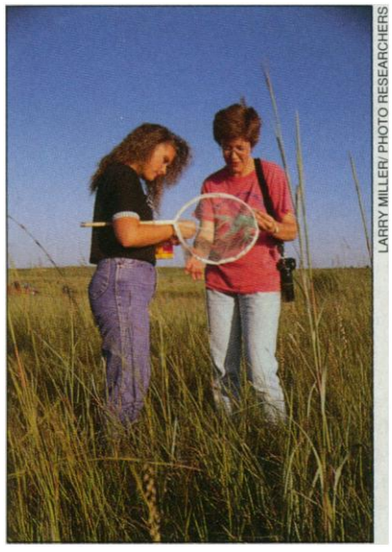
Green Education Under Fire

Conservative critics contend that teachers and texts are feeding children biased and incomplete scientific information about the health of the planet, but advocates say the charges are overblown

When Marianne Moody Jennings flipped through her daughter's algebra textbook last year, she discovered, she says, at least one of the reasons why 14-year-old Sarah did not understand what it meant to balance an equation. The 800-page book, *Secondary Math: An Integrated Approach: Focus on Algebra*, published by Addison-Wesley in 1996, seemed short on equations. But there were plenty of word problems and boxes about deforestation in developing countries, the role of zoos in society, and the drawbacks of fossil fuels. Jennings, a professor of legal and ethical studies at Arizona State University's College of Business in Tempe, was infuriated: "What we have is students being fed one side of the environmental story and coming away with a lot of misinformation."



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Enlightening hike. Most U.S. schoolchildren receive some green education.

Jennings is part of a growing backlash against the way environmental issues are taught in U.S. schools. Critics, whose cause has been taken up by conservative groups across the country, say that children are being fed doomsday visions of the future and biased and incomplete scientific information about everything from global warming and endangered species to pesticides and population growth. Environmental educators say the charges are overblown: Although critics will always be able to dredge up anecdotes that highlight questionable teaching practices, they say, most schoolchildren are being taught sound lessons on how nature works and how human activities affect the planet. Richard Wilke, professor of environmental education and associate dean of the College of Natural Resources at the University of Wisconsin at Stevens Point, says, "Yes, there's some validity to the criticisms, but they're overstated and some are politically motivated."

It's difficult to pin down whether the problems cited by critics are common or rare because curricula—devised, not at the federal level, but by states, schools, and teachers—vary widely. But the debate may soon grow louder. A book published in November by two leading critics encourages parents to push teachers to present cheerier views of the state of the environment. Congress is due to reauthorize the National Environmental Education Act of 1990 next year, and some of the proposed amendments could change the tone of teaching around the country. In addition, a commission of scientists enlisted by the conservative think tank George C. Marshall Institute in Washington, D.C., is expected to release a critical report this spring based on their review of environmental education materials. Meanwhile, the North American Association of Environmental Educators (NAAEE)—whose members work in universities, public and private kindergarten through grade 12 schools, museums, government agencies, and industry—is distributing its just-completed "Guidelines for Excellence" to help improve the quality of green education.

Out of nature study

Environmental education was far less politically charged in its first incarnation as "nature study"—which got its start in the 1920s with Junior Audubon Clubs teaching children to appreciate nature. In the 1930s, the Dust Bowl tragedy spurred the notion that youngsters should learn to manage natural resources, and some public schools introduced "conservation education."

Then came Earth Day in 1970. As a new green consciousness seized the country, more and more schools began educating children about the environment. The National Environmental Education Act of 1970 ensured that tens of thousands of teachers a year received supplemental training in environmental issues. Many states subsequently passed their own environmental education laws, and schools started incorporating green topics into science classes.

On the 20th anniversary of Earth Day, President Bush signed the National Environmental Education Act of 1990, which bolstered national commitment to green education by creating an Office of Environmental Education at the Environmental Protection Agency. The new law also set up additional grant programs for curriculum development at the state level, and teacher training, which now reaches 100,000 instructors a year.

