biomedical Research: HHS Direction Needed to Address Financial Conflicts of Interest (GAO-02-89)**  
This report includes a review of five universities that have developed broad policies and procedures regarding individual investigators' financial conflicts of interest. The universities acknowledged a need for better coordination of information

about investigators' financial relationships. It discusses the steps taken by HHS to improve its oversight and monitoring. However, this guidance does not provide detailed advice on managing institutional financial conflicts of interest.

- **Nuclear Weapons: Status of Planning for Stockpile Life Extension (GAO-02-146R)**  
This report discusses the Stockpile Stewardship Program, which is focused on maintaining the safety and reliability of the nation's nuclear weapons stockpile indefinitely without nuclear testing. It finds that NNSA's Office of Defense Programs is not developing a comprehensive stockpile life extension program plan as called for in the National Defense Authorization Act for Fiscal Year 2000.

## THE NATIONAL ACADEMIES

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*Government offices may obtain single complimentary copies by calling the Office of Congressional and Government Affairs at 202/334-1513. Others may order copies from the National Academy Press (800/624-6242, [www.nap.edu](http://www.nap.edu)).*

- **Investigating the Influence of Standards: A Framework for Research in Mathematics, Science, and Technology Education (ISBN: 0-309-07276-X)**  
This book addresses the issue of the influence of standards in education and, most importantly, whether standards truly improve student learning. It provides a framework to guide the design, conduct, and interpretation of research regarding the influences of nationally promulgated standards in mathematics, science, and technology education on student learning.
- **The Genomic Revolution: Unveiling the Unity of Life (ISBN: 0-309-07436-3)**  
The last fifty years have ushered in a revolution of knowledge in how organisms develop, function, and replicate. Scientists are now engaged in the task of sequencing of the human genome, which will lead to landmark changes in medicine, agriculture, and the study of evolution. This book provides a broad discussion regarding genomics from the basic presentation of ideas about heredity through the essential principles of molecular biology, including an exploration of the ethical implications of the genome project for individuals and society.
- **American Hazardscapes: The Regionalization of Hazards and Disasters (ISBN: 0-309-07443-6)**  
This book examines the risks associated with living and owning property in diverse regions across the United States. It summarizes what we already know about regional patterns of hazard events and losses, and discusses the nature of the events themselves and their impact on society. The book presents a regional ecology of disaster-prone or disaster-resistant states, and offers thoughts on what local, state, and federal managers need to do to meet the challenge of reducing hazard losses in the next century.

# scientific definitions

1. The act of making clear and distinct.
2. the act of stating a precise meaning or significance.

## EVOLUTION TERMS

**EVOLUTION** In general terms, biological evolution is the process of change by which new species develop from preexisting species over time; in genetic terms, evolution can be defined as any change in the frequency of alleles (i.e., specific forms of a gene) in populations of organisms from generation to generation. Darwin called this process "descent with modification."

**NATURAL SELECTION** The survival and reproduction of different classes of an organism at different rates due to variations in one or more (usually hereditary) characteristics. Through this process, the forms of organisms in a population that are best adapted to their local environment increase in number relative to less well-adapted forms over a number of generations.

**ADAPTATION** Any hereditary characteristic of an organism that improves its ability to survive and reproduce in its environment. Also used to describe the process of genetic change within a population, as influenced by natural selection.

**MENDELIAN INHERITANCE** The mode of inheritance of nearly all multicellular organisms. Inheritance is controlled by genes, which are passed on to offspring in the same form as they were inherited from the previous generation. An individual has two forms of every gene – one inherited from its father and the other from its mother.

**DARWINISM** Darwin's theory that species originated by evolution from other species and that evolution is mainly driven by natural selection. Differs from neo-Darwinism mainly in that Darwin did not know about Mendelian inheritance.

**NEO-DARWINISM** (1) Darwin's theory of natural selection plus Mendelian inheritance. (2) The larger body of evolutionary thought that was inspired by the unification of natural selection and Mendelism.

**MENDEL, GREGOR** An Austrian monk whose plant breeding experiments, begun in 1856, led to insights into the mechanisms of heredity that are the foundation of genetics today. His work was ignored in his lifetime and only rediscovered in 1900.

**DARWIN, CHARLES** The 19th-century naturalist considered the father of evolution. His landmark work, *On the Origin of Species*, published in 1859, presented a wealth of facts supporting the idea of evolution and proposed a viable theory for how evolution occurs – via the mechanism Darwin called "natural selection."

**HYPOTHESIS** An explanation of one or more phenomena in nature that can be tested by observations, experiments, or both. In order to be considered scientific, a hypothesis must be falsifiable, which means that it can be proven to be incorrect.

**THEORY** A well-substantiated explanation of some aspect of the natural world that typically incorporates many confirmed observations, laws, and successfully verified hypotheses.

SOURCE: PBS Evolution Library, [www.pbs.org/wgbh/evolution/library/glossary](http://www.pbs.org/wgbh/evolution/library/glossary)

## Evolution

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to eliminate evolution from state tests, a decision that has since been reversed.

