

The Fight to Keep Evolution Out of Schools: The Law and Classroom Instruction

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ABSTRACT

There are forces at the local, state, and national levels that have worked to delegitimize and obstruct the teaching of evolution and, in some cases, to legitimize the teaching of religious ideas. Despite scientific evidence, public opinion, and even legislation, these forces have continued to influence, and in some cases block, the teaching of evolution in public schools. Proponents for the teaching of aspects of religion in schools have been defeated in the courts many times but have continued to find new ways to insert their ideology into the U.S. education system. Strategies for avoiding controversy, confronting misinformation, and distinguishing science from non-science are provided.

Key Words: *evolution; teaching of evolution; religious theory; law; classroom instruction.*

In a 2008 publication, the National Academy of Sciences stated, “the evidence supporting [evolution] is so strong, scientists no longer question whether biological evolution has occurred and is continuing to occur. Instead, they investigate the mechanisms and patterns of evolution¹ [genetic drift, punctuated equilibrium, founder effect, etc.], how rapidly evolution can take place, and related questions” (NAS, 2008, p. 11). Similarly, 83 percent of Americans surveyed in national opinion polls indicated that evolution should be taught in public schools (DYG, 2000).

In spite of this support, there are forces at the local, state, and national levels that have worked to delegitimize and/or block the teaching of evolution, and, in some cases, even to legitimize the teaching of religious ideas. Unfortunately, even some biology teachers are part of the problem rather than the solution. For instance, an often-cited survey indicated that 28 percent of high school biology teachers were not considered to be advocates for evolutionary biology (Berkman & Plutzer, 2010). Some of the teachers who responded to the survey even reported fear at the prospect of teaching evolution.

As will be seen below, proponents of the teaching of religious theory in schools have been defeated in the courts many times but have continued to find new ways to insert their ideology or to

weaken the presentation of science they regard as at odds with their ideology in the U.S. education system. We will discuss some strategies for avoiding controversy, confronting misinformation, and distinguishing science from faith at the end of this article.

○ Evolution and its Opponents

In 1859, Charles Darwin published *On the Origin of Species*, in which he proposed natural selection as the mechanism governing evolution and affirming that evolution itself is the explanation for how life on Earth developed. Many members of the scientific community were initially skeptical of Darwin’s proposal when it was first published (Moore et al., 2010). However, steady accumulation of evidence culminated in a 1922 resolution by the American Association for the Advancement of Science, stating that “the evidence in favor of the evolution of man are sufficient to convince every scientist of note in the world” (Berkman & Plutzer, 2010).

Despite the accumulation of evidence, the teaching of evolution in U.S. public schools remains controversial, particularly in some areas of the nation. For extended periods in American history, the teaching of evolution was excluded from the standard science curriculum due to legislation and to reluctance on the part of schools and teachers to engage a controversial topic. Recently, opponents of the teaching of evolution have targeted state education agencies, textbook publishers, and local school boards. Such opponents often support creation “science” or some version of intelligent design, which suggests that life and the universe are the creation of some supernatural entity (e.g., an intelligent designer). Those who hold this view frequently contend that scientific evidence exists to support the underlying idea of that all life is the design of a creator rather than processes including natural selection.

Opponents of evolution have occasionally been successful in their attempts to influence what is taught in classrooms. For instance, state laws banning evolution, requirements to teach the so-called controversy, and the inclusion of textbook disclaimers

when teaching evolution have all been used to block evolution education. These attempts have likely impacted the way teachers feel about teaching evolution. In the 2007 National Survey of High School Biology Teachers conducted by researchers at the Pennsylvania State University showed that 17 percent of teachers surveyed did not cover human evolution in their biology class, and 13 percent of those surveyed did not personally believe that evolution by natural selection was the best mechanism for explaining the history of life on Earth. In addition, 60 percent of the teachers who responded spent only one to five hours of class time covering the topic of evolution (Berkman & Plutzer, 2010). When teachers were asked to explain their decisions about discussing human evolution, they stated that they often avoided the subject for fear of stirring conflict.