But even as environmental education has gained legitimacy and popularity, it has come under increasing scrutiny. "Environmental stuff has become fashionable, and it's being chucked into books of every description—math, geography, history—but [a lot of it is] just inane," argues Bill Bennetta of the Textbook League, a nonprofit group that reviews textbooks for educators in Sausalito, California. Consider a 1993 middle-school textbook called *Merrill Physical Science*, which includes the "EcoTip," "Make your own air freshener. Put vinegar, a few spices, and a little cinnamon in a small glass jar. Heat the jar in the microwave oven ... and then place it where you need it most." Bennetta contends that such "misconceived rubbish" is commonplace.

Stephen Schneider, an atmospheric scientist in the department of biology and the Institute for International Studies at Stanford University, says that many materials uncritically accept feel-good positions such as "recycling is good for the planet." Schneider, who warned of possible global warming as early as the 1970s, is using part of a MacArthur Fellowship grant to study science and environmental education in public schools. His conclusion: "Let's get materials that aren't so flaky."

An ideological battle

But much of the debate swirling around environmental education is concerned not just with flakiness but with a perceived ideological bent to educational materials. Such criticisms are coming largely from conservative groups. For instance, Michael Sanera, director of the Center for Environmental Education Research, a division of the Claremont Institute in Tucson, Arizona, argues that many texts seem designed to make children feel guilty about the way Americans live. He cites a discussion of energy resources in *Physi-*

cal Science: Challenge of Discovery, published in 1991 by DC Heath, which states: "In the United States, fuel is wasted and used carelessly. The United States has 6 percent of the world's population but uses 35 percent of the energy available in the world. ... Heated pools and hot tubs are seen as necessities in some parts of the United States. This is not true in other countries."

But environmental educators point out that teachers don't necessarily buy everything that's in the books. "Teachers we work with recognize biased materials, and they're intelligent enough to decide how to use them, if at all," says Kathy McGlauflin, national director of Project Learning Tree, a teacher-training organization supported by federal and industry funds. Indeed, sometimes teachers use materials to show students what "advocacy" is, or to spur a classroom debate, she says.

While no educational materials are entirely value-free—and there will always be tussles over whose values will dominate—Sanera also contends that schoolchildren aren't getting fair presentations of the science of many green issues. He examined 62 widely used textbooks and says many discussions are "skewed." For instance, few books paid much attention to data showing that the human population is expected to level off in the next century, to uncertainties in the estimates of the numbers of species going extinct, or to a 10-year study called the National Acid Precipitation Assessment Program that found evidence of only limited damage to the environment from acid rain.

Concern about what children might be learning about the environment has brought the George C. Marshall Institute into the fray. The institute—which is perhaps best known for its vigorous defense of the Strategic Defense Initiative in the 1980s and, more recently, its skepticism about possible global warming and the thinning ozone layer—established an Independent Commission on Environmental Education earlier this year. The panel of 10 scientists is charged with investigating whether the most commonly used textbooks and supplemental materials (produced both by educational and advocacy groups) provide balanced scientific presentations of environmental issues. Robert Sproull, commission chair and a professor of physics at the University of Rochester in New York, says that while the commission found a range of good and bad materials, overall, the science information was "a mile wide and an inch deep. ... Some materials say they're teaching kids how to think, not what to think, but then they leave the teachers high and dry, with little scientific information."

Perhaps surprisingly, the commission found that materials produced by advocacy groups were at times more balanced than those produced by textbook publishers. For instance, Roger Sedjo, a commission member and director of the Forest Economics and Policy Program at Resources for the Future in Washington, D.C., pored over elementary through high school materials on forest issues and found that a booklet called "The Great Yellowstone Fire"—published by the environmental group the Sierra Club—was more scientifically accurate than many textbooks. "I found a mixed performance," says Sedjo, "and advocacy was not always predictable on the basis of who published it."

But the fiercest debate is reserved for the matter of whether children should be encouraged to take political action on behalf of the environment. "That's a big sticky wicket," says Kevin Coyle, president of the National Environmental Education and Training Foundation in Washington, D.C., a nonprofit funded by federal and industry grants.

RENEE LYNN/ PHOTO RESEARCHERS

Not basic? Critics maintain that environmental lessons need to focus more on fundamental biology.