Opponents, meanwhile, questioned the singling out of biological evolution. The resolution fails to differentiate between political and scientific controversy, a distinction considered crucial by many scientists. While evolution has generated a great deal of political and philosophical debate, the opponents argue, it is generally regarded by scientists as a valid and well-supported scientific theory.

In response to the resolution's passage, a letter signed by 96 scientific and education organizations was sent in August to Sen. Edward M. Kennedy (D-MA) and Rep. John Boehner (R-OH), the chairmen of the education conference committee, requesting that the language be removed from the final bill. In an apparent compromise, the committee declined to include it as a "sense of Congress" resolution in the bill itself, but added the following slightly altered language to the final conference report:

"The Conferees recognize that a quality science education should prepare students to distinguish the data and testable theories of science from religious or philosophical claims that are made in the name of science. Where topics are taught that may generate controversy (such as biological evolution), the curriculum should help students to understand the full range of scientific views that exist, why such topics may generate controversy, and how scientific discoveries can profoundly affect society."

This language has been praised by anti-evolution groups and criticized by scientists for the same reasons as the original amendment. Neither a sense of Congress resolution nor report language, however, has the force of law, so the debate has primarily symbolic importance. ●●●

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### FOR MORE INFORMATION:

*AAAS Program of Dialogue on Science, Ethics, & Religion:*  
[www.aaas.org/spp/dser/news.htm](http://www.aaas.org/spp/dser/news.htm)

*Joint Letter on Evolution in H.R. 1:*  
[www.agiweb.org/gap/legis107/evolutionletter.html](http://www.agiweb.org/gap/legis107/evolutionletter.html)

## Cloning

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a procedure is rejection of the implanted cells by the patient's immune system. Some scientists have argued that by creating an embryo cloned from one of the patient's cells, stem cells could be produced with the same genetic makeup, thus reducing or eliminating the risk of immune rejection.

In August, after much deliberation, President Bush issued a new policy allowing federal funding for some stem cell research, but critics questioned whether he had allowed sufficient room for scientific progress to be made. Some speculated that Congress would attempt to intervene and broaden the administration's policy. Even a report released in September by the National Academy of Sciences found that more research would be needed than what the president had allowed, including research on therapeutic cloning.

After September 11, however, the stem cell issue receded from the agenda. Then, in late November, the cloning issue exploded back on the scene after Advanced Cell Technology, a Worcester, Mass., company announced that it had produced the first cloned human embryos. While their claims were questioned by many scientists, the announcement was enough to thrust the issue back into the public mindset, and pressure for Senate action on the cloning ban increased.

Sen. Brownback tried again to force a debate on his bill, and offered an amendment imposing a six-month cloning moratorium to an unrelated railroad retirement bill, but both efforts ultimately failed due to the short time left in the session and the complexity of the issue. However, with Sen. Daschle's promise in hand, backers of the cloning ban are expected to launch a renewed effort in the next session. ●●●

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### FOR MORE INFORMATION:

*AAAS Policy Brief on Stem Cell Research:*  
[www.aaas.org/spp/cstc/issues/stemcells.htm](http://www.aaas.org/spp/cstc/issues/stemcells.htm)

## Space Station

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When O'Keefe was named to succeed Dan Goldin as NASA Administrator, it became clear that the task force report would be given high priority, and that lawmakers hoping for an immediate commitment to a seven-member crew were likely to be disappointed. Rep. Hall wasted no time in continuing the debate, however, releasing a statement just hours after the appointment became public. "Anything less [than a seven-member crew]," the statement read, "would compromise our space research effort, our relationships with the international partners, and ultimately the entire purpose and rationale of the Station program. I look forward to working with the new Administrator to achieve these goals."

The views aired at the House hearing were largely reiterated when O'Keefe testified before the Senate at his December 7 confirmation hearing. Chairman Boehlert introduced him to the subcommittee enthusiastically. "I have not been impressed by the criticism ... that Sean is 'a budgeteer not a rocketeer,'" he said. "... [H]e knows enough about rockets to know that they burn cash just as assuredly as they burn fuel, and that both propellants are finite."

The senators were effusive in praising the endeavor of space exploration. However, there was also plenty of realism about NASA's financial situation, and the subcommittee members were quick to embrace O'Keefe's record as a disciplined financial manager. O'Keefe "will bring to the job a reputation as a tough fiscal watchdog," said Sen. Ron Wyden (D-OR), the subcommittee chairman. "Costs for the horrendously mismanaged International Space Station have shot out of control, while its capabilities have shrunk. ... The bottom line, fiscally, is this: there isn't going to be any massive infusion of new funds for NASA during Mr. O'Keefe's tenure."

O'Keefe reiterated his commitment to fis-

cal discipline and to the task force report. "That and the president's management agenda will be required reading throughout the organization," he said.

