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Answer Sheet

Four reasons why teachers should not teach creationism

By Valerie Strauss February 22, 2013

(Corrections: A previous version said anti-evolution laws require the teaching of creationism. They don't. And more than one state has anti-evolution laws on the books.)

Evolution is the animating principle of modern biology, uniting all biological fields. It's a theory in the sense that everything in science is considered a theory but biologists have no doubt of its essential truth. Creationist ideas are not a scientific alternative view to evolution — though you wouldn't know it given all the efforts in state legislatures to pass bills that either open the door to teaching creationism or allowing teachers to question evolution in a way that is not scientifically valid. From 2004 to spring 2011, at least 50 such bills were filed in more than a dozen states. Two states — Louisiana and Tennessee — enacted anti-evolution laws during that period and Kentucky passed one in 1976; in 2006, a Mississippi bill passed that forbids education administrators from prohibiting teachers to discuss the origin of life, which critics say is a veiled effort to encourage teachers to teacher creationism. Efforts continued, however, with eight bills so far being introduced in state legislatures this year, according to the National Center for Science Education. Here cognitive scientist Daniel Willingham explains why teachers should not teach creationism. Willingham is a psychology professor at the

University of Virginia and author of "Why Don't Students Like School?" His latest book is "When Can You Trust The Experts? How to tell good science from bad in education." A version of this appeared on his Science and Education blog.

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By Daniel Willingham

A new bill just passed the Education committee in the Oklahoma House of representatives, as reported on in the Oklahoman. Titled "The Scientific Education and Academic Freedom Act," the bill purports to protect the rights of students, teachers and administrator to explore fully scientific controversies.

The bill supposes that some people currently feel inhibited in their pursuit of truth regarding "biological evolution, the chemical origins of life, global warming, and human cloning" and so the bill forbids school administrators and boards of education from allowing such "exploration."

According to opinion pieces in the Daily Beast, The Week, and Mother Jones, the bill is a fairly transparent attempt to allow intelligent design into science classrooms.

Yeah, that's what it sounds like to me too.

But even if we take the purported motive of the bill at face value, it's still a terrible idea.

Why shouldn't science teachers "teach the controversy?" Isn't it the job of teachers to sharpen students critical thinking skills? Isn't it part of the scientific method to evaluate evidence? If evolution proponents are so sure their theory is right, why are they afraid of students scrutinizing the ideas?

Imagine this logic applied in other subjects. Rather than just reading Shakespeare and assuming he's a great playwright, why not ask students to read Shakespeare *and* the screenplay to Battlefield Earth [a science fiction film starring John Travolta based on a novel by Scientology founder L. Ron Hubbard], and let students decide? And hey, why is such deference offered to Euclid? My uncle Leon has an alternative version of plane geometry and it shows Euclid was all wrong. I think that theory deserves a hearing.

You get the point. Not every theory merits the limited time in students have in school. There is a minimum bar of quality that has to be met in order to compete. I'm not allowed to show up at the Olympics, hoping to jump in the pool and swim the 100 m butterfly against Michael Phelps.

Indeed, the very inclusion of a theory in a school discussion signals to students that it must have some validity–why else would the teacher discuss it?

The obvious retort from supporters of the bill is that intelligent design is actually a good theory, much better than the comparisons I've drawn.

That belief may be sincere, but it's due, I think, to a lack of understanding of scientific theory. So here are a few of the important features of how scientists think about theories, and how they bear on this debates.

1) It's *not* telling that legitimate scientists point out unanswered questions, problems, or lacunae in the theory of evolution. *Every* theory, even the best theories, have problems. People who make this point may be thinking about the status of scientific laws as scientists did until the early part of the 20th century–as immutable laws. Scientists today think of all theories as provisional, and open to emendation and improvement.

2) A vital aspect of a good scientific theory is that it be open to falsification. It's not obvious what sort of data would falsify intelligent design theories, especially young-earth theories, which make predictions that are already disconfirmed by geology, astrophysics, etc., and yet are maintained by their adherents. Evolution, in contrast, has survived tests and challenges for 100 years–indeed, the theory has changed and improved in response to those challenges.

3) In the case of old-earth intelligent design theories, the focus is much more on the putative beginnings of the universe of or life on Earth, and these don't have the feel of a scientific theory at all. They seem much more like philosophical queries because they focus on large-scale questions and how these questions ought to formulated–they never get to detailed questions that might be answerable by experiment, the meat-and-potatoes of science.

4) Good scientific theories are not static. They not only change in the face of new evidence, they continue to spawn new and interesting hypotheses. Evolution has been remarkably successful on this score for over 100 years. Intelligent design has been static and unfruitful.

These are some of the reasons that scientists think that intelligent design does not qualify as a good scientific theory, and therefore does not merit close attention in K-12 science classes, and more than my uncle's theory of geometry does.

If you're going to write bills about what happens in science class, it's useful to know a little science.

Valerie Strauss covers education and runs The Answer Sheet blog. Follow @valeriestrauss

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