

## Science Class is No Place for Intelligent Design

At a time when the United States is in danger of falling behind in innovation, it is critically important to preserve the integrity of science education. It is critical that we prevent school boards from singling out evolution for criticism and introducing non-scientific concepts such as intelligent design into science classes. As a scientist and physician, I applaud Judge Jones' strong and clear message that intelligent design is not science and therefore has no place in science class.

Proponents for non-scientific accounts of the development of life, including creationism and intelligent design, contend that evolution alone should not be taught in science classes. Arguing that evolution is "just a theory," rather than a fact, they insist that intelligent design should be offered as an alternative to evolution or given "equal time", and that schools should "teach the controversy" surrounding evolution. Such positions are anathema to the majority of the scientific community, and seriously undermine science education.

In science, a theory is a coherent explanation of natural phenomena based on direct observation or experimentation. Theories are logical, predictive, and testable. They are open to criticism and when shown to be false, they are modified or dismissed. Using this definition, evolution is categorized with other scientific theories such as gravity or atomic theory, which, like evolution, are established scientific facts.

Evolution is among the most thoroughly tested concepts in the biological sciences. It is supported by volumes of scientific evidence in numerous fields, including genetics, biochemistry, developmental biology, comparative anatomy, immunology, geology, and paleontology. Moreover, evolution lays the foundation for much of what we know about genetics, immunology, antibiotic resistance, human origins, and the adaptation of species to a changing environment. Removing evolution from the classroom, or misrepresenting evolution as a flawed theory, deprives students of one of the most important tenets of science as well as the basis of our understanding of biology and medicine, including pandemic influenza and AIDS.

In contrast to evolution, intelligent design and creationism are not science because they fail to meet the essential and necessary requirements: they are not based on direct observation or experimentation nor do they generate testable predictions. Therefore, offering these beliefs as alternatives to evolution or giving them equal time in science classes completely misrepresents the nature of science.

Before information is presented as fact in science textbooks, it is tested, evaluated by experts, published in scientific journals, and considered credible by the broader scientific community. Even alternative ideas should have an evidentiary basis and garner at least limited support by scientists before they are incorporated into textbooks. Allowing intelligent design and creationism to circumvent this rigorous process of scientific scrutiny paves the way for other, poorly studied, pseudoscientific ideas to enter science curricula.

Proposals that call for "teaching the controversy" or singling out evolution for criticism are equally objectionable. While there may be some debate about the details evolution, it is not controversial among scientists. Rather, there is overwhelming scientific consensus that evolution is a valid explanation for the development of species. Although students should be encouraged to think critically about all ideas, introducing false controversy into science classes will ultimately impair science education.

Training in science is crucial for driving U.S. innovation and for preparing our citizens to compete in the 21<sup>st</sup> century workplace. For these reasons, it is critical to support science education, including the teaching of evolution. It is imperative that the scientific community and the American public safeguard science by continuing to oppose initiatives to teach intelligent design, creationism, and other non-scientific beliefs. Our place as the world leader in science and medicine depends on it.