He also resisted calls from Sens. Nelson and Hutchison for a commitment to a seven-member crew. Sen. Hutchison likened the core complete model to a hospital with no patients. "As soon as we get the basics down, ... we'll look at expansion opportunities," O'Keefe promised, saying he hopes to reach that point in 12-24 months. Expanding beyond a three-person crew "would be my fondest hope," he said.

"If you succeed [in expanding], you will be my hero," Sen. Hutchison said. "If not, I will be all over you."

Just as a three-person crew is considered inadequate by many members of Congress, it is vociferously opposed by NASA's international partners. At a December 6 meeting of the NASA Advisory Council, representatives from several key foreign space programs, including those of Canada, Europe, Japan and Russia, argued that failure to expand to at least a six-person crew would be a violation of U.S. obligations under the international agreements that created the ISS.

Sen. Nelson thus expressed concern about NASA losing its international partners, but O'Keefe did not respond directly, saying that he would need to consult with Secretary of State Colin Powell.

The NASA Advisory Council endorsed most of the Young task force recommendations in a December 19 letter to Daniel R. Mulville, NASA's acting administrator. ●●●

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### FOR MORE INFORMATION:

*Task Force Report:* <ftp://ftp.hq.nasa.gov/pub/pao/reports/2001/imce.pdf>

*NASA Advisory Council letter:*  
[www.nasa.gov/newsinfo/nac122001.html](http://www.nasa.gov/newsinfo/nac122001.html)

Science and Technology in Congress  
AAAS  
1200 New York Avenue, NW  
Washington, DC 20005  
Phone 202/326-6600 Fax 202/289-4950  
Web [www.aaas.org/spp/cstc](http://www.aaas.org/spp/cstc)  
E-mail [congress\\_center@aaas.org](mailto:congress_center@aaas.org)

- Albert H. Teich  
*Director, Science and Policy Programs*
- Joanne Padrón Carney, *Director, CSTC*
- David G. Cooper, *Project Coordinator, CSTC*

**Science and Technology in Congress** (ISSN# 1096-0406) is published by the Center for Science, Technology, and Congress (CSTC) at the American Association for the Advancement of Science (AAAS). It is distributed 8 times per year: February through August and October. Issue Updates are published periodically to supplement the newsletter.

AAAS is a non-profit, non-partisan organization. Since it was founded in 1848, AAAS has been dedicated to the advancement of scientific knowledge for the good of society as a whole. **Comments and suggestions** on the newsletter and information on upcoming congressional science and technology activities are welcome. This bulletin has not been reviewed or endorsed by the AAAS Board or Council.

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Center for Science, Technology, and Congress  
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Washington, DC 20005

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## Heard off the Hill

(xenotransplantation) as replacement organs for humans. Scientists have attempted to use animals such as pigs as an alternative source of transplant organs but immune rejection has been a significant barrier. Now scientists have overcome this obstacle by genetically engineering pigs to partially lack one version of the gene that triggers this response. They removed (i.e., "knocked out") a section of DNA from fetal pig cells, and then fused these cells with pig eggs to create cloned embryos that were implanted in surrogate sows. Researchers hope to create pigs that completely lack the immune-triggering enzyme, to provide organs that do not invite acute immune rejection.

---> *Science*, January 7, 2002

**Weapons that Really Stink** • Researchers at the Monell Chemical Senses Center in Philadelphia have been tasked by the Pentagon to create a universally offensive odor that can be used by the military for, among other things, crowd control. The nonlethal "odor bomb" is said to smell like rotting garbage, human waste and burning hair with the idea that people would "flee in disgust." The odors can also cause shallow breathing, increased heart rate and nausea.

---> *Chemical & Engineering News*, January 7, 2002

**Knockout Pigs** • The successful birth of four genetically engineered and cloned piglets may pave the way for more successful transplants of donor animal organs

**Stop Paying Attention** • Psychologists at Michigan State University have found clues as to why athletes "choke" when performing tasks that should come naturally. Researchers tried to determine if people choke because they are paying too much attention to a task, or because of the distraction of a pressure-filled situation. In a study involving students putting a golf ball, it appears to be the former. The scientists trained these groups to excel at putting under different conditions: while being videotaped, while listening to a tape, and under normal conditions. When the stakes were raised by telling students that in order to receive a monetary reward, they must improve their performance, the only ones to putt better were those in the group being videotaped. The results support the theory that choking is the result of paying too much attention to a familiar task. They also suggest that choking can be prevented by making an athlete or performer feel self-conscious during practices.

---> *The Washington Post*, December 19, 2001

**Jumping Ship** • Non-native organisms are famous for causing environmental problems after being translocated via the ballast water in ships. For example, introduction of the zebra mussel wreaked havoc in the Great Lakes Region. A new study shows that a novel method for combating ballast tank corrosion may also be a cost-effective way to prevent the introduction of foreign aquatic species in coastal waters. The method—using nitrogen gas to remove oxygen from the ballast water—presents a rare win-win solution for the shipping industry and environmentalists.

---> *Biological Conservation*, January 7, 2002