Teachers may fear the topic because there are many people who continue to doubt the evidence supporting evolution, or they may have, themselves, only received cursory instruction on evolution (Wiles & Branch, 2008). In a review of public opinion polls from 1981 to 2007, researchers found that in a typical year, about 45 percent of individuals polled agreed with the statement that humans developed from earlier species of animals. In addition, nearly two-thirds of the individuals polled believed that creationism should be taught alongside evolution as an alternative theory rather than teaching evolution alone (Plutzer & Berkman, 2008). It seems that that teachers and science classrooms are ground zero for the public debate between science and religion. Understandably, some educators will avoid material that might be construed by some as offensive or controversial.

○ The Legal Case for Teaching Evolution

The backlash against the teaching of evolution often eventually led to the passage of laws excluding it from the classroom in certain states. The most famous of these laws was the Butler Act, Tennessee General Laws Chapter 27 § 1 (1925), which prohibited any state-supported school from teaching any theory that contradicted the divine creation of man as taught in the Bible. John Scopes, a substitute science teacher at Rhea High School, volunteered to be the defendant in a test case and admitted to using a text that featured a discussion of human evolution. As many know, he was the defendant in the famous Scopes “monkey trial.”

The Scopes Trial and Its Legal Arguments

The jury trial in Dayton, Tennessee, and the appeal to the Tennessee Supreme Court involved three distinct arguments about evolution in the public schools. These arguments will be discussed in detail from a legal perspective because they remain relevant to educators today. The first argument addressed the strength of the evidence supporting evolution and the question of whether the evidence supporting evolution would contradict the teachings of the Bible. The second argument related to the constitutionality of a law that tells teachers what not to teach. This line of questioning sought to answer the question, Should the legislature be able to set curricular policies for public school employees? The final argument involved the issue of academic freedom and tackled the question, Does a public school employee have the right to teach what he or she deems appropriate? These themes continue to dominate the discussion about evolution in the schools long after the Scopes trial.

The Criminal Court of Rhea County in *Tennessee v. Scopes* (1925) focused almost exclusively on the question of whether teachers have the right to ignore a law prohibiting the teaching of a certain subject. In so doing, they found Scopes guilty of violating a state law. Scopes and his legal team appealed. However, in *John T. Scopes v. the State* (1927), the Supreme Court of Tennessee focused on whether the legislature should be allowed to set curricular policies for teachers. The Supreme Court upheld the Butler Act and concluded that Scopes had a responsibility to teach whatever the state indicated was appropriate and to restrict his instruction to topics that the state established (Berkman & Plutzer, 2010).

The Legal Challenges to Anti-Evolution Laws

The ruling in the Scopes “monkey trial” effectively removed evolution from the public-school curriculum for more than thirty years (Berkman & Plutzer, 2010) because many publishers were reluctant to include the topic in textbooks. Effectively, the topic of evolution did not reappear until after the launch of Sputnik by the Soviet Union in 1957, and the resulting critical analysis of science curricula in U.S. public schools. The case for teaching evolution was strengthened by the “modern evolutionary synthesis,” which occurred during the 1930s. The modern evolutionary synthesis drew together ideas from genetics, biology, botany, morphology, ecology, paleontology, and medicine to provide a comprehensive understanding of evolution and its mechanisms. In a charge led by BSCS to increase the focus on evolution, publishers began more widespread inclusion in new textbooks adopted by public schools. Despite the growing movement to include evolution in the science curriculum, at the time, three states—Tennessee, Arkansas and Mississippi—still had laws on the books interfering with the teaching of evolution in public schools often by specifying “equal time” or “balanced treatment.” Such statutes had the desired effect with teachers often opting out of including evolution education.