Many environmental educators see their field as an arena for teaching children civic responsibility. "Environmental education is more than nature study—it's a way to help students look at trade-offs, learn decision-making, and become better citizens," says Kathy McGlauflin. This viewpoint is at times taken a step further in texts. The teacher's edition of a middle-school textbook called *Health*, published by Holt in 1994, suggests that teachers ask students to see if their community has a recycling program and, if not, to lobby for one by writing local officials and putting up posters.

Some critics, such as Jonathan Adler of the conservative Competitive Enterprise Institute in Washington, D.C., counter that green activism in classrooms is at least partly to blame for U.S. schoolchildren's weak math and science skills. "Kids need less petition-writing sessions and more [lessons in] biology and earth sciences," he argues.

Members of Congress debated the merits of green activism in the classroom as they considered whether to reauthorize the National Environmental Education Act this fall. "Congressional offices [had been] getting letters from kids saying, 'Please don't ruin the environment, Mr. Gingrich,' " Coyle says. Congress ended up refunding the act for another year at $7 million, and members will again consider reauthorizing the law in 1997. A proposed revision of the act, sponsored by Senator James Inhofe (R–OK), responds to some of the criticisms by requiring funded programs, such as teacher training, to be "balanced and scientifically sound." His redraft also prohibits teachers from enlisting children in letter-writing campaigns and other forms of political lobbying, a change that Coyle and many other environmental educators embrace.

Seeking firmer ground

But some critics contend that it will take more than changes in the wording of the federal law to improve environmental education. Stanford's Schneider says that teachers and textbooks need to do more to foster creative problem-solving—a skill students will need if they are going to tackle real-world environmental problems: "[In the classroom], there should be skeptical welcoming of dissonant ideas, encouragement to cross disciplinary boundaries, and some reward and respectability for problem-solving."

But even the most creative students will need basic knowledge to work with. A new interagency federal program launched by Vice President Al Gore on Earth Day 1995, called Global Learning and Observations to Benefit the Environment, or GLOBE, hopes to use children's interest in the environment to boost their science skills. Managed by the National Oceanic and Atmospheric Administration, the GLOBE program has provided curricula to over 3000 schools in 44 countries for students to collect environmental data and share it over the Internet.

A number of federally funded programs also are redoubling their efforts to train teachers—a critical strategy, as only about 10% to 25% of the nation's 2 million K-through-12 teachers received preparation during their certification, according to Bora Simmons, president of NAAEE. Teacher workshops funded by grants from the National Environmental Education Act and industry co-sponsors, for instance, will train 100,000 teachers each year through programs such as Project Learning Tree.

In October, the NAAEE also released its new "Guidelines for Excellence" to help teachers spot environmental materials with strong biases and factual errors, and to guide curriculum developers toward producing balanced and accurate materials. In Febru-

ary, NAAEE also will launch its series of "Educators Resource Guides" that will contain summarized reviews of texts and other available materials.

Other reformers are setting their sights on the textbook industry. "Publishers have a responsibility to produce better materials," says Michael Glantz, a member of the Marshall Institute's commission and program director of the environmental and societal impacts group at the National Center for Atmospheric Research in Boulder, Colorado. Indeed, the commission has decided to direct its suggestions to the textbook industry. The upcoming report will include recommendations for ensuring greater accuracy in texts and perhaps for improving the scientific peer-review process, says Jeff Salmon, the Marshall Institute's executive director.

Some critics are calling for a parental rebellion against green education. Sanera and Jane Shaw of the libertarian Political Economy Research Center in Bozeman, Montana, recently published a book that encourages parents to challenge teachers, school boards, and state legislators to clean up green education. Marianne Moody Jennings has already taken that route: A year after she first saw her daughter's algebra text, she and other parents have convinced the Mesa Public School District to switch to more traditional math books for some classes beginning in January.

But while debate can be healthy, many educators say a generalized revolt could do more harm than good. Harold Hungerford, president of the Center for Instruction Development and Evaluation at Southern Illinois University in Carbondale, says it's important to take a critical look at what schoolchildren are learning, but "in the classrooms I've been in, kids are learning a lot about ecology and economics and how to make good decisions. I sure respect them."

