Teaching the Controversy: Why teachers refuse to teach evolution as scientifically valid

> *I say to the grownups, 'If you want to deny evolution and live in your world that's completely inconsistent with everything we've observed in the universe that's fine. But don't make your kids do it.'*
>
> *Bill Nye*

We spent two class periods watching *Inherit the Wind*.

Released in 1960, the film portrays a fictionalized version of the Scopes "Monkey" trial. In the end (spoiler alert), the defendant is found guilty of breaking Tennessee state law for teaching evolution in a high school classroom.

We watched the movie in my freshman biology class because my teacher desperately wished to convey the controversy – she wanted to explain why legally she couldn't claim that "evolution was true."

I shouldn't have been surprised. Only two years before, my seventh-grade science teacher explained that evolution couldn't be true, because if it were, *why were there still monkeys*?

Both teachers' attitudes are good examples of the obstacles that are keeping evolution from being taught the way it should be. Penn State political science researchers Michael Berkman and Eric Plutzer show that nearly three-quarters of teachers today either advocate creationism or teach evolution alongside "alternatives" while endorsing neither. Of that group barely a third had completed a course on evolution. They explained that teachers, then, do not have enough knowledge or enough confidence in their knowledge to defend teaching evolution.

Opponents of evolution fall mostly into two camps: Creationism and Intelligent Design. While the groups are sometimes conflated, there is an important distinction. Creationists contend that the Bible is strictly true – that a deity created the world and continues to intervene. Advocates for Intelligent Design claim that evolution and its mechanisms are insufficient to explain the complexity of organisms and only the existence of an intelligent designer can account for the world as we know it.

Creationists have never used scientific language or techniques to explain their beliefs (except the small subset who promote "creation science," a way to prove their beliefs through scientific means, which hasn't gained much traction in the controversy). Proponents of Intelligent Design, on the other hand, take the damaging approach of employing "scientific explanations" for their conclusions. They claim that the random processes of mutation and natural selection cannot possibly have led to the complexity of life on earth. They use the language of the scientific method to present their beliefs and show their "scientific process" for arriving at their claims.

"They use science to say there's no possible way that there's an evolutionary explanation for how these things work together," explains James Wynn, an associate professor of English at Carnegie Mellon University who specializes in the rhetoric of science. "They choose features of organisms and say this could not come out of a random system," he continues, "which is their argument – but is it science?"

The damaging effects of Intelligent Design come from its pretense of engaging in scientific inquiry. The advocates of ID say Darwinian evolution should be taught in schools in even more detail than now, according to the Center for Science and Culture, a Discovery Institute program designed to support the work of individuals who promote Intelligent Design. But what these advocates really want is for schools to show the holes in Darwin's theory, and fill those holes with the concept of an intelligent designer.

"The idea [of the ID advocates] is it's very undemocratic to just put forth an idea and not have debate about it or have two sides," Wynn says. "What they're doing is mixing the political and the scientific."

Partly as a result of ID supporters, teaching evolution in schools continues to be hotly debated and states still introduce anti-evolution legislation. In February 2009, Rep. David Grimes, and Alabama republican, introduced the Academic Freedom Act in the Alabama House of Representatives, a bill that would protect teachers who offered alternatives to evolution. In February 2013, a bill was brought to the Arizona state Senate that would protect teachers who questioned "controversial" scientific issues and encouraged students to do the same. In March 2011, Florida Republican Stephen R. Wise sponsored a senate bill that would have changed Florida law and required teachers to critically analyze evolution. In May 2013, the attempt of Democratic Senator Karen Carter Peterson of New Orleans to repeal an anti-evolution law in Louisiana was rejected.

In the face of such opposition, teachers without enough understanding of evolution tread carefully to avoid repercussions

from parents, administrators, and school boards. According to Berkman and Plutzer, they use three main strategies.