The Arkansas law was effectively challenged by a tenth-grade biology teacher named Susan Epperson in 1968. Epperson won her case in the Arkansas Chancery Court (Berkman & Plutzer, 2010). The case was appealed to the Arkansas State Supreme Court, where Epperson lost (*Epperson v. Arkansas*, 1968). The Arkansas State Supreme Court concluded that the prohibition of evolution instruction was an appropriate exercise of the power of the state. Epperson next appealed to the U.S. Supreme Court and won in a unanimous decision (*Epperson v. Arkansas*, 1968, p. 107). The U.S. Supreme Court focused on an interpretation of the First Amendment of the U.S. Constitution’s Establishment Clause, which states that “Congress shall make no law respecting an establishment of religion.” The court concluded that the exclusive motivation behind the prohibition of evolution instruction was to protect specific religious viewpoints. The ruling, however, did allow state legislatures to make decisions about the science curricula and textbooks if this issue of religion was absent.

Legal Challenges to Creation Science

The anti-evolution forces responded to the U.S. Supreme Court ruling by pressing state legislatures to pass new laws promoting the teaching of several alternatives to evolution. In similar fashion, the “Balanced Treatment for Creation-Science and Evolution-Science Act (Act 590)” passed in Arkansas in 1981. Act 590 mandated equal time for instruction in evolution and creation science.

Arkansas's law was challenged in federal court in *McLean v. Arkansas Board of Education* (1982). The Federal District Court concluded that creation science was not a science at all, but an attempt to bring the biblical account of creation into the science curriculum, and that mandating its instruction in public schools was, therefore, unconstitutional.

A similar case was brought against a Louisiana law with similar but vaguer wording. This case also landed in the U.S. Supreme Court. In that case, *Edwards v. Aguillard* (1987), the court determined that the law had an explicit religious perspective and was impermissible as a result. In addition, the requirement that creation science be taught alongside evolution undermined the provision of a comprehensive science education. Ultimately, the Louisiana law was ruled unconstitutional. The result of these legal decisions was that state legislatures could not ban evolution, nor could they require the inclusion of the story of creation from the Bible or creation science.

Additional Challenges to Evolution Education

Not to be deterred, the forces opposing the teaching of evolution found alternative ways to delegitimize and obstruct instruction in evolutionary biology. In separate instances, several local school districts required a warning label be included in textbooks or read aloud during evolution instruction. This approach was challenged in court (*Freiler v. Tangipahoa Board of Education*, 1997; *Selman et al. v. Cobb County School District and Cobb County Board of Education*, 2005). Rulings in these cases found that warning labels for evolution violate the Establishment Clause of the First Amendment. In the case of *Freiler v. Tangipahoa Parish Board of Education*, the warning label actively promoted religion because teachers were required to state, prior to a unit on evolution, that the information was “presented to inform [them] of the scientific concept and not intended to influence or dissuade the Biblical version of Creation or any other concept.”

These legal actions demonstrated that state legislatures and local school boards were clearly prohibited from drafting rules to include creation science, but the opponents of evolution were undeterred, and creation “science” subtly morphed into intelligent design (ID). ID in a blander version of creationism typically without advocacy for a young Earth or other position on some of the more critical religious issues. This new strategy was put to the test in Dover, Pennsylvania, where the School Board adopted a policy that required teachers to read a four-paragraph disclaimer to students that mentioned the theory of intelligent design as an alternative to evolution and recommended a specific supplemental textbook, *Of Pandas and People*, that explores intelligent design. A group of parents challenged the decision in *Kitzmiller v. Dover* (2005). Barbara Forrest testified at the hearing and convincingly showed that the words “creation” and “creationist” were systematically changed to “intelligent design” and “design proponent” in the recommended supplementary book. Her testimony, and that of others, demonstrated that intelligent design was nothing more than a thinly disguised version of creation science. In a stunningly complete decision, the court agreed and found that ID could not be distinguished from material reflecting a specific religious perspective. The ruling has generally discouraged other school boards from adopting intelligent design as a part of their science curriculum.

Summation

The history of these cases makes it clear that laws prohibiting the instruction of evolution or requiring it to be presented alongside some form of creationism are unconstitutional. In an alternate approach, several teachers made the argument that requiring a teacher to provide instruction on evolution was a violation of the teacher's individual First Amendment rights to freedom of speech or exercise of religion (*Webster v. New Lenox School District*, 1990; *John E. Pelozo v. Capistrano Unified School District*, 1994; *Rodney LeVake v. Independent School District 656 et al.*, 2000). The rulings in each case found that neither free speech rights nor the right to free exercise of religion are violated when science teachers are asked to teach a scientific theory or to refrain from teaching creation science.

