The E Word

Teaching evolution in high school often means a soft sell.

TWENTY-SIX WEEKS INTO SUZANNE BLACK'S 10TH-GRADE BIOLOGY class in a Seattle suburb, she drops the bomb. ¶ *Evolution.* ¶ Black didn't purposely avoid the word before then, but in 25 years of teaching she's learned to minimize conflict by presenting information about evolution gradually. ¶ Though the principles of evolution underlie biology from genetics to ecology, the religious beliefs of some students can make teaching the topic difficult. Experienced high school educators have learned to get past the controversy by working up to the important concepts and keeping lessons relevant to the students' lives.

Black also trains teachers as part of the HHMI-supported Science Education Partnership, a professional development program for high school teachers based at the Fred Hutchinson Cancer Research Center. She and others like her build their case with each day's lesson until the bigger picture forms. Then they let on that they've been teaching evolution. It's like adding shredded zucchini to a homemade chocolate cake. No one knows it's there, and once it's pointed out, people realize it's not at all what they thought.

"We start with evidence that's based in molecular biology and genetics and slide in the 'evolution' word later on," agrees Ann Findley, professor of biology at the University of Louisiana at Monroe. She teaches college students as well as high school seniors and high school biology teachers in an HHMI-supported summer course. "[Some students] have been misled to think it's something else, and they don't see what all the fuss is about."

The same day Black formally introduced the "E" word, a student asked a question about intelligent design.

"I explained that intelligent design is a religious viewpoint that says that some things are so complex that you can't explain them, and that it's not scientifically supported," she says. "The kids wanted to know what I meant, and I asked how we could design experiments to test the ideas behind intelligent design. And that was it."

She adds, "It was great that he asked, because you know 10 other kids were thinking the same thing and just not asking."

Years ago, Black remembers taking a different tack, with dreadful results. She inaugurated a student teacher with a unit on evolution. "That was a mistake," she says. "The kids ganged up on her and were literally firing questions at her like, 'Were you married in a church? How could you do that and believe in evolution?'"

Black's own early attempts were "too textbook," she adds. "I came across as too confrontational. With high-school students, it has been more successful to present learning experiences that let them construct their knowledge from evidence they can see, hear, touch, and analyze."

Taking that approach, teachers say, can be the tipping point between keeping high

KNOW YOUR AUDIENCE

EVEN IN THE TITLE OF ITS REVISED BOOK, *Science, Evolution, and Creationism*, the National Academy of Sciences (NAS) and the Institute of Medicine faced the controversy head on. But the book's developers went to its audience to make sure its messages were on target, and made big changes as a result. "The book is very different than I expected it would be," says Jay Labov, NAS senior advisor for education and communications. Several focus groups in Indiana and South Carolina led the editors to downplay legal decisions, focus on how science works, and present real-world examples of evolution. The book, released in 2008 (nap.edu/sec or nationalacademies.org/evolution), includes quotations on the compatibility of religion and evolution from several scientists—including Francis Collins, former director of the National Human Genome Research Institute, an evangelical Christian—as well as Pope John Paul II and other religious leaders.

school students interested in science and turning them off for good.

Make it Relevant

Deb Whittington, a teacher in Lake City, South Carolina, encourages science teachers in her district and state to pair evolutionary evidence and interesting, relevant examples embedded throughout instruction and not just during a "unit" on evolution. Teachers might, for example, discuss antibiotic resistance, sickle cell anemia, bird evolution, or family trees. "It helps them see where evolution affects life every day," she says.

In 2005, she helped organize South Carolinians for Science Education after realizing that some fellow teachers were apprehensive about presenting evolution in the classroom. Whittington has also participated in, and helped run, HHMI-supported summer courses on the topic for biology teachers at Clemson University.

"We take the teachers into the labs, show them evolution in action, try to present it as something that's happening every day, not some abstract concept," says Barbara J. Speziale, associate dean of summer programs and undergraduate studies at Clemson.

Providing information and dispelling myths can open doors to students and to their families and friends, as well.

"A few years ago in our precollege program, we had a young woman whose father and grandfather were Baptist ministers," Findley says. "At the end of the program, she said she was excited to go home and talk to her father about evolution. I thought that was great—she can at least start a dialogue in her community. That's what I'd like to achieve."

Black agrees. "For a student to see the power and beauty of evolutionary theory … that's worth any of the barbs you might get along the way." ■ –NANCY VOLKERS

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