First, some refuse to acknowledge that evolution applies to organisms above the molecular level. They teach the concept as if it does not apply to species. Second, teachers will explain to students that they have no choice in the matter – they are forced to teach the concept of evolution whether they believe in it or not. Third, they teach evolution alongside several alternatives, regardless of whether the alternatives are scientific.

My seventh-grade science teacher refused to acknowledge evolution because she either didn't understand the theory or didn't accept it. My freshman biology teacher either lacked confidence in her ability to teach the concept or in her job security. The result was the same: Both taught only the controversy.

The ramifications of such actions are clear. Not only do students leave high school without an understanding of a foundational concept of biology, they also implicitly learn that the scientific method lacks validity. When teachers teach the controversy or teach evolution and its nonscientific "alternatives" as equally viable options, they suggest to students that an empirically tested and proven theory does not outweigh "alternatives" that lack a scientific basis. They suggest that the theory of evolution is something to be "believed in" or not, which undermines the scientific method and reduces a scientifically established concept to a matter of personal opinion.

"Intelligent design is not scientific," Wynn contends. "It makes no predictions, it has no theoretical basis, it's not science. That's the fundamental thing. It would be one thing if there were competing scientific theories. This is not a scientific theory. Therefore, it should not be taught in science class."

Proponents of teaching creationism, intelligent design, or other "alternatives" to evolution, on the other hand, argue that they want to promote "academic freedom," explain Berkman and Plutzer. These advocates insist that students should learn all the options side-by-side so they can make an informed decision about which seems most valid.

"Most of the modern debate is about intellectual fairness," Wynn says, "this notion that it's not fair that kids have to go to school and only learn about evolution and not ever hear about these other theories."

The problem with this argument, explain Berkman and Plutzer, is that the students least likely to accept evolution enter the classroom with a years-long background in an evolution alternative. The limited classroom time spent on teaching the scientific basis for evolution is simply not enough to expose them to the evidence in favor of evolution – the extensive, empirical research and the thousands of peer-reviewed journal articles.

In spite of these arguments, we have made progress since the Scopes "Monkey" trial. In that case, a teacher stood accused of teaching evolution, whereas in the court case *Kitzmiller v. Dover School District*, a resolution passed by the Pennsylvania school district requiring teachers to name Intelligent Design as an alternative to evolution was struck down by a federal judge. Furthermore, in a December 2013 poll, Pew Research Center showed that 68% of 18-29 year-olds accepted evolution, compared to only 49% of adults 65 years and older.

However, the frightening gap between high school graduates (51%) and college graduates (72%) who accept evolution shows we still have progress to make. The 21 percentage-point gap suggests that many students aren't getting the evolution education they need in high school or earlier, and this is likely due to teachers who either can't or won't teach evolution in the classroom.

Berkman and Plutzer have a solution. Individuals who want to become teachers should be required to take a course in evolution. This kind of requirement would do two things: One, individuals would gain a better foundation for teaching evolution, and two, those individuals who refuse to accept evolution will be dissuaded from becoming teachers in the first place. The researchers believe this is the first step to ending the "cycle of ignorance."

Wynn disagrees.

"I think if anything that would probably revive the controversy," he argues. "The minute you say that people have to do something, then the other side is going to get very vocal. Oh, look what they're doing, see we were right, they're trying to force people to think only one thing."

In my senior year of high school, I took AP Biology and my teacher explained, on the first day, that he would teach evolution as scientific fact, since none of biology makes sense without it. Students who take higher level biology courses will learn evolution as it should be taught, but the problem still remains that for nearly a quarter of high school graduates, biology will be their only science course and they will not learn its foundational concept.

Still, the battle rages on and doesn't seem as though it will end anytime soon.

"The notion [of evolution] is that we can never predict how things are going to turn out because it's so complicated," explains Wynn. "Conceptually, that's really hard for people to get, that this just sort of happens and that there's not some guidance. It's very random and I think that's what a lot of people have problems with."

But as Neil deGrasse Tyson pointed out, "The good thing about science is that it's true whether or not you believe in it."