The scientific evidence for evolution is clear and unequivocal. As national associations of science teachers and national associations of scientists have made clear, teaching evolution is a critical component to producing scientifically literate graduates from U.S. public schools. The case law recognizes that evolution is the only scientific theory for explaining the history of life on Earth. All other explanations, as represented in the case law, have been found to promote a religious perspective. However, as can also be concluded from examining the case law, this has not stopped the opponents of evolution from injecting doubt and sowing confusion about evolution's place in the science classroom. The introduction of a new ruling supporting instruction in evolution appears only to breed new strategies for dismantling its instruction.

○ Current Laws Regarding Evolutionary Instruction

Kentucky still has a law on the books, originally enacted in 1976, authorizing teachers in the state's public schools to present Biblical creationism and for students to get credit on exams if they give answers consistent with that instruction. Two additional states, Louisiana and Tennessee, have passed legislation in 2008 and 2012, respectively, that encourage teachers to discuss scientific evidence critical of evolution. The court cases mentioned above have restricted the language that can be used to deny evolution, but they have not stopped the opponents of evolution from continuing the effort to undermine the teaching of evolution in public schools.

Anti-evolution legislation continues to be introduced in state legislature on a regular basis. In January 2015 alone, a total of five anti-evolution bills were introduced across the nation. These included Missouri's House Bill 486, Indiana's Senate Bill 562, Oklahoma's Senate Bill 665, South Dakota's Senate Bill 114, and Montana's House Bill 321. To date in 2016, similar legislation was introduced in Florida, Idaho, Mississippi (where there is already a similar law about the origin of life, and not evolution, specifically), Oklahoma, South Dakota, and Tennessee. Additionally, Alabama decided that its biology texts would continue to carry a disclaimer about evolution, and Louisiana three times failed to repeal the Balanced Treatment for Creation-Science and Evolution-Science Act of 1981, which was found to be unconstitutional in the 1987 *Edwards v. Aguillard* Supreme Court decision. Taken in consideration alongside the states with legislation already on the books, it is evident that the fight against evolution instruction is not restricted to one geographical region. Clearly, the controversy lives on.

In a 2016 study conducted on 110 anti-evolution bills introduced between 2000 and 2012 across 26 states, researchers at Rice University and West Virginia University reported that only 25 percent of the legislation made it through the respective state's education committee to a vote by the state legislature. Only two bills were enacted into law—one in Louisiana and one in Tennessee. The three most productive states for such bills were Oklahoma, Mississippi, and Alabama with 13, 11, and 10 bills, respectively. These three states also have the highest rates of persons identifying as conservative Protestants in the United States. The researchers found that higher rates of conservative Protestants correlated with a higher number of bills being introduced, but the correlation did not carry over to bills being considered in the state legislation. Given the low rate of success in having anti-evolution bills become law, it was concluded that legislators introduce such bills “not because they expect success, but to mollify religious constituents” (Johnson et al., 2016).

○ Recommendations

The opposition to evolution is strong and continues to impact instructional choices in U.S. schools. The amount of control that districts have over curriculum is slim and getting slimmer due, in part, to the efforts of the accountability movement (e.g., Common Core, Next Generation Science Standards, and the No Child Left Behind Act). The court cases make clear that the inclusion of biblical creationism, creation science, or intelligent design in the science curriculum is unconstitutional. Likewise, it is unconstitutional to ban evolution education.

Evolution is one of the four core ideas of biology instruction included in the Next Generation Science Standards, as discussed by Bybee (2012), and is certainly a vital element of science literacy. The issue of evolution in the classroom, though, has little to do with the results of recent court cases. Teachers may still face challenges from passionate opponents of evolution, so eliminating or minimizing evolution instruction to avoid controversy is an entirely understandable, though not responsible, response. Evidence from surveys of biology teachers suggests that teachers do not devote the necessary time to evolution instruction. More concerning is the inference that many biology teachers may, in fact, be sympathetic to a young-Earth view.