–Karen F. Schmidt

Karen F. Schmidt is a free-lance writer in Greenville, N.C.

BUDGET '98

Gibbons Warns of Decline in R&D

Every year around Thanksgiving, White House budgeteers tell federal agency managers how much money the Administration intends to request from Congress for their programs in its upcoming budget. This year, the message was a real turkey for scientists: Most agencies have been told to expect less in the 1998 fiscal year, which begins next October, than they received this fiscal year. And that's not all. Last week, Jack Gibbons, the president's science adviser, warned agency officials that their budgets through 2002 won't be keeping up with inflation, and that they would need to trim their staffs to avoid significant cuts to R&D programs. "We'll all have to practice some triage," he says.

That bleak picture dominated a press briefing by Gibbons on R&D in the second Clinton Administration. But the Administration hasn't forgotten about science; Gibbons also announced that his Office of Science and Technology Policy (OSTP) was planning a series of meetings with state governors, industry managers, and members of Congress to explore the future of U.S. research and development. The idea, he says, is to build on the new spirit of cooperation between Democrats and Republicans following 2 years of bitter recriminations over the direction of government funding. It's also an attempt to shore up support for R&D in the face of a drive to erase the deficit by 2002 by trimming domestic discretionary spending, of which R&D is a small piece.

In the meantime, R&D is fighting for a bigger slice of the president's 1998 budget request, which is slated to go to Congress in February. *Science* has learned that the White House Office of Management and Budget (OMB) late last month told NASA, the Department of Energy's (DOE's) civilian research program, and the National Institutes of Health (NIH) to expect requests below the amounts appropriated by Congress in 1997. The National Science Foundation (NSF) fared slightly better, with a roughly level budget, according to government sources. NASA and DOE officials say they are disappointed with the overall OMB levels but can live within the constraints, while NIH seems likely to win a modest increase. NSF officials say they are especially concerned about the impact on the foundation of a mandated governmentwide 5% cut in personnel.

RICK KOZAK

Tough talk. Gibbons tells U.S. researchers to expect less.

Gibbons declined to discuss the 1998 request in detail, but he says "it will show clear signs that the president is still very attentive to the need to protect the science budget" at a time when all government spending is under the knife. He acknowledged, however, that few agencies will win a level budget request, and those whose request matches the rate of inflation will be even rarer. Gibbons singled NIH out for praise, noting that its good fortune in the past 2 years—annual increases of nearly 6% and 7%—is due in large part to its success in explaining its work to the public. "The rest of the research community needs to understand the value of communication" in garnering support from lawmakers, he says.

Even so, that support did not prevent OMB from rejecting NIH's request for a 9% boost in the current $12.75 billion budget, according to NIH-watchers on Capitol Hill. This was a smaller initial request than NIH has sought in recent years, but even so, sources say the White House response was harsh. One biomedical lobbyist says OMB instead has proposed a decrease of about $200 million from the current level. Although Health and Human Services Secretary Donna Shalala is expected to appeal to the president if OMB isn't more generous, she must compete with Clinton's repeated campaign promises to boost spending on education and help former welfare clients find work.

Negotiations between OMB and the agencies will be intense over the next few weeks, leading up to the Administration's budget submission to Congress on 3 February. That is also when the first of a series of meetings on R&D policy will take place, as congressional leaders and Clinton discuss how NASA can reconcile a shrinking budget with a growing list of programs planned for the next decade. Later in February, Gibbons will talk with governors about greater collaboration between the federal and state governments.

OSTP officials also are supportive of the nonprofit Council on Competitiveness (COC), which plans two regional R&D summits in February featuring industry, academia, and state and federal leaders. The group's annual meeting in Washington in March also could involve a major discussion of R&D, says COC spokesperson Brenda Siler.

As for his own situation, Gibbons reiterated his desire to remain on the job, although he faces a continuing struggle between an OMB eager to restrict spending and science agencies desperate to win some measure of fiscal relief. And he told researchers to expect sympathy but no special treatment from the White House as the budget tourniquet tightens. "Everyone has to carry part of the load," he says.

–Andrew Lawler

With additional reporting by Eliot Marshall.