An exploratory study conducted by Barnes and Brownell (2016) indicated that college biology instructors do not believe that it is part of their role to get students to accept evolution or to address potential conflicts between religious beliefs and scientific theory. This is important because recent research suggests that how instructors frame the topic of evolution lays the foundation for success or failure in students' acceptance of evolution. Research by Yasri and Mancy (2016) suggests that students can come to accept evolution with increased understanding of the evidence for evolution. In addition, changes occurred in students' acceptance when they were provided a framework for understanding religious beliefs and scientific theory in distinct contexts (Yasri & Mancy, 2016).

More research is necessary to answer questions about why teachers devote so little time to evolution instruction and what can be done to increase focus on this vital topic. Science teacher preparation programs can play a critical role in emphasizing evolution instruction in schools. Science teacher education programs should consider the legal, ethical, and scientific imperative of teaching evolution. Sadly, we must admit that we have emphasized the importance of

evolution education for decades, but data have not shown a decline in the popularity of creationist views in society. The scientific evidence supporting evolution is no longer in dispute, and the court cases recognize that evolution is a necessary component of quality scientific instruction.

It seems that one way to enhance evolution education is to assist teachers in moving beyond their comfort zones. This is easy to suggest but hard to accomplish because the impediments may be highly individualized. For some, this movement could require learning more about evolution by taking a class, reading a textbook, or reaching out to more knowledgeable colleagues. This could mean broaching a topic with students despite reservations about potential reactions from a community not accepting of evolution. This could even mean remaining open to the idea of evolution, particularly for the 13 percent of biology teachers who see creationism as a viable alternative.

Biology teachers are on the frontline of the battle for evolution education. A useful first step is to understand the religious background of the community where you teach. This means understanding the religious practices of your school and potentially meeting with religious leaders in the community. There are two benefits to such an action: doing this will help you understand the perspectives of local religious leaders, while communicating to those same leaders your perspective. This is good practice even beyond evolution instruction. If the topic may be controversial in your schools, consider offering to testify at a school board meeting or writing a letter to the editor of your local newspaper. Some excellent suggestions for taking such action can be found on the National Center for Science Education website (<http://ncse.com>) under the *Taking Action* tab on the home page.

Biology teachers should consider how they introduce evolution to students. Perhaps start by defining science, philosophy, and religion as distinct ways of learning about the world. Southerland and Scharmann (2013) provide an excellent overview with respect to religious questions, aesthetic questions, and scientific questions (among others), as well as offering additional resources for introducing evolution. This practice has relevance for any topics that are politically charged, such as the human influence on climate change.

The proponents of intelligent design and creation science often come to an evolutionary discussion prepared to debate the supposed critiques of evolution. Biology teachers should be well versed in the misconceptions and barriers that impede student understanding of evolution. It is critical to develop a toolbox of pedagogical strategies useful for overcoming them. A detailed listing of conceptual understandings regarding evolution, with respect to specific grade levels, is available at the Understanding Evolution website <http://evolution.berkeley.edu/evolibrary/teach/framework.php>. This framework has been aligned with the Next Generation Science Standards and is divided into five strands: History of life, Evidence of evolution, Mechanisms of evolution, Nature of science, and Studying evolution. A strong conceptual understanding will allow teachers to “stick to the facts,” and framing the lesson as one strictly about science will allow teachers to talk about how evolution answers specifically scientific questions.

Finally, it is worthwhile to understand the talking points that are promoted by supporters of intelligent design or creationism, as these are frequently brought up in the science classroom. One excellent resource is *Evolution vs. Creationism: An Introduction* (Scott, 2009).

The book contains writings from creationists with explanatory context and useful rebuttals. A teacher familiar with the objections to evolution is much more likely to be able to sidestep attempts by students to draw the class into a discussion of religious ideas and to focus on the science.

Note

1. Evolution is a change in gene frequency in a population over time. Natural selection is one, but not the only, process by which certain alleles are “chosen.” For instance, sexual and artificial selection are two additional types of